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THE BUILDING NEWS

AND ENGINEERING JOURNAL.

THE ENVIRONMENT OF BUILDINGS.

FOREIGNERS and colonial visitors who have helped to swell the crowd in the Metropolis during the late Jubilee festivities will carry back with them rather "mixed" and vivid impressions. Our buildings, streets, squares, and parks will no doubt have impressed them favourably, as seen under a veil of festal green and Venetian masts; but immediately outside the favoured streets many dismal rows of houses must have met their gaze. So much squalor and poverty, and so much gaiety and wealth, could hardly be matched anywhere else. More startling contrasts between the poor and the rich parts of the Metropolis could anywhere be equalled than those which present themselves to the visitor of the East and West. But there have been extenuating circumstances which have to a certain extent lessened the painful discrepancy between the wealthier and the poorer neighbourhoods. Sanitary progress and improved buildings have materially helped to soften down the disparities. Half a century has made a vast difference in this respect. When the century was in its teens the stranger might have gone from one end of the Metropolis to the other and have found a far more astounding difference between East and West than he would now. The change was greater, and more felt; there were no compensatory elements like baths and washhouses, public free libraries, hospitals and convalescent homes, technical institutes and museums, which now, through Governmental and private munificence, adorn the East-end as much as they do the West. The very presence of these buildings, often of architectural character, tends to soften the asperities of the locality, and to relieve the dull monotony of the streets. Narrow streets, passages, and courts, squalid and exhaling foul smells, have given place to wider thoroughfares and sanitary pavements. All these have been distinct gains to health and salubrity. Yet there is something more, which the foreign critic will find absent, and which sanitary improvements and building regulations have not supplied. He will miss the sense of art. What has been gained in material comfort is lost in qualities which appeal to the eye and the heart. The great model block of flats for the working classes has something forbidding and gloomy about it—a huge collection of tenements piled up one on another without character or variety; the paved new street of houses or tenements without breathing room at the back and perhaps close up to the street, is monotonous with its stereotyped house-fronts, as if the life and habits of the occupants were all cast in the same mould. The new streets are laid out on straight lines to save every inch of ground, as if the first aim had been to squeeze in as many houses as possible for ground-rent. The great advertising mania so characteristic of the age cannot fail to arrest the eye of the foreigner wherever he goes. Our finest shop façades and offices covered with huge letters or posters—even chimney stacks and roofs utilised; our railway viaducts disfigured by placards. These and other modern things, like overhead wires, impart a commercial stamp to our streets and buildings. There is something in all these modern appliances which weary and disappoint the observer. They disgust the artist, not because they are useful and necessary, but because they shock the taste and are put up without any regard to architecture and the sense of propriety, right across façades, spoiling some feature with lines of wires, as a chimney or a roof. They are offensive against good taste, and all sense of proportion is lost between the utilitarian and the artistic. Can anything be more incongruous than the proximity of gasworks and ugly gas-holders to a neighbourhood of houses, anything more deplorable than the juxtaposition of prodigious blocks of dwellings with low buildings, or hideous railway structures spoiling the best approaches to a suburban, such as we see everywhere in London. No wonder all our best architecture is spoilt by utilitarian structures which are allowed to thrust themselves into notice.

The West-end is no less full of these monstrosities than the East-end. Knightsbridge itself has been spoiled by the erection of monster blocks of mansions and barracks, and the vicinity of the Imperial Institute and Kensington Gore is ruined by the erection of blocks of considerable height and of intensely ugly profiles. A few years ago this site—the Royal Horticultural Gardens—rendered famous for its series of now historic exhibitions, beginning with the "Fisheries," and ending with the "Colonial," was a charming open spot in the midst of palatial street residences, covered with grass, and adorned by valuable trees and shrubs: now it is a wilderness of bricks and mortar between the Natural History Museum and the Albert Hall. Even the Imperial Institute, both in front and rear, has been spoiled by the nearness of unsightly brick buildings. Here we had an exceptionally fine position marked out by two important buildings, one in Kensington Gore, and the other in Cromwell-road, close to Hyde Park and the South Kensington Museum, bounded on the west by Queen's Gate, and on the east by Exhibition-road. In a few years the site is so hemmed in by lofty buildings which have been planned without any reference to the general surroundings, that the visitor will look in vain for any of that skill in artistic disposition of great edifices which marks the plans of most Continental cities. What have we to compare, for instance, to the Arc de Triomphe, or Place de la Concorde, Paris, or that of the République, with their wide roadways and pavements, statuary and adornments, or lines of trees? Paris, with its labyrinth of dark, Mediæval streets has been transformed into broad, spacious thoroughfares adorned by architectural and sculptural features and planting. The "Commission des Artistes" was appointed after the Revolution of 1848, and the work of remodelling Paris has proceeded ever since. New streets were driven through densely-populated districts; but these have been undertaken and finished according to the plan of the commission made fifty years ago. The Loi d'Alignement gave the municipal authorities power to create a servitude on land bordering on public thoroughfares, or those in advance of the line of frontage laid down. By this means the erection of new buildings has been made to fall into line, and the rectification of the lines of old streets has been brought about. Our course is different. Plans are proposed and set aside, or a remodelling is begun, to be curtailed at the next election of the local authority; so we get a piecemeal arrangement, worse in some cases than the previous state. Mr. Hamerton writes, in his "Old and Modern Paris": "An Englishman who finds himself in some great Parisian street of our own time, such as the Boulevard Haussmann or Boulevard Malesherbes, has nothing to do but confess that here indeed is the ideal street, and that his own Shaftesbury-avenue, Bond-street, or Oxford-street are not yet the ideal." And he points out that a street ought to be of the same width throughout, with seats for foot passengers on the causeway. Look at the boulevards, for example, which converge on the Arc de Triomphe, twelve altogether, some of them 300ft. wide and over 1,000 yards in length, with clear views of a mile in length.

Again, Vienna has been remodelled on similar lines; a wide boulevard or "ring" has been formed round the city, in which many stately open spaces have been planted, like the Ring Strasse, and this surrounding thoroughfare is connected to the broad quay of the Danube Canal. We could give other examples. It is not unlikely that our visitors will compare mentally these and our own shortcomings, the random piecemeal arrangements of our streets and main centres of traffic with such a great focus of thoroughfares as that of the Arc de Triomphe, our squares with that of the Place de la Concorde.

Such a centre as that of Oxford-circus or Piccadilly-circus will raise expectations; the eye looks for some order, symmetry, and design, and finds none. Natural features or statuary are absent altogether, and there are few seats for weary pedestrians, while the examples of fountains and statues we possess may well create in the minds of our visitors "odious comparisons." Where nature or art could have been utilised or turned to account, the commercial speculator seems to have had all his own way.

Two important principles have been lost sight of in the remodelling of the Metropolis. One is the isolation or emphasis of our great buildings. The authorities of the French capital take care to isolate their chief edifices, their churches and palaces, making them the attractive features, as anyone may see who looks at a map of the city. Except in the two cases of churches in the Strand, which are isolated, the rule seems to be to block out our finest buildings, exposing them only on one or two sides. We thus lose them as great features. Is not the Law Courts spoiled by being practically shut in on two sides, and the Government Offices in Whitehall similarly cramped, being only visible in front and rear? Imagine what these buildings might have been—better architecturally, and certainly more inposing—if they were placed in areas of ground clear all round, and made the centres and main thoroughfares east and west, north and south! Wren proposed such a scheme in his plan of making St. Paul's Cathedral a great centre with radiating streets, while we all know how it is situated. Our foreign visitors, who took part in the imposing function before the west front of the cathedral the other day must have been disappointed at the contracted area in front of our great City basilica, and how little of the proportions of Wren's noble fane could be seen from the adjacent side street. The great City centre at the end of Cheapside is another instance of partial isolation. The Royal Exchange is at least a stately structure, which faces the spectator as he proceeds eastwards and divides two main arteries of traffic. Here we have an instance of an isolated building. The Bank is also surrounded by streets; but the whole area might have been made imposing if these edifices had been placed symmetrically in a great square, by which the wedge-shape of the Exchange might have been avoided. If Fleet-street had been in a line with Cheapside, what a grand effect St. Paul's and these buildings might have produced! The second principle is the importance of natural features in the environment of our great buildings. How few of our parks and gardens are made to border our thoroughfares or to play a part in their design. Green Park certainly skirts Piccadilly from Hyde Park Corner for some distance, and Hyde Park is partially bordered by two thoroughfares, Knightsbridge and Uxbridge-road; but how little they are made to contribute to the effect! A row of old houses and a large block of cavalry barracks shut off the view of the park from the former. The scene-painter idea emulated by our French neighbours would have probably suggested Hyde Park as a noble part of the thoroughfares on either side of it; the fine trees, and the Serpentine itself would have been brought into the vista, just as the Parisians have opened up their town parks, like the Parc Monceaux, or the Champs Elysées, by boulevards, which pass through their most beautiful parts. Our greatest modern thoroughfare is the Thames Embankment, where the reclaimed land of the old wharves, now a fringe of gardens from Westminster to Waterloo Bridge, borders the road and combines with the river itself in giving dignity to the roadway. Some of our most successful modern buildings have been erected along the river from Westminster to Blackfriars, though there are no evidences of any attempt to unite the architecture with the roadway or its scenery. Even at the bridges the arrangement of buildings at the approaches has been left to chance. The most diversified character and irregular skyline prevails. What might have been is almost a vain regret in an age of commercial expediency, with frontages and building areas of fabulous value. Still, something can be done if we had the mind and heart to do it. We have still men like Perrault, Vanbrugh, and Uvedale Price who can conceive schemes in which scenery and architecture can be united; but our municipal authorities lack the courage, and content themselves with piecemeal improvements in which ground landlords, lessors, and surveyors are most concerned.

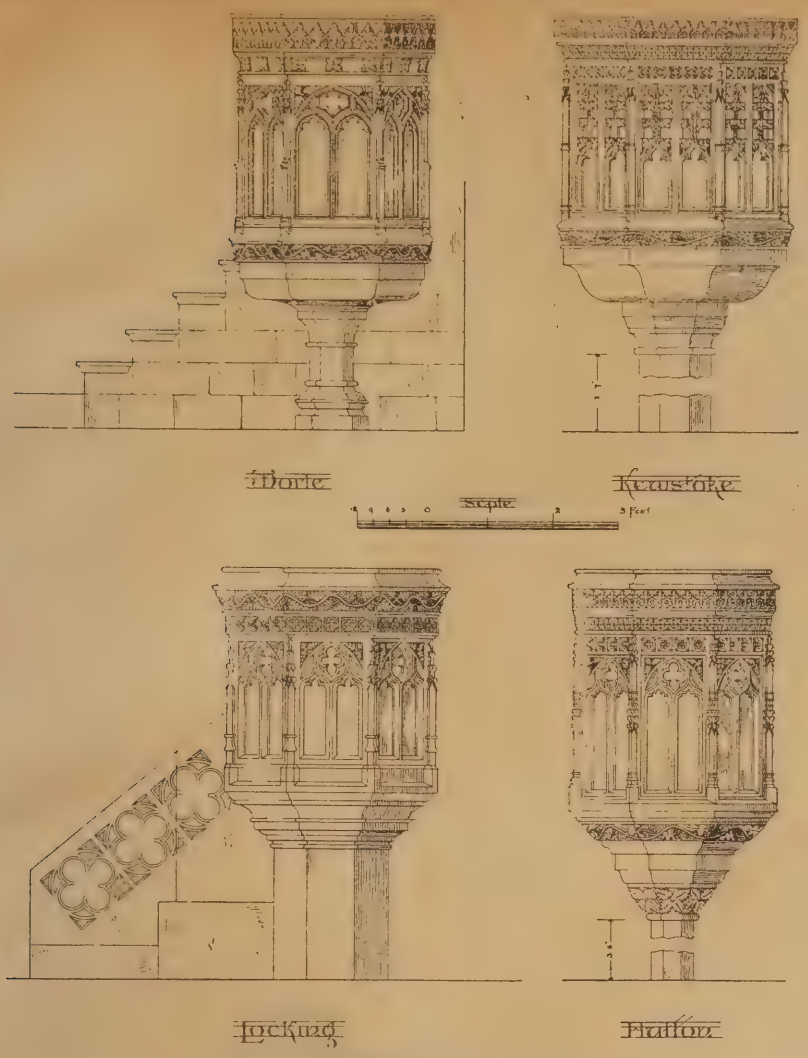
ROUGH AND RAPID BUILDING.

A CASE tried in the Newcastle-on-Tyne County Court ought to convince people of the great risks incurred in rapid building. The widow of a working man sued a builder on behalf of herself and children for damages sustained through the death of her husband, who died from the collapse of a house at Sandgate, Newcastle, in March last. The jury had to inquire into the cause of the fall. The defendant was both the owner and builder, engaged in pulling down when the accident occurred, which resulted in the death or Brogden and four other men, and injury to others. As we reported the case, it is needless to explain all the circumstances. The plans deposited by the builder with the corporation did not disclose the whole of the work contemplated, and notice of intention to commence the work was not given, as it should have been. It was contended that if the officials of the corporation had had the opportunity of seeing the work as it was being carried out, the workmen engaged would have had the benefit of their supervision, and their lives might have been saved. Great hurry was used in taking the building down, and a number of men were employed. Were reasonable precautions taken? The evidence given showed that the house was in a very dilapidated state, the mortar had lost all its properties of adhesiveness, the timber was rotten, there were no ties or bands, and yet in this condition a chimney-breast was removed, and the back wall cut into and a girder inserted, while the shores were taken out too soon. Other evidence was to the contrary effect, but verdict was returned for plaintiff—damages £225.

This is another instance where the desire to expedite the work has resulted in a catastrophe. It has lessons of deep import to all owners and builders who are engaged in altering and pulling down old buildings. There is the desire to "rush" the work, and, as in this case, more hands are engaged than is either necessary or desirable. Pulling down old walls of doubtful brickwork is not a work that should be done without consideration and judgment. Every part that looks weak or uncertain in its support ought to be shored, and no essential part of a structure like that of a chimney breast should be taken down till the last thing, and not before the building has been securely shored up. From what we can gather from the fragmentary evidence given, the building was poorly built, the mortar had lost it nature, and the timber ties were brittle; careful inspection of the ties or bond were not made, and the walls were not sufficient to carry any weight. Notwithstanding which, the old walls were cut into, and a girder inserted, and the support of a chimney-breast removed without proper temporary supports. A number of men had been employed—about 19—their combined work and action tending to shake the loose and incoherent walls. The shores were taken away before the girder and joists were fixed or the mortar had set. The girder was put in an old and not sound wall instead of being carried by brick piers. All this is typical of a good many alterations of old buildings. No examination is made of the old walls and their nature and bond, whether the mortar is rotten, if the chimney-jambs are properly bonded to the party-wall, or whether it is safe to cut into a wall to rest a girder on. The work has to be done quickly, and there is a penalty for non-completion by a certain time. In many town buildings that have to be altered, other inducements to hurry the work are apparent. The builder is required by the by-laws to give 48 hours' notice to the authorities, as in the case we have mentioned, before the work is actually commenced, which notice enables the officials of the council to make an inspection, and supervise the work as it proceeds. An artful builder tries to get over this official inspection by commencing his work as soon as possible after the plans are passed. The sooner he begins to pull down or commence the new building, the better it is for him. He naturally does not desire the work to be examined. We have seen premises hoarded round and pulled down in an exceedingly short space of time. In these operations the architect takes not much interest as a rule, his principal care is with the new work, and he is often contented to leave the pulling down and shoring to the contractor. Yet there is often more skill necessary in dealing with the old work, in directing where shores are to be placed, what walls are to be taken down, and in supervising the cutting of openings and the insertion of beams.

There are certain legal points in the case. One of them is, Whether it is possible to use reasonable care if the work is done in a hurry, as when overtime is made? As the judge said, the question for the jury was, Did the "defendant do what a reasonable man would have done under the circumstances"? The liability of the builder in the case of accident is a serious one that ought to make contractors more than ordinarily careful in their work. Building workmen are very apt to dispense with the usual supports like shores as soon as possible. They impede their operations, and they are not sufficiently conversant with structural matters. If they can save their labour in any operation like cutting away a foundation or any piece of masonry, they seldom think of the consequences that might ensue. They are prone to take advantage of the natural cohesiveness of the materials they work in, quite unmindful of the effect of thrust or the imperfect bond and bad mortar of the wall. Rough and rapid building can only be practised at the great risk and responsibility of the builder. Hurried building is generally a blind to cover rough workmanship, and it is one of the subterfuges resorted to by a certain class of contractors which calls for the architect's closest attention.

The district surveyor knows how alert he has to be when Mr. Scamper is putting up a row of houses—how quick he has to be in preventing a lot of old mortar being sifted for lime, or a lot of loam and unclean sand being used in the mortar. He has to be pretty quick, too, if he wishes to condemn cartloads of inferior bricks, or to see that the walls are not built with bats. Commercial enterprise has encouraged rapid building. A large bank or insurance office, a shop or a restaurant, must be rapidly finished for business, and the contractor knows too well how he can turn this circumstance to his personal advantage. In all contracts the quicker the building or other work is completed the better, and this hurry in execution leads to many of the evils we have been considering, and roughness of execution and risk are two of the most important.



FOUR SOMERSETSHIRE PULPITS.

SOMERSETSHIRE PULPITS.

THE accompanying measured drawings of pulpits are taken from four villages lying within a couple of miles radius of Weston-super-Mare, and exhibit the characteristic Perpendicular work for which the county of Somerset is so justly famed. Those at Kewstoke, Hutton, and Locking are octagonal, that at Worle being hexagonal. E. G. RODWAY.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE sixteenth general meeting of the Institute was held on Monday night, when the Gold Medal was presented by the President to Dr. Cuypers, H.C.M. The attendance was large.

The PRESIDENT, in his opening address, after some general remarks about the works of Nature, the Pyramids, the Acropolis, &c., said: "I have now to introduce to you the distinguished Dutch architect, Dr. Cuypers, on whom you are about to bestow the Gold Medal. It is usual to give a slight sketch of the life and works of the Gold Medallist, in the interest of those who cannot be here; and many of those who would be here to-night are in the uppermost parts of the earth. So I must ask Dr. Cuypers to bear with me a little longer. I can hardly think of Holland as a foreign country, so intimate has been the relation between it and England, so warm is still our sympathy with its soul-stirring efforts in the cause of freedom; and did not Holland give us one of our revered kings, William of Orange, and many of our celebrated families? Most of us when at school translated Grotius and the dialogues of Erasmus, that friend of Sir Thomas More, whom he called "his darling." Who does not love the Dutch school of painting, and feel at home with its creations? Who has not been enchanted by the power of Rembrandt and the vigour of Frank Hals, with the crystal purity of the colour of Peter de Hooge, with the woods of Hobbema, the rushing waters of Ruysdael, and the beautiful architectural works of Van der Heyden? Who has not been fascinated by the dignity of those warriors and statesmen, and by the grace and loveliness of those high-born ladies that live for us again in the pencil of Van Dyck? Who has not in imagination shared in the hardships and rejoicings of such discoverers as Van Diemen and Tasman? Dr. Cuypers finishes a long line of distinguished Dutch architects to whom we owe the admired Mediæval churches, mansions, and town halls, and the wondrous cathedral of Antwerp, through Renaissance days when Van Santen, under the Italian name of Vasanzio, designed the Villa Borghese and the portal of the Vatican for Pope Paul V., when Floris, Philip Vingboons, Van Campen, and Post enriched their native country with their works, all of which have been preserved for us in the publication of Mr. Ysendyck. It is not usual to give the age of our Gold Medallist; but on this occasion the arrival of Dr. Cuypers' seventieth birthday this year has been the cause of almost national rejoicings in Holland; this points to something in his personality and career that has touched the hearts of his compatriots in a way that no mere quantity or excellence of his works could insure. Dr. Petrus Josephus Hubertus Cuypers was born on May 16, 1827, at Roermond. In his nineteenth year he became a student at the Antwerp Academy, and got the prize for excellence, and the gold medal for architecture in 1849. He began his practical career by the restoration of the Minster of Our Lady in his native town, and built his first church in 1853. In 1864 he was awarded a crown for the William I. Museum, and up to 1894 he had built a cathedral and sixty-one churches and chapels in various parts of Holland and Belgium; he had restored 57 ecclesiastical buildings, mostly cathedrals and churches, and built museums, railway stations, mansions, villas, and private houses, besides his great work of the Royal Museum at Amsterdam, some 45ft. long and 280ft. deep, with a central hall some 70ft. wide and 260ft. long; the whole building comprising two quadrangles 130ft. long and 100ft. wide; it is built of brick, with stone window-jambs and mullions and bands. The style adopted is Late Gothic, just feeling the first breath of the Renaissance, in which cusps have been abandoned. This, however, is by no means all we have to be thankful for, as he started schools all over Holland, where the innumerable handicraftsmen who carry out architecture were taught the elements of design belonging to their craft. His motto is, 'I believe, I love, I hope,' and he says, 'The love which binds together my beliefs and my hopes makes up my life.' In his own house he has inscribed an apothegm of architectural wisdom: 'Study the old, in order to win strength and support to design the new.' It is clear that any architect who had carried out such an enormous mass of work must have been guided by fixed principles systematically employed; and when no detail has been allowed to pass without his own supervision, and is mostly from his own hand, it is obvious that his industry must be equal to his genius. Sir, you are said by your contemporaries to be the one man in Holland who has done more than any other to point the way to higher things, and to follow out his own teaching. I gather from the admiration you excite in Holland that your character is as much revered and loved as your genius is admired, for without the existence of peculiarly admirable qualities we cannot believe that you would have so endeared yourself to your countrymen, for you have falsified the poet's saying that—

> He who surpasses or subdues mankind,
> Must look down on the hate of those below.

I now beg, in the name of the Royal Institute of British Architects, to invest you with Her Majesty the Queen's Gold Medal, and to enrol you amongst that company of Gold Medallists that sheds such lustre on our Institute and on our country, and to hope, both on behalf of the Institute and myself, that you may live long to enjoy the honours you have so well merited, and the love that you have called forth, and to add to the number of those works with which you have already so largely adorned your native land."

Dr. Cuypers read his reply in French. The following is a translation:—"Mr. President,—Allow me to express myself in another language than in your national tongue, which I deeply appreciate and revere, but would fear to profane by speaking imperfectly before this august assembly. My own Dutch speech, although it partly has a common base with yours, in that old Saxon which, had it not been for Charlemagne, would have become the universal Germanic or Teutonic language, is familiar to only a minority of the inhabitants of Great Britain, and would not suffice to render me intelligible in this chamber. I have recourse to the French language, which has numerous relations with yours—witness the denominations of the provinces of Normandy and Brittany in France—and like English, but in a less degree, is heard in the most distant countries of the terrestrial globe, everywhere that civilisation and liberty have established their glorious reign. I feel, Mr. President, that I must, before and above all, express to you my sincere thanks for the words, too kindly and too flattering, which you have been good enough to address to me. If it is true that all approbation of our work flatters our pride, what satisfaction must we not feel when this approbation comes from those of our colleagues for whom we have reserved a place of honour in our esteem and our veneration. Yes, at this hour I dare publicly and solemnly say that, if I have had any success in my career as an architect, the example which has been given me by my colleagues in Great Britain has greatly contributed to it. When I visited England for the first time, so as to study the great monuments of our neighbours, it was not only the ancient and majestic cathedrals, the characteristic churches of little towns and villages, the splendid colleges, and other monuments of bygone ages, which delighted and deeply impressed me, but, above all things, the wise lessons which my honoured colleagues Pugin, Scott, Street, Burges, Clutton, and so many others—only to speak of those who have gone before us into eternity—had drawn from the work of the great architects of the Middle Ages and of antiquity. It was here that I saw applied, with that correct, sober taste which characterises your glorious nation, the pure, true, and unchangeable principles of our art, which must be true, utilitarian, and practical, and at the same time not offend against those elusive canons of Beauty wherewith God has endowed us, to be the

immutable appanage of those who cultivate the arts. It was particularly in your country, my dear colleagues, that I learned to estimate at its just value the charm which proceeds from correct and persevering application of the difference between materials, as much with respect to their properties, nature, and qualities, as with respect to their colour and other æsthetic features. It was here that I learned to appreciate the great advantages that result from the survival of the old co-operative guilds of arts and crafts, by which you have been able to maintain for the execution of your works practical and capable craftsmen, worthy of the share in the work that is entrusted to them. It was in your country more than anywhere else that I noted and admired the happy application of the good principles of the past to the needs of modern society in all the works of your great masters. If, on the one hand, your fair and interesting land attracted me, with its rich monuments and its great analytical architecture, on the other the welcome given me by my dear colleagues, from my very first visit, was such that I was able to profit by all the advantages that friendship and urbanity can offer. If the old masters were there to instruct me and to stimulate my ambition by the contemplation and the study of the masterpieces of great periods, the living masters, their worthy rivals, gave me their aid in procuring me access to, and serving as my guides in, all hidden nooks of interest, in all celebrated museums, in the innermost of all sanctuaries of art. It was in 1866 that I had the honour of being elected Honorary Corresponding Member of the Royal Institute of British Architects—a title which is held in high esteem abroad, and in itself gives a certain influence and position to any architect. And who will be astonished if it is known that this noble Royal Institute is the great school in which has been, and is still being, formed all that England can produce of that which is glorious and illustrious in architecture? The preservation and the restoration of the historic monuments of your ancestors, the imitation of ancient models, the assimilation therewith of new buildings, the formation of a legion of artists fighting, without ever losing ground, against those errors of every kind with which the depraved taste of certain periods threatened the sanctuary of art—these are the first-fruits of this glorious institution. Another great service rendered by you to the whole artistic world is to be found in the important travels that you have undertaken so as to study the monuments of the most distant countries, without regard to the manifold sacrifices that such enterprises inevitably entail. The remarkable publications in which are printed the results of these artistic peregrinations are, and will remain, a splendid memorial of your Royal Institute. If on this day I have thought it behoved me to pay homage to the Institute for the great services which it has rendered to the artistic world in general, I will beg you to believe me, my honoured colleagues, when I add that I feel doubly happy in being able to express to you my keen appreciation of the distinguished honour with which you have gratified me. I venture to request the honourable President to be kind enough to act as interpreter for his foreign colleague before Her Majesty the Queen of England, in order to express to her my deep gratitude for the fact that she has deigned to confirm the choice of the Institute by honouring me with the Gold Medal in the very year when so many millions of faithful subjects are blessing Heaven for having given them as a Sovereign the most accomplished woman who has ever worn a crown."

Photographs of Dr. Cuypers' chief buildings were shown on the walls, and portfolios of his drawings were exhibited on the table.

THE LONDON COUNTY COUNCIL AND THE WORKS DEPARTMENT.

AT the meeting of the London County Council on Monday, discussion was resumed on the report of the Special Committee on the Works Department. The committee recommended: "That a Works Board be substituted for the Works Committee, such board to be elected forthwith, one member to be nominated by and from each of the following committees: Finance, Asylums, Bridges, Fire Brigade, Highways, Improvements, Main Drainage, Parks, and Housing of the Working Classes; and that in future years the election of members of the Board do take place at the meeting of these committees next to the 31st March."

In the absence of Lord Onslow, Mr. Porter moved, "That, as the Council is divided in opinion on the question as to the permanent maintenance of the Works Department, it is inexpedient to discuss the question of substituting a Works Board for the Works Committee; and that it be referred to the General Purposes Committee to consider and report, in conjunction with the principal officers concerned, on the steps which should be taken with a view to carrying on the business of the Works Department with as little loss as possible to the ratepayers until after the election of the new Council." He declared that he was animated by no opposition to the Works Department. The question was, Should the Works Department be rehabilitated and put upon a permanent basis in the form of a Works Board controlling? Next March there must be a new Council, and the wisest course was to preserve the thing as it stood at present until the electors had an opportunity of pronouncing judgment. He had no confidence in mere change of name from that of a "Works Committee" to a "Works Board." They were not justified in putting an end to the Department, nor were they justified in putting the Department on a permanent basis for the same reason. The course recommended by the amendment was a prudent course under the circumstances.

Mr. Campbell seconded the amendment, and contended that the labour policy of the Council was a mistake.

Sir A. Arnold said he had not abandoned hope that there might be some basis of agreement. The Works Committee was just as much divided against itself as it was when eminent members of it gave evidence before the Special Committee. It was necessary that the matter should be dealt with at once. He himself would be willing to accept the amendment to be moved by Mr. White. He made the proposal because he felt the Department would not work with any success unless there were a united council. He hoped that Mr. Porter's amendment would be withdrawn.

Sir J. Blundell Maple said the Moderate party had done their best to make the Works Department a success, but it would not pay.

After further discussion, the amendment was lost.

Mr. E. White moved as a further amendment, "That all works ordered by the Council to be carried out without the intervention of a contractor shall in future be carried out by the manager of the Works Department, who shall be responsible to the Spending Committee in the same way that a contractor would be; and that the Finance Committee shall have control of the finances of the Department." He contended that the Moderates had striven to the best of their powers for the success of the Works Department, but they had been treated with hostility by the Labour members. They were trying to put the Committee on a sound footing. The work should be put in the hands of a man who knew something about the intricacies of the contractor's business.

The amendment was seconded by Mr. Antrobus, and carried, after a lengthy discussion.

The other recommendations of the Committee were adopted, with amendments, consequent upon the adoption of Mr. White's amendment.

ERECTING BALTIMORE COURT HOUSE.*

THE Baltimore Court-house is a large, tall, steel and stone building 313ft. by 191ft. in extreme dimensions, that occupies an entire square between Lexington and Washington and Liberty and Calvert streets, Baltimore, Md. Its construction involved such a large amount of high and heavy hoisting and rapid handling of beams and columns, masonry and materials, and the magnitude and duration of the work were such that the contract prices and requirements justified the design, manufacture, and installation of a special power and hoisting plant and a system of work and apparatus adapted to the long and important service for the entire continuous construction of the building entire. The complete erection was awarded in a single contract. These conditions justified an unusual expenditure for plant, and it was determined to provide derricks that should command every part of the building and handle any amount of material, including the heaviest possible loads, at a rapid speed and each unit independently of any other while operated from a single central power station on the site.

It was decided to adopt a system of long-boom derricks of adjustable heights, operated by independent special hoisting engines coupled on to line shafts driven by two engines on opposite sides of the building that received steam from a single battery of boilers. Competitive designs for the details and arrangement of such apparatus were received and the system shown herewith was accepted from a number presented that included several alternate arrangements and modifications from the successful bidders. The result of the study and comparison of methods was the adoption and development of a series of six tall, square towers, 16ft. by 16ft. by 170ft. high, set near the corners and in the middle of the long sides of a rectangle 100ft. by 250ft. concentric with, parallel and similar to the building lines. Each tower had two trussed booms from 60ft. to 70ft. long that overhang the curb so as to unload waggons in the street at twelve different places at once if necessary, and transfer their burdens from one to another or deposit them at any given points within the building walls. All these derricks are raised and lowered, hoisted and swung by one operator on an elevated platform in each tower, who controls the engines on the ground below by hand levers and pedals. This system, therefore, provides for the simultaneous hoisting and transfer over any part of an area 250ft. by 360ft. of twelve separate loads (aggregating 80,000lb.) at a speed of over 50ft. a minute by a force of 15 men, allowing two men on each tower platform and two on the ground to attend the engines, besides one fireman. One man can, however, frequently operate both booms in the same tower.

Fig. 1 is a plan showing the outlines of the lot and building, the location of the towers, &c., the position of the central power plant, location of driving-engines E E, alignment of shafts, and the system of adjustable steel wire cable guys G G, &c., by which the tops of the towers were secured and strains distributed from one to another and transmitted both through their braced sides into the ground and through the four 1in. main corner guys C C, &c., to heavy oak piles driven 15ft. deep into the ground.

Fig. 2 is an elevation of part of the lower portion of one of the towers. These towers were built in two sections, the first ones being about 70ft. high above the surface of the ground, and having the booms connected at an elevation of about 30ft., as shown, where it was operated to set all the material up to the third story, after which the tower was extended 70ft. higher and the boom raised 40ft., and used to complete the hoisting for the upper stories.

The towers were 16ft. square, with 12in. by 12in. corner posts, in 20ft. lengths butt and cover spliced, with 16½in. bolts in each splice. There were 3in. by 10in. horizontal and diagonal braces, spiked on every side. The towers were each set in a pit 18ft. deep and loaded with about 40 tons of ballast on a bottom platform to increase their stability.

Fig. 3 is a general plan of the building showing the positions of the columns which were set by the booms. Immense walls were built inclosing the columns and all around between the n, which are here indicated in general outline.

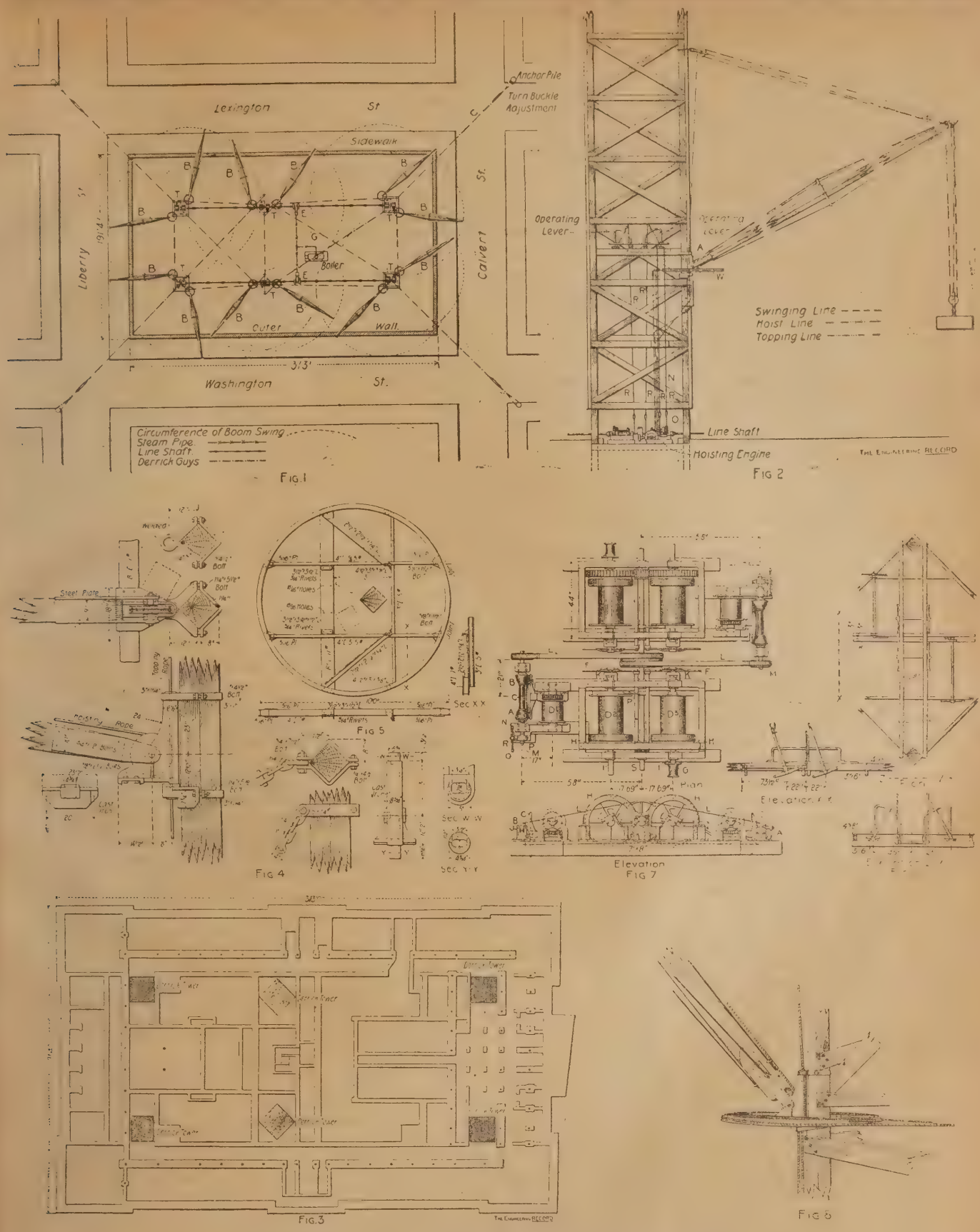
Fig. 4 shows the trimmings and details of connection at A at the foot of the boom.

Fig. 5 shows the construction of the horizontal wheel W, by which the mast and boom were swung by means of rope R^1, Fig. 2.

Fig. 6 is a plan and elevation of the operating platform and levers in the tower from which the hoisting engines are controlled.

Fig. 7 shows the general features and dimensions of the pair of special hoisting engines at each tower. The line shaft S runs continuously and always drives the main gears H H, and secondary shafts I I, that, however, run loose except when engaged by clutches K K, that throw the drums in and make them wind up when moved by the rocker levers F F, and their vertical rods R R, shown in Fig. 2. Pawls P are arranged to stop the drum in case of breakage and the rocker lever F automatically sets the friction brake as fast as it releases the clutch. Drums D2 and D3 operate the hoist and topping lines respectively. Belts L L continuously drive end shafts M M, upon which paper cones, A B, are set, so that when either of them engages coned disc wheel, C, the other has a clearance of ¼in. (not here shown). Pulling rod N (Fig. 2 also) makes the rocker R turn the pinion P through part of a revolution in one direction, and

* From the *Engineering Record*.



ERECTING THE BALTIMORE COUNTY COURT HOUSE.

DE LA VERGNE MACHINE COMPANY, New York City, Designers; Messrs. JOHN GILL AND SONS and D. W. THOMAS, Baltimore, Md., Contractors.

it, engaging the rack attached to shaft M, brings wheel B into contact with disc C, and through it and a worm gear drives D1, so as to swing the boom to the right: pulling rod, O, similarly engages C and A, and operates the drum D1 in the reverse direction, so as to swing the boom to the left; if neither rod N or O is pulled and held, drum D1 will not be driven at all.

All the derricks are operated by the two 50H.P. high speed centre crank steam engines with automatic cut-off and a speed of 275 revolutions per minute. This speed gives a speed of hoisting for each boom of 72ft. or 120ft. per minute, according to whether a five-part or three-part tackle is used. Allowing a loss of 25 per cent. for overcoming friction, &c., it was calculated that both engines could lift 18 tons 72ft. high in one minute when making 275 revolutions, and single loads of from one to three tons could be lifted by three and five-part tackle at the above speeds. At 2·5 revolutions of the main engine, 10⅝ tons could be lifted 52ft. or 87ft. per minute, at 200 revolutions. In practice it was found that one boom on each tower hoisted 6½ tons 52ft. high per minute with ease.

This plant was manufactured and installed for the contractors, John Gill and Sons and D. W. Thomas, Baltimore, Md., by the De la Vergne Machine Company, New York, and to their engineer, Mr. Gus P. Wern, who designed the

hoisting machinery and details of the plant, as well as to Messrs. John Gill and Sons, we are indebted for the data from which this description has been prepared.

Fig. 8 is a view of the mechanism at the foot of the masts to revolve them horizontally.

"BUILDING NEWS" DESIGNING CLUB.

A GROUP OF STABLE BUILDINGS.

"NUT" is placed first, and "Pickles" comes second; the third position is obtained by "Nap." All three designs are picturesque and interesting. The condition issued to the competitors were as follows:—"A group of stable buildings suitable for erection in connection with a gentleman's moderately-sized country house. The accommodation to comprise six stalls and two loose boxes (the latter may be located in an adjacent building to the stall stable), a washing place, harness-room, and a coachhouse for four vehicles. A groom's bedroom must be provided on the first floor, and a loft for provender. A corn-shoot desirable. The carriage-washing space to be outside in front of the coachhouse. Adjoining, and planned to group well with the stables, a cow-byre for five cows is to be provided, with a covered yard, a mixing-room, and a calf-box large enough to be divided into two. A small dairy and churn-room may form part of the buildings, and a hen-house; two earth-closets, one for use near the dairy. Scale 8ft. to inch for elevations. Plans may be smaller. Two elevations, one section, and plans with view. Materials, brick and tiles." "Nut" sends a pretty sheet of drawings illustrating an unpretentious group of buildings which would look at home by the country-side almost anywhere, and his plan has several advantages, one of which is its compactness, and another is its suitability. The arrangements readily explain themselves, and although in items of detail we are aware that modifications may be pointed out as desirable, "Nut" well deserves the first place. The turret shown in the front elevation is left out in the view, an omission with which we agree rather, though it is not fair to do so while the turret is left in on the elevation, where it does not look badly. As a matter of fact, it would come better on the ridge if shifted to where the gable of the loft runs back into the main roof. The adjoining chimney is pimpingly small. Our old Mediæval builders realised the value of a long unbroken ridge line, and if it curved about a bit so much the better; but when they did put a chimney there was no mistake about its importance and scale. "Pickles" makes more of his stable-yard, but we do not like his design so well, and in a way it is not so pleasingly unambitious as "Nut's." The arch, in a skimpingly thin, rough-cast plastered wall, is not a happy one, and the reveals being so shallow, the effect would be poor and thin, and thereby this objection is increased. In old English stuccoed and whitewashed cottages the walls were mostly built of local rubble, used necessarily very substantially, and thus the charm of simplicity and solid breadth insured their distinguishing characteristics. In modern everyday building we are well aware how difficult it is to obtain a kindred spirit, like that associated with ancient vernacular work; but, of course, archæology is not architecture — a mistake often made by those who affect a crude queerness. Successful contemporary work becomes so when the requirements and conveniences of present-day conditions are suitably recognised and artistically provided for, a truism which seemingly needs constant reassertion, judging by the major portion of the designs nowadays erected. "Nap," the author of the third design, has merits which we have not overlooked, and although he has provided a more adequate dungpit than "Pickles," he has located it in a needlessly confined position, convenient enough in some respects, but not a nice arrangement at the end of the covered yard. The roof over this covered yard seems to go the wrong way, and if a longitudinal section of it with the adjoining slopes were shown, our point of objection would look very conspicuous. The cross-section given is really rather misleading. One of the best designs submitted is by "Dache." Architecturally, it is very nice indeed; but its author loses marks by ignoring our rules about the size of the paper, by making his drawing much too large. "Pantile" sends a group of farm buildings of no little merit; one advantage of his over "Nap" is that the dairy can be better visited by the lady of the house and her friends. The perspective is nicely drawn, and the whole composition is done without ostentation. The balance of plan has been allowed to govern the arrangements too clearly, and the large yard to the stables is wasteful without being roomy, the solidly built washing space with its big arches obtruding too much and incurring a needless expense. There is no dungpit and no place for one. The maids' E.C. is too much in evidence from the stables. "Tyke" errs, too, in this respect, for though the E.C.'s entrances are well isolated one from the other, the author has placed them back to back in such a way that they could not be used as earth closets at all, and another objection is that the dairymaid's closet entrance would very likely be mistaken for the way into the dairy, a very awkward oversight of "Tyke's." His design is not to be condemned, however, for a seemingly minor point of this kind, but we single it out thus prominently as an index to the style of thoughtlessness which more or less marks other details of his work. For instance, the fowls'-house can only be reached by passing along the feeding-passage of the calves'-house and cow-byre. An outside door for such a place is of the greatest value. "Tyke" has taken pains which we give him credit for, and, architecturally, he is fairly successful. "Agon" fails in this respect, but his plan is more compact; in fact, the stockyard is not spacious enough really, and there is, in general terms, a cramped character about all his arrangements. "Bolebrook" is careful and neat, mindful of ventilators and other contrivances such as hollow walls and the like; he is likely to do better, and will improve if he makes a study of good men's work. "Manxsman" draws freely, and recalls something which we have seen before, but not here improved. The idea of the plan is an inclosed courtyard reached by an archway under a sort of tower. "Mist" wastes no effort after architectural appearance; three gables of the plainest kind break up a long façade, and Boyle's air-pump ventilators are relied on for character in the skyline of the group. The plan is fairly practical, but not strikingly so, and the drawings are poorly executed. "Vlan" is more ambitious, and marks his stables by a square, squat tower, which, however, is not large enough for a provender loft. "Vlan's" south elevation is artistically managed, and we ought to have had a better result as a whole from a student who can imagine so good a portion as this elevation. "St. Leonard" has a good plan, and his elevations, though wanting in spirit, are sensible and practical-looking—qualities of the first consequence; but he fails to interest us sufficiently with his outline diagrams. "Mannikin" sends a toy-like design, wanting in breadth and simplicity. We possibly may vex him by using so strong an expression; but if he be wise he will take the criticism in good part and act upon the hint another time. In detail his plan is not good; but we can quite understand that "Mannikin" has done his best, and therefore is likely to improve. "Look" comes next, with a better plan than elevation. The stock-yard should not be separated from the cow-byre, and the dairy ought not to open out of the stable yard. The dairymaids in this plan must needs go through the stock-yard to reach their earth-closet, which is needlessly close to the churn-room. "Charley's Aunt" does not improve much; but the author continues to contribute energetically, which must benefit him in the end if he studies the published designs. This persistent industry is the distinguishing feature of our Club, which has gone so far to make it an established success for nearly a generation, at any rate. Other journals, at home and abroad, have imitated our Club, but have failed entirely in their endeavours, because those who contributed dropped off and lost heart. Some of the most prominent young architects in this country at the present time were "B.N.D.C." men not many years ago. The two remaining designs for the stables are by "Geisha" and "Nil Desperando."

NOTES FROM EDINBURGH.

THE works of reconstruction and expansion in the city have been going briskly on since the opening of the year. The severely cold weather which had lingered far beyond its usual limits of the month of May into June, and so that the gardens are hardly yet in full leaf, was not accompanied with any protracted snowstorms, and hardly a day has been lost in carrying forward the great amount of work now, and for some time in hand. There has been another rise in wages, and plasterers, before the term, were getting anything they chose to ask.

Great progress has been made with the reconstruction of the North British Railway station and North Bridge. The whole of the arch girders are in position, and, judging from the appearance of the eastern and completed side, the structure has every indication of being as great an improvement as it is conspicuous as a landmark in the architecture of the city. The only thing which strikes the observer as somewhat detracting from the elegance of the design is the unfortunate selection of the freestone in the massive piers, which is far from uniform in colour and texture. The lofty walls, which inclose the property of the company, are much better in this respect.

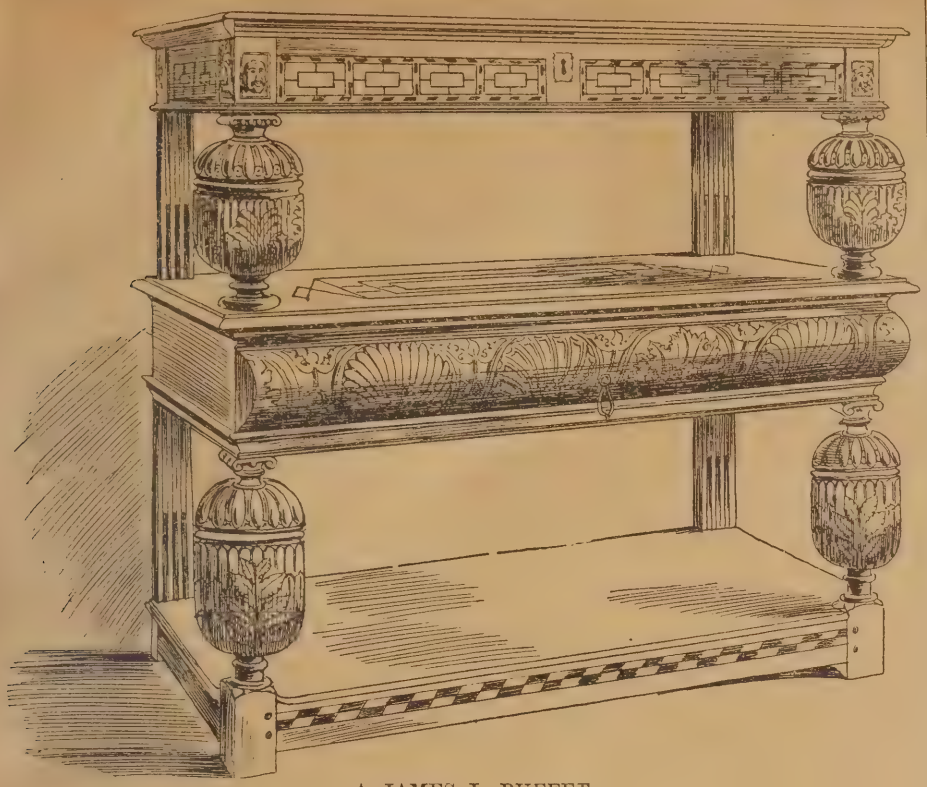
The station proper is still in great confusion. The old roof is nearly all removed, and the platforms most completed. Much has to be done, however, before access to the platform can be made easy for the increase in summer traffic, as old buildings and the scaffolding of the bridge must be removed. The new access, which runs at a somewhat steeper gradient on the north side of the old, is made and sufficiently finished for traffic. It is carried on massive ironwork, with a handsome parapet at the sides constructed to carry the roofing of the sheds at either side. Near the foot the ironwork, which has arcaded panels and pilasters, with the usual Classical details, is continued with a balustrade of Ionic pillars, which, with the substructure, are in stonework. The booking-offices are also finished, though they make no appearance as yet, being covered by the lofty screen, which is itself concealed from view by the present booking-office. This department of the new station, which has been described in the BUILDING NEWS, has a most elegant and comfortable aspect, as contrasted with the unsightly appearance of the same at the Caledonian station. The floor has a pretty pattern of Doulton tiles with the Scotch thistle and crest of the company, and the grilles ironwork protecting the flat glass-work in the ceiling has a fine effect. No expense apparently has been spared to make the entrance attractive to the public—and their convenience also has been carefully studied—who have not, as in most stations, to traverse a great length of platform to find the proper waiting-rooms, &c. Good progress has been made also with the lower floor of the railway-offices, where there is a vast amount of heavy brick and stonework; a good idea of this can now be had from the gardens over the Vegetable Market, where there are always a number of observers inspecting the proceedings of the builders below. The walls are mostly all lined with white glazed bricks, and appear to be excellent samples of brickwork.

The town council have decided to expose the building ground of North Bridge-street in separate lots for the convenience of intending purchasers. It is thought there will be more competition and a better price secured in this way than by putting the whole up to auction for £200,000.

The work of preparing the foundation for the extension of the Municipal offices has been completed, or nearly so.

Some progress has been made in the way of realising the architect's design for the decorative details of the National Portrait Gallery. Four statues, at least, have been commissioned, of Dunbar, Hume, Watt, and Sir Henry Raeburn. The capitals of the pillars of the halls, hitherto blocked out only, are being carved with foliage carving, of the Decorated Gothic style apparently, and a commission has been given to W. Hole, R.S.A., for decoration of the walls of the hall and gallery round it with scenes from Scottish history. The great defect of this and other parts of the interior is the want of light occasioned by the unfortunate adoption of red stone and rather dirty red bricks for the finishing of the walls. Even with a strong south light the staircases are dark; it is proposed to lighten up the hall by removing three small rooms on the north side, which will greatly help to make the interior more lightsome.

The Usher site question has not been heard of since the Lord Provost's committee reported in favour of Charlotte-square, but the Canal site is still under consideration. It is certainly more central, and the hall would be much more conspicuous and better seen there than in Charlotte-square, unless the square were denuded of the garden trees.



A JAMES I. BUFFET.

The Prudential Assurance building at the south-east corner of St. Andrew-square is now completed to the roof; it forms a striking addition, both in respect of altitude and style. It has five floors, with a bold, projected eaves-belt course and two attic floors over it, which happens nearly to coincide with the same feature of the adjoining building. It is throughout constructed of brickwork, with surface-facing of polished freestone and polished Aberdeen granite on the ground floor. The style is a chaste and elegant example of the Queen Anne period, common enough in the pages of the BUILDING NEWS, but unknown as yet in Edinburgh, and presents a very striking contrast to all the other buildings in the square, which there and elsewhere adhere to the old Classical type of design. It is a brick building, executed in stone to all appearance, and the vertical members dominate. The purely decorative details are few, and very judiciously disposed for good effect. The angle is finished with an octagonal tower or turret, which is finished at the top with an ingenious and very elegant arrangement of windows and gables and inclosed spaces for receiving the roof water. The building is in red stone from Dumfriesshire, which rather kills the beauty of the granite. However well the red sandstone looks in itself or in company with other buildings of the same colour, or with green fields and foliage, the streets of Edinburgh, which are all in freestone of different aspect altogether, have not been improved by its introduction. What they would be like if every other building were red may be imagined, but is not likely to be realised.

Great improvements have been recently made in the National Gallery. The injuries sustained by the tunnelling operations of the North British Railway Company have been all repaired, and the interior, as well as the arrangement of the pictures, presents another and much more attractive aspect than hitherto. The floor has been laid with parquetry, with a black-moulded skirting about 2ft. in height, the walls are a deep red, and the rooms have been apportioned to reception of the pictures so as to illustrate the different schools of painting. The walls are not so much crowded as before, some having been placed in the portrait gallery or otherwise disposed of.

The records of the Dean of Guild Court show still a great amount of work, principally new tenements and alterations. The North British Hotel in Princes-street has got a new front, and is being entirely reconstructed. The principal feature of the frontage, which is nearly finished, is two large circular projecting windows, with polished granite pillars. The Scottish Provident Institution, which has a handsome building in the Barry Club style, is taking down the plain tenement beside it to extend its accommodation, and foundations are laid for another large insurance building at the north-east corner of St. Andrew's-square.

A JAMES I. BUFFET.

THIS is noteworthy for its unusual character, there being no attempt to inclose any portion for cupboards. The upper portion, which is shallow, has a lift-up top; and one long drawer, with bold contour richly carved, occupies the central part. The buffet is inlaid in many places in light and dark woods; the middle shelf having a geometrical design in reddish wood. The length is about 4ft., the height being the same, and the width 1ft. 6in. The different character of the big acorn-shaped legs is worth noting. Our sketch was made at Christies'.

COAL AS A SEWAGE PURIFIER.

AT a meeting of the Midland Counties branch of the Municipal and County Engineers' Association, held at Stafford on Saturday last, Dr. G. Reid (the medical officer of health for Staffordshire) read a paper on "Sewage Disposal by Artificial Filtration." In the course of his paper, Dr. Reid called attention to a new filtering medium, which, he said, had lately come into great favour in Staffordshire, and which appeared to excel all other media which had hitherto been tried. In fact, so satisfied was he with the results which had been obtained from this filter, that he felt that the time had arrived when an effort should be made to induce the Local Government Board to reconsider their position, and accept efficient artificial filtration as a satisfactory method of disposal without land in cases where suitable land could not be obtained at a reasonable cost. He was no advocate of artificial filtration if it were possible to obtain suitable land; but bad land was worse than useless, as many authorities were discovering to their cost. Dr. Reid then went on to describe the working of a filter constructed by Mr. Garfield, the manager of the Wolverhampton Sewage Disposal Works. Mr. Garfield having had his attention drawn to coal as a purifying medium, had a small filter of fine coal made, in order to see what effect it would have upon the Wolverhampton tank effluent. The results of the analysis made by Mr. Jones, the county analysist, were startling, and he (Dr. Reid), after careful consideration of the question, had come to the conclusion that coal was a valuable and cheap medium for sewage purification. Why coal should prove so good a filtering medium it was difficult to say, especially considering the fact that, compared with other substances, it was practically non-porous. The Wolverhampton filter had been at work sufficiently long now to establish fairly conclusively that its activity did not diminish with time, and with proper use the life of such a filter need not, as far as could be seen, be limited. One thought occurred to him, and it was whether the immense areas now covered by shale from the mines could not be turned to good account for sewage filtering purposes. The experiment was well worth trying by those authorities who were conveniently placed for putting it to the test. A short discussion ensued.—The Chairman said that coal as a filtering medium was certainly a new idea, and further experiments with it would be watched with interest. He should like to ask whether any chemical change had been noticed in the coal which would account for the results obtained by analysis.—Mr. Cameron (Exeter) defended the "septic" tank treatment he had introduced at Exeter, a system which Dr. Reid had unfavourably criticised.—Mr. Clarson proposed a vote of thanks to Dr. Reid, and observed that he hoped Dr. Reid would be able to induce the Birmingham Corporation to adopt the system. If they did, they would save many thousands of pounds. The way in which sewage was at present turned into the river was a disgrace to civilisation. Mr. Ayres (West Bromwich) seconded the motion. Mr. Corbett (Birmingham) explained the methods adopted and the results obtained at Saltley, and said he wished that the Local Government Board could be induced to go with the times in this matter instead of holding the local authorities back to the knowledge of twenty years ago. Mr. Jones, the county analyst, said he could not discover that there had been any change in the coal which had been experimented upon. The motion was carried, and Dr. Reid replied, briefly touching upon some of the points which had been raised during the discussion.

A paper had been prepared by Mr. W. Blackshaw, the Stafford borough engineer and surveyor, on some of the engineering works carried out at Stafford. He described the waterworks, the Royal Baths, the sewage works, and the Isolation Hospital, entering at length into the details of each from an engineering point of view. A vote of thanks was accorded Mr. Blackshaw for his paper, and the Mayor was asked to convey the thanks of the association to the County Council for having granted the use of the hall. Subsequently the members were entertained to luncheon, and afterwards visits were paid to the Royal Baths, the Sanitary Depot, the Sewage Disposal Works, the Free Library, the Gasworks, and the Electric Lighting Station.

THE INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

THE Annual Meeting will be held in London, on Thursday, Friday, and Saturday, the 8th, 9th, and 10th July, 1897. The members will assemble on Thursday, July 8th, at the Westminster Town Hall. The business programme is as follows:—

Thursday July 8th.—10.0 a.m., Meeting of the Council, Westminster Town Hall. 11.0 a.m., General meeting, annual report, general business, election of hon. secretary northern district, re-election of hon. district secretaries, election of auditors and scrutineers, Presidential address, paper and discussion—(1) "Biological Treatment of Sewage," by W. J. Dibdin. 1.0 p.m., Adjournment for luncheon. 2.0 p.m., Papers and discussions—(2) "The Buckinghamshire Road System (Equalisation of Highway Rates)," by R. J. Thomas; (3) "Tramway Haulage," by E. J. Silcock. 4.30 p.m., Adjournment. 6.30 p.m., Annual Dinner at the Trocadero Restaurant, Piccadilly Circus, tickets 7s. 6d. each.

Friday, July 9th.—10.30 a.m., Westminster Town Hall. Papers and discussions—(4) "Tramways Laid in Asphalte Carriageway Pavements," by L. H. Isaacs; (5) "Brick Paving for Carriageways," by J. T. Eayrs; (6) "Scavenging of Streets," by W. Weaver; (7) "Shrubs for Parks, Recreation Grounds, &c.," by F. Smythe. Visits to works: (*a*) The Central London Railway. By the kind permission of Sir Benjamin Baker, permission has been granted for a limited number of the members to visit the Oxford Circus Station of these works at 9 o'clock on the morning of Friday, the 9th July. Tickets will be forwarded to those who apply to the secretary, in the order of application, till the limit of 40 is reached. (*b*) Messrs. Doulton's works. Those members who are desirous of visiting these interesting works will leave the Westminster Town Hall at 1 o'clock, and take steamer at Westminster Pier for Lambeth Pier, close to the works. The party will be entertained to luncheon by Sir Henry Doulton, after which an inspection of the art studios and other departments will be made. Tickets for this visit will be sent to those signifying their intention to attend.

Saturday, July 10th.—9.25 a.m., Leave Victoria (L. C. and D. Railway) Station by special train to Rochester

Bridge, tickets for which will be obtained at the booking-office at Victoria Station on presentation of the card to be obtained from the secretary. On arrival at Rochester, an inspection of Messrs. Aveling and Porter's works will be made. Afterwards, visits will be paid to the cathedral and to the castle. The members will then be entertained to luncheon, after which a trip on the river will be made, returning from Chatham Station (L. C. and D. Railway) at 4.50 p.m. 5.50 p.m., Arrive at Victoria.

A MICROBE-PROOF HOUSE.

ONE of the oddest domiciles on earth is that recently erected at Yokohama by Dr. Van der Heyden, the noted bacteriologist of Japan. The New York *Home Journal* describes it as a dust-proof, air-proof, microbe-proof building of glass, which stands on the open unshaded grounds of the hospital at Yokohama. The house is 44ft. long, 23ft. wide, and 17ft. high. Large panes of glass ½in. thick and about 4in. apart are set in iron frames, so as to form the sides of a cellular building block. Of these blocks the walls are constructed. There are no window-sashes, the air-escape being through several small openings around the upper part of the second story, but through which no air from the outside is admitted. The air-supply is obtained from a considerable distance, forced through a pipe, and carefully filtered through cotton-wool to cleanse it of bacteria.

To insure further sterilisation, the air is driven against a glycerine-coated plate glass, which captures all the microbes the wool spares. The few microbes brought into the house in the clothes of the visitors soon die in the warm sunlight with which the place is flooded. The space between the glasses of the building-blocks is filled with a solution of salts which absorbs the heat of the sun, so that the rooms of this house are much cooler than those protected by the thickest shades. In the evening the interior is heated by the salts radiating the heat they absorbed during the day. So effective is the system of regulating the temperature that a few hours of sunlight, even in freezing weather, will render the house habitable. It is only when several cloudy days follow in succession that artificial heat is needed. Then it is supplied by pumping in hot air.

WOODEN STAVE PIPES.

IN a description illustrated in the *Engineering Record* of the power plant of the Pioneer Electric Power Company of Ogden, Utah, the writer gives some interesting particulars of riveted steel pipes, and also of wooden stave pipes. The latter are constructed of Douglas fir furnished by the Oregon and Washington Mills. The wood is planed on all sides to a uniform finished size of 8in. by 2½in. The best timber was specified, perfectly free from knots, sap holes, season checks, and other flaws, and well seasoned and dried. "The pipe was built of 32 staves, the finished staves being 7½in. wide on the outside and 7⅛in. wide on the inside, and 2in. in thickness. A planing mill for the work of building the pipe was erected near the mouth of Ogden Canon. In this mill both sides of the stave was dressed in a planing-machine to conform to the outlines of a circle; the outside to a circle 38¼in. radius, and the inside to a circle of 36¼in. radius. The radial surfaces were planes smoothly finished. Steel templates of the stave section were furnished to the contractor and the inspectors, and no stave varying more than $\frac{1}{32}$in. was accepted." The length of the staves were specified to be 16ft., 18ft., and 20ft. No more than 15 per cent. of the 16ft. lengths nor more than 30 per cent. of 18ft. lengths were allowed, and this condition was fully complied with, and many lengths of 24ft. and 26ft. were used. The staves were made to break joint at least 12in., and at all end joints a steel tongue was used, fitted into grooves sawed into the ends of staves. These grooves had a depth equal to half the width of tongue, and of such width that the tongues fitted tightly. These steel tongues were 1½in. wide and about ⅜in. thick, and rather longer than the width of staves, so as to extend ½in. into the adjoining staves. The pipes were incircled with round steel rods, ⅝in. and ¾in. diameter, the latter being used where the pressure exceeds that due to a head of 100ft. These bands were tested to an ultimate tensile strength of between 55,000lb. and 64,000lb. per square inch, an elastic limit of 40,000lb. per square inch, and an elongation of 25 per cent. in 8in. being given. A band consists of two rods bent to a semicircle, and two steel shoes. Two kinds of rods are used which are illustrated; one of each kind makes a complete ring. The wooden and steel pipes are connected thus:—The steel pipe enters the stave pipe 12in., and is securely bolted. Two angle flanges are riveted to the steel, and the other consists of loose angle irons fastened by bolts. Other particulars are given in the *Engineering Record*, and the sections and details are shown by illustrations.

WROUGHT-IRON AND STEEL IN CONSTRUCTIONAL WORK.—XXII.

PLATE GIRDERS are seldom used now, excepting for small dimensions, in which they are very popular, lattice-girders being preferred for any spans of over about 75ft. The plate girders of the section, shown in Figs. 99—103, in Article XX., are, however, very useful for

FIG. 119.

many purposes, and they are either single or of the box type; the latter being used in cases where the depth is limited, and when lateral stiffness is desirable. The plate girder fulfils the condition of lightness by comparison with combinations of joists, and of cheapness and facility of construction by comparison with braced girders. It is, however, a rather crude structure: it is too heavy for long spans, because it adds too much to the dead weight. The trussed girders are therefore adopted for the latter, because they permit of the best distribution of material, the metal being massed proportionately to the stresses from centre to ends, and suitably for tension and compression. From the point of view of the builder the plated and box girders are attractive, because a wide range of proportions and lengths to suit definite loads can be always obtained. Firms like Dorman, Long, and Co. supply them made up from stock sections of plate and angles in a practically unlimited range of sizes. Plate girders are used in depths ranging from 15in. or 18in. to about 4ft. and 6ft. Many lattice girders are also made in similar dimensions; but, as a very general rule, girders are plated up to about 3ft. in depth, and are lattice-braced when over 3ft.; shallower girders are braced when the diminution of dead weight is a main consideration and when lightness of appearance is also desired; deeper girders are plated when the opposite conditions exist.

Plate girders are parallel, or fish-bellied, or they are semi-beams, or of irregular outline; they are usually parallel, but not invariably so. The bellied type is used for some purposes in constructional work, chiefly for bridges of short span, fixed, and swinging, the camber being set uppermost. As so generally employed on travelling cranes, with the curved edge downwards, they are seldom used in bridge-work, except for transverse girders, partly because the curving down at the centre lessens the headroom beneath, partly because in short-span girders it is cheaper to make the booms parallel than to curve one of them. With long-span girders a bellied form will often be selected with a view to economy of material, and in swinging bridges the bellied form diminishes overhanging weight, and requires less power for operation. The type is, in the latter case, that of the semi-beam; as a semi-beam the plate-girder is employed for carrying roadways and footways of large bridges, Fig. 119. It occurs in various outlines with angles riveted round, as shown, and with flanges, plate, and solid web, or braced, or partly plated and partly braced. When the cross-section of a girder has to be diminished more or less abruptly, then the plated type affords facilities of construction rather superior to the braced girders; such cases arise not unfrequently. (Fig. 120.)

In a plate girder there are no lapping joints, but cover-plates only; every plate in web and flanges is planed at the abutting edges and riveted with covering plates on one or both sides, and adjacent angles are riveted together and through the plate with covering angles. These joints are shown in Fig. 121. The rivets are pitched widely, since no caulking is necessary, leaving ample plate section. Rivet-holes in compression members do not weaken the joint if the rivets fill the holes; but rivet-holes in joints in tension lessen the strength at the riveted section. Very generally the same pitch is adopted for both types of joints in a given job. Web covering plates are in some cases used alone; but, in most instances, stiffeners are riveted upon and through them. Stiffeners occur also at intermediate parts, with or without packing strips beneath. Stiffeners may consist of a single angle on one side, or of two angles, one on each side, the rivets passing through each and the plate; or, in deep wide girders and about the centre-parts four angles may be used, two on each side, with a gusset or web, *a*, riveted between each pair, Fig. 122. This method of stiffening would sometimes, when wide flanges are necessary, be preferable to the use of a boxed girder; but the overhanging flanges would not be so well supported, and the lateral stability would not be quite so good; or one or two tees are used, forming essentially four angles. The ends are stiffened by the riveting of end-plates or posts, with angles to the web.

Fig. 121 is drawn to illustrate the usual method of putting together plated girders. The upper figure is a section along the plane *a a* below. A joint between web-plates A and B is shown at *b*; the joint is covered by two plates, *c c*, of the same thickness as the longitudinal angles *g*. Usually, though not invariably, tees *d* are riveted through the covering-plates and web to stiffen the girder, as well as to reinforce the joint. The length of

FIG. 120.

the web-plate is generally the maximum length obtainable for a given width or depth and thickness. In steel the joints are less numerous than when iron was extensively used; a joint between flange-plates C and D, and E and F is seen at *e*, and the cover-plates at *f f*. These are made of good length—say, from 2ft. to 4ft.—according to size of girder, being in the proportion shown; it is usual to stiffen the girder at such a joint. Always the longitudinal angles, *g g*, run over web or flange-joints, and are themselves jointed elsewhere as seen at *h*, covering angles *j j* of from 2ft. to 4ft. in length going over the joints; the end-post is shown at *k*, united to the web with angles resting on packings. Girders which are too long for transit are parted at a web-joint and at flange joints next adjacent. The whole of the riveting, except that which must necessarily be omitted for separation, is done, and when the girder reaches its destination the joint-rivets are inserted.

In the building-up of plate-girders it is desirable to observe a uniformity of dimensions of plates and angles as far as practicable; it saves trouble in ordering and in the shopwork. All plates for the web can often be of the same length, and nearly all those for the flanges of another length; angles can be mostly of one length and section, and so can most of the angle and tee-stiffeners and covering-plates. Flange or boom-plates, being narrow, are frequently made twice the length of the web-plates. They must break joint; the end-plates or posts are as wide as the flanges. Covering-angles are from ½in. to ¾in.

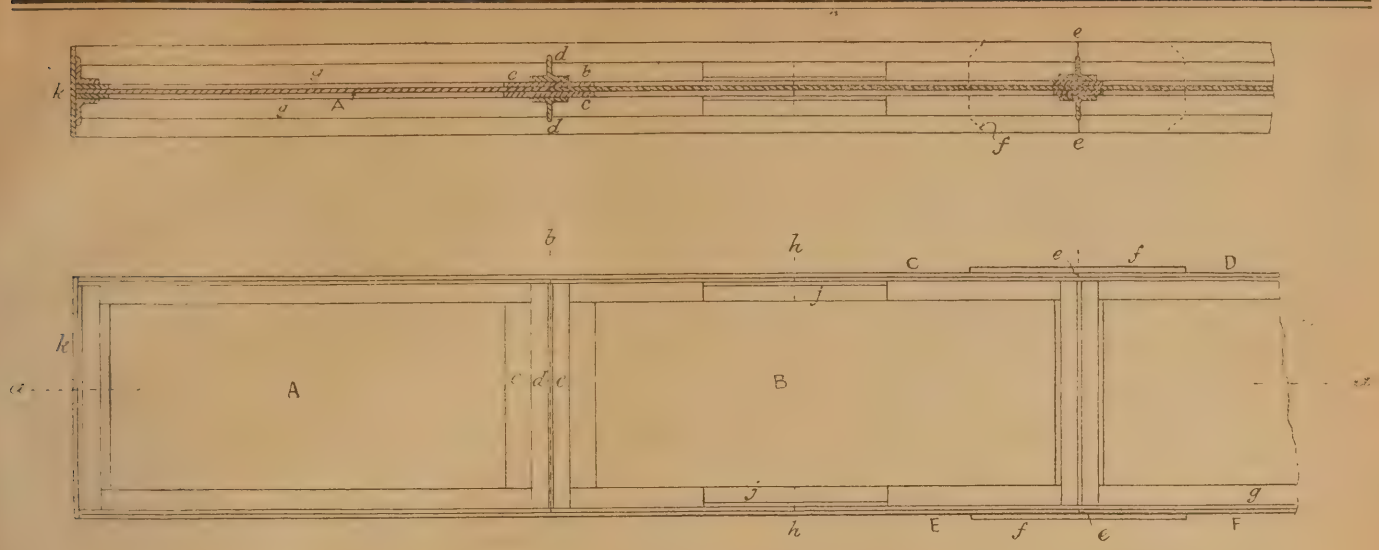


FIG. 121.

narrower than the main angles, according to thickness, so bringing the edges as nearly as possible flush. The flange-covering plates are much longer than web-covering plates, those in tension having to sustain great part of the stress.

Diagonal stiffeners are not often attached to plate girders. Fig. 123 shows an example of this kind: it is a portion of one of the cross-girders on the Glasgow Central Railway, upon which girders the street roadway is supported. These are single-webbed, having the usual vertical stiffeners, except in the portion shown, which is pierced with holes for the passage of the gas, water, and electric mains. The diagonal tee-stiffeners crossing on opposite sides of the web sustain every portion of the plate, and the edges of the tees help to sustain the weight of the pipes. The web-plate is only thickened $\frac{1}{8}$in. more over the stiffened area than elsewhere, being $\frac{5}{8}$in. thick there and $\frac{1}{2}$in. in other parts.

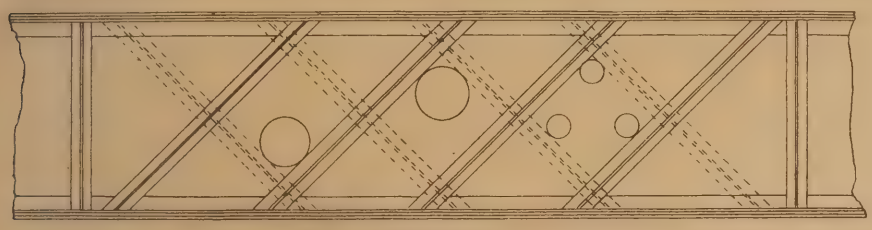


FIG. 123.

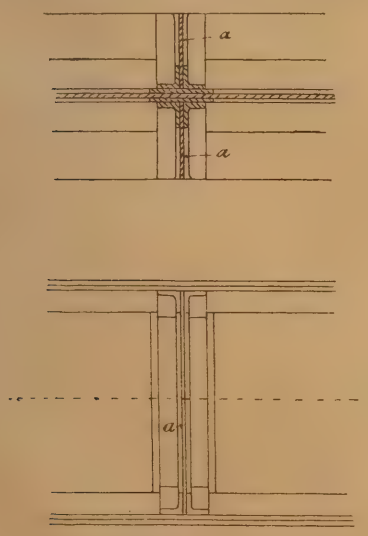


FIG. 122.

Box-girders are in nearly all cases composed of two single-webbed girders riveted together through the medium of top and bottom plates, the type being illustrated in section in Fig. 103 in Article XX.; but occasionally it is desirable to imitate the device of riveting three rolled joists together, side by side, and thus have three webs in the box girder. It is done for the same reason—viz., when headroom is low, and added width desirable or permissible. Fig. 124 illustrates the sectional form of girders of this type which were used on the Glasgow Central Railway, that runs under some of the most busy thoroughfares of the city. These are the heavy main longitudinal girders which carry the cross-girders in Fig. 123, and the arching and the street. Head-room was limited, and the girders are but 3ft. deep. They are 3ft. 2in. wide, and are made of $\frac{1}{2}$in. steel plates, stiffened at intervals of 3ft. by tee-bars, and in the manner shown.

Circular and segmental girders are required for swing-bridges, for roller-paths, and for live rings of rollers; they are built of plate and angle. The construction of curved girders is similar to that of straight ones as regards the covering-plates and stiffeners; but they are not quite so easily made; the flanges have to be cut to curvature by punching a number of holes adjacent to the curved edges, which edges have to be finished by chipping and filing; in girders of small radius the edges are turned in a lathe. The web-plates, the angles, and the web-covering plates are bent in rolls.

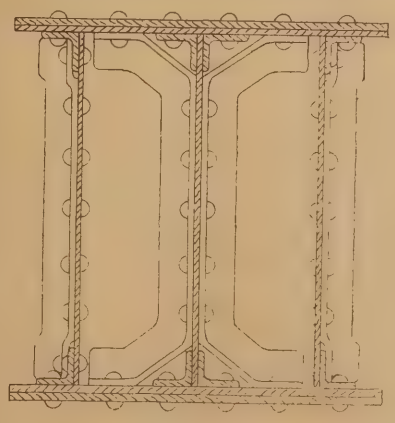


FIG. 124.

A trough girder is shown in Fig. 125. It is used to connect vertical columns or standards, and to serve also the purpose of a gutter; it is made of plate and angle. The troughing used in bridge-floors will be considered alone.

The strength of steel girders, both plate and box, is reckoned at about 7·5 tons per square inch of sectional area contained in the flanges. This is suitable for ordinary work, live and dead, and is that adopted in the loads given by Dorman, Long, and Co.

The advantage of the greater maximum dimensions in steel over those of iron is apparent in the building-up of these plate-girders; less than one-half the number of joints suffices, and the weight of covering plates and cost of rivets is saved. Being rolled larger, and yet being stronger, the weight is diminished in the ratio of about 21 to 30 tons. J. H.

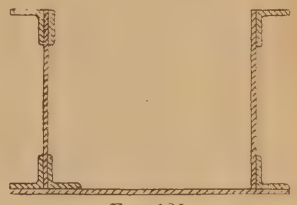


FIG. 125.

COLLAPSE OF CAST-IRON COLUMNS.

ANOTHER collape of a building is reported from New York City. The building was at the corner of the Twelfth-avenue and Fifty-first street. The cause of the failure was the insecure way the cast-iron columns were bolted through the flanges with four loosely fitting bolts at each joint—so often the cause of similar disasters. These columns were, it appears, unbraced, and four stories in height, and carried at the top the ends of floor-beams supporting several tanks, each with its load of water weighing over 80 tons. The columns were only tied together at each floor, and the ends of the beams were all on one side of each column. The description of the collapse of the columns given in the *Engineering Record* furnishes us with some details. The columns were 16ft. to 20ft. apart, and the floor girders were rolled steel beams with wooden joists on the top supporting double floors. Square cast-iron columns set in recesses in the inside of exterior walls each supported one end of a floor-beam at each floor; both framework and walls were independent and separate. Fourteen large square tanks in two rows of seven each, each occupying a separate bay, and all full of water, were carried on this ironwork. Five intermediate ones in the eastern row suddenly fell to the ground, carrying with them all the beams and girders. The columns were hollow cylindrical ones, about 8in. in diameter at the upper stories, with flange connections and shelf-brackets. The splice flanges were on two opposite sides of all columns, and the girders were bolted to them only by three $\frac{3}{4}$in. bolts at each end. It is said no special care was taken to secure the bearing of these girders on the

horizontal cast-iron brackets, to which they were neither bolted nor riveted. The tanks that fell went straight down. Plans and details of the floors and columns with the tanks are given in the *Record*. These tanks were 12½ft. by 13ft. on plan, and 15ft. deep, and were on the fourth floor perched on the columns. A weight of moving water which acted as a live load exercised a severe strain on the beams and columns, each tank-load resting on four columns, or each pair of columns had to carry the load of one tank, allowing half the load to rest on two of the four columns which carried it and its adjacent tank. Each tank, when filled, was calculated to weigh over 170,000lb. The facts given by our contemporary are of importance to all architects who carry such loads on iron columns at considerable heights above the ground.

MOVING A BRICK CHIMNEY.

THE feat of successfully moving a brick chimney nearly 1,000ft., 85ft. high, of two 8in. brick walls 3in. apart, bonded together at intervals, is recorded from Manchester, N.Y. The chimney is 7ft. square at the base, tapers slightly, and is estimated to weigh about 200,000lb. The *Engineering Record* gives the following description of the process adopted:—"Holes were cut through the lower part of chimney from side to side, and through them large square horizontal timbers were inserted to project 8ft. or 10ft. on each side. On top of these other large horizontal timbers of the same length were laid at right angles to the first one on each side of chimney close to the wall. A double quadrangular cross platform was thus formed, the end of the pair of beams were connected by cross timbers, and from each of these a pair of inclined braces were put up and secured to a timber collar encircling the chimney about 12ft. or 14ft. above the bottom timbers. This framework made a cradle that extended the base of chimney to a diameter of over 20ft. Cross beams were placed under the lower sills of the cradle and supported on timber shoes, which were planed on the bottom and greased to slide on skids 50ft. long, from which the whole weight of chimney was supported after the lower brickwork had been cut away. These skids were supported on timber crib blocking as much as 5½ft. high in some places where the ground was rough. Grades of 3½ft. ascending, and 5ft. per 100 descending, were encountered. The chimney was moved by a single horse working a 30-gear capstan that operated a 5-part (⅝in.) chain tackle. The chimney was revolved 90° about its vertical axis, and was loaded, moved, and set on its new foundation in nine days by six men." Messrs. W. H. and C. P. Topping, Bridgehampton, N.Y., were the contractors, and our contemporary is indebted to them for the above data. The timber framework thus practically formed a steadying cradle to the brick shaft supported on it, which was made to slide along with its burden by the simple motive power of a capstan. Any chimney might be thus cradled and disconnected from its foundations, and then slid along to its destination.

At a meeting of the antiquaries and archæologists of the North of England recently held at Newcastle, it was unanimously resolved that a portrait of the Rev. W. Greenwell, F.R.S., should be painted and presented to the library of Durham Cathedral.

At the meeting of the Falmouth parish church restoration committee, on Thursday in last week, Mr. Edmund Sedding, the architect, pointed out that the north-east corner of the building should be rebuilt in line with the rest of the eastern end, otherwise it would be impossible to carry out the proposal that the present east window should be placed in the choir aisle. It was decided to accept Mr. Rickard's tender for this work, and also for cementing the whole floor of the building and laying down wood block flooring. These improvements will cost quite £350 beyond the contract price.

Great progress has been made with the doubling of the railway between Probus crossing and Burngullow. The work has been much heavier than might have been anticipated, because at two or three places corners have been cut off, while at Probus the whole level of the line has been raised for a considerable distance, these obviating an incline both ways. The new line is expected to be ready by the end of August, and both lines will be used until the summer traffic is over, when all the traffic will be run over the new line for the purpose of altering the old line.

Building Intelligence.

DARLINGTON.—On the 16th inst. the foundation-stone of the new parochial hall in connection with the parish of St. Cuthbert's, Darlington, was laid by Mrs. Mortimer, wife of the vicar of Darlington. The new hall is an oblong building, two stories in height, with frontage to Victoria-road. In the basement there are a classroom, covered cloister, heating-chamber, &c. The hall is on the upper floor. There are two entrances and lobbies from Victoria-road, one for the general body of the hall, and one for front seats and platform. A small ante-room is provided off the platform. Over the rear of the hall there is a small gallery, reached by open staircase, which also gives access to the basement classroom. The building will be erected with ordinary clamp kiln bricks, relieved by terra-cotta dressings. The roof will be covered with red Staffordshire tiles, and finished with pointed spirelet, which incloses the air-pump ventilator. The main hall will have stained wood panelled dado. The heating will be by open fireplaces and hot water. The contracts for the work have been let to Messrs. R. Kitching and Son, T. Metcalf, R. Smith, J. and G. Wharton, and J. Robinson and Son, all of Darlington. The architects are Messrs. Clark and Moscrop, F.R.I.B.A., of Darlington.

ROTHBURY.—Amongst the many improvements that have taken place in the old Border town of Rothbury during the last ten or fifteen years none has attracted more attention than the block of cottages recently built by Lord Armstrong at the east end of the village. There are in all twelve cottages, six of which are single, and six with kitchen and single room. All the cottages throughout have scullery and pantry, coal and other outhouses being in a small inclosed yard behind. The roof is a common rafter projecting roof, and the tiles which cover it are Staffordshire tiles. The work has been carried out by the following tradesmen:—Mason work, Mr. Thomas Muckle, Rothbury; joiner work, slating, plastering and plumbing by the workmen employed by Lord Armstrong on his estate, under the superintendence of Mr. William Bertram and Mr. James Riddell; the whole being from plans of Messrs. James Stevenson and Son, architects, Berwick.

WINNINGTON.—Owing to the rapid growth of the district, it has been found necessary to build, at a cost of £5,000, a new church at Winnington, near Northwich. The building, which was opened on Monday afternoon, is capable of accommodating 320 persons. It is built of red pressed brick, the nave and chancel being divided by a Gothic arch of white stone. The nave is 69ft. long, and the chancel 34ft. 3in. A tower and spire have been designed for the north side, but for the present this portion of the work will not be undertaken. The structure has been built from the designs of Mr. J. L. Pearson, of London.

CHIPS.

It may be regarded as certain that work will not be resumed this year at Lord Penrhyn's slate quarries, although the notices inviting the men to present themselves are still in force. Lord Penrhyn is leaving next month for Germany, and Mr. Young, the chief manager, has left Bangor for a long holiday. The loss in wages already approaches £250,000. Many of the men are still without employment.

At the Old Bailey on Monday Luke Leonard J. Durant, formerly in business in the City as brick and tile merchant, was sentenced to 12 months' hard labour for forging and uttering acceptances to bills of exchange.

On Thursday week the corner-stone of new shops and house for the Pontefract Industrial Society was laid at Featherstone. The premises will be centrally situated, and building operations commenced about six weeks ago, the architect being Mr. Hirst, Pontefract, and the builder Mr. A. Sutton, Featherstone.

A new Wesleyan mission-hall and Sunday-school were opened in Jenning-street, Groves, a suburb of Hull, by Mr. H. H. Russell last week. The building, which is designed in the Early Gothic style of architecture, is built of red brick, with stone dressings, and comprises a central hall, with gallery to accommodate 600 persons, an infants' schoolroom, seven classrooms, and thirteen other rooms, and other offices. The work has been carried on by Mr. Good, builder, and will cost something like £2,900.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

DUNDEE INSTITUTE OF ARCHITECTURE, SCIENCE, AND ART.—(Session 1897-98). Syllabus of competitions;—No. 1. Best freehand sketchbook of architectural subjects from existing buildings, not less than six pages, in pencil only, not copied from any drawing. Size of page not larger than 10in. by 7in. No. 2. Best measured drawings of any architectural subject, in black and white, and not more than four nor fewer than two sheets, containing plan, elevation, and section to ⅛in. or ¼in. scale, and detail of a part to $\frac{1}{12}$th full size. Measurement books to be lodged. Size of drawing, 21in. by 14in., with margins or mounts beyond drawing not exceeding 4in. No. 3. Best work in modelling or carving of any of the following:—(*a*) Cornice, not exceeding 12in. by 9in. by 18in.; (*b*) one quarter of centre flower, not exceeding 21in. by 21in.; (*c*) key-stone, not exceeding 18in. by 12in.; (*d*) lock-plate and door-handle, not exceeding 21in. in height. No. 4. Best outline drawing, from an antique subject in the Dundee Art Museum of Casts or from duplicates thereof. Size of work, 22in. by 14in., with 4in. margins or mounts. No. 5. Best design in colour for any of the following subjects:—(*a*) Interior decoration of a private library, dining or drawing room, (*b*) wall and ceiling paper, (*c*) door-panel, (*d*) tile or parquetry floor, (*e*) mosaic tympanum. Conditions:—The first and second of these competitions are limited to architects' apprentices in Forfar, Perth, and Fife. The others are open to anyone under 25 years of age, as at 31st January next, residing in Forfar, Perth, or Fife. The following conditions are applicable to all the competitions:—The competitions are not confined to members or associates of the institute or their assistants or pupils. The subjects submitted must be specially prepared for these competitions. The prize for each competition will be of the value of £2 2s., and in such form as the successful competitor may prefer. All the works submitted to be under motto, and accompanied by a sealed envelope bearing same motto, and containing the name and address of the competitor, and all to be delivered free to the hon. secretary, at the institute rooms, on or before 31st January, 1898.

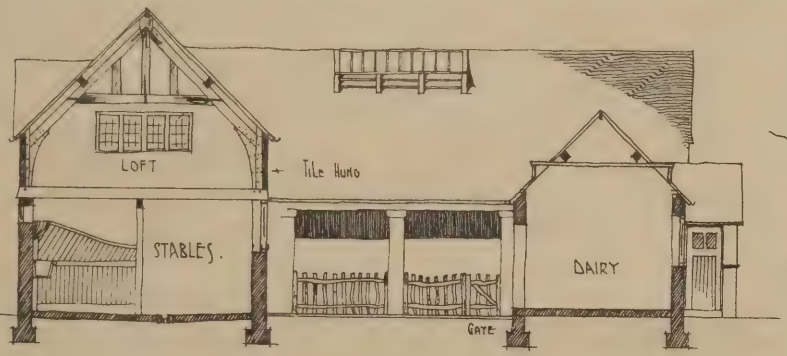
SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—This year Chatsworth House was selected for the annual excursion, and the excursion on Saturday was one of the pleasantest ever held. Amongst those who took the trip were Messrs. Joseph Smith, vice-president, C. J. Innocent, F.S.I., F.R.I.B.A., hon. secretary, T. H. Waterhouse, J.P., Benjamin Bagshawe, E. M. Gibbs, F.R.I.B.A., W. J. Hale, H. Webster, J. Norton, J. T. Cook, A. Holland, J. C. A. Teather, C. F. Innocent, A.R.I.B.A., T. Myles, L. D. Hemsoll, W. Denton, F. J. Innocent, C. F. Bond, T. H. Robinson, and F. Wilson. Mr. B. Bagshawe, who is a "lay" member of the Society, was appointed cicerone, and fulfilled the duties of his office admirably. Peculiarities of the stonework at the entrance having been commented upon, a visit was made to that portion of the house usually shown to the public. The tour concluded with a visit to Queen Mary's Bower, and many were the opinions hazarded as to the time of erection and object of the strange, moat-surrounded building. No satisfactory conclusion was come to, but there was general agreement that the building was erected before the time of Queen Mary.

After undergoing alterations, Wolsingham parish church was on Saturday duly consecrated by the Bishop of Durham. The church has been enlarged by the addition of a baptistery; a new floor of wooden blocks has been laid, the nave has been entirely reseated with oak benches, and a new altar and pulpit of massive oak have been provided. The architect is Mr. C. Hodgson Fowler, of Durham. The works have cost between £700 and £800.

New chancel stalls of carved oak, erected as a Jubilee memorial, have been placed in St. James' Church, Exeter. They are of decorated Gothic design, and carry richly carved finials on the bench ends carried out in foliage patterns. The fronts are worked as a traceried arcade and carry suitable inscriptions. A good effect is produced by recessing the priests' seats on either side into the Hamhill piers of the chancel arch, thus enabling the central passage to be kept of good width. The work is from designs by Messrs. Fulford, Tait, and Harvey, of Exeter, and has been admirably executed by Mr. E. T. Rogers, carver, of that city.

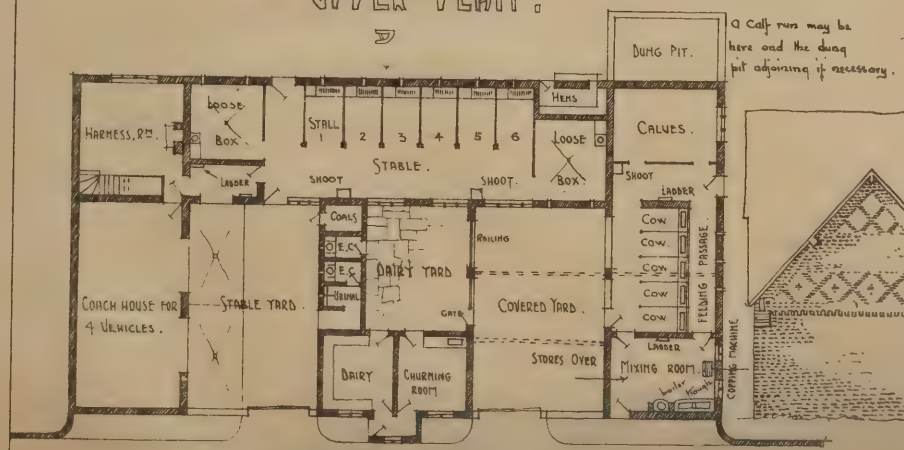
BNDG. A GROUP OF STABLE BUILDINGS. BY "NUT".

PLACED FIRST

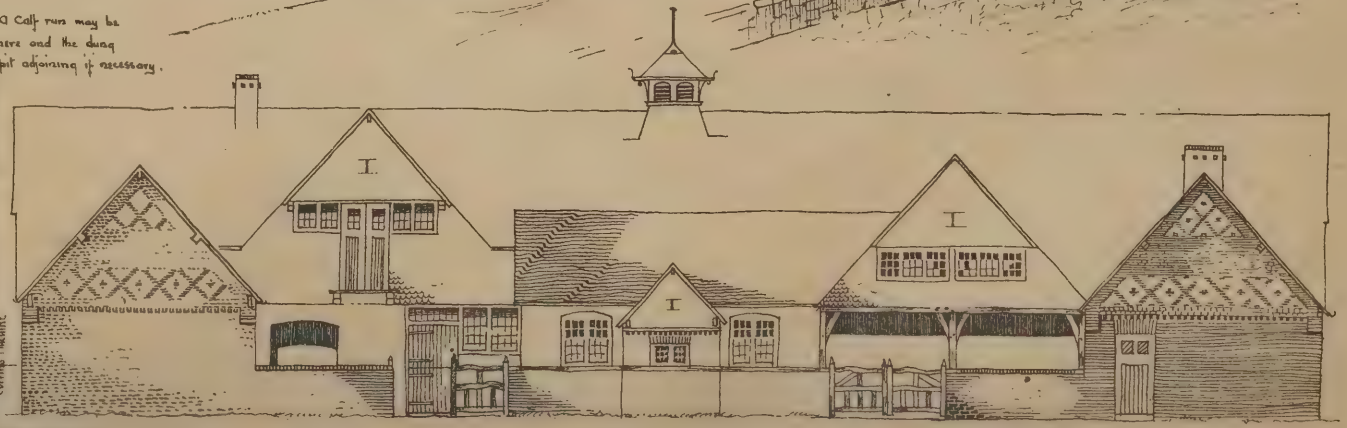


SECTION. A. B.

UPPER PLAN.



GROUND PLAN.



FRONT ELEVATION.

10 5 0 10 20 Feet

TO ELEVATIONS ETC.

10 5 0 10 20 30 40 50 Feet

TO PLANS.

APRIL 1897.

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ILLUSTRATIONS.

FIRST AND SECOND PREMIATED DESIGNS FOR THE NEW TECHNICAL SCHOOL, SUNDERLAND.—RESTORATION OF THE TOWER OF THE CHURCH OF ST. JOHN THE BAPTIST, CARDIFF.—"BUILDING NEWS" CLUB DESIGN FOR A SMALL COUNTRY STABLE.—A RELIC OF THE TUILERIES.—FOUR SOMERSETSHIRE PULPITS.—A JAMES I. BUFFET.

Our Illustrations.

PROPOSED TECHNICAL SCHOOL, SUNDERLAND. (SELECTED DESIGN.)

THIS design was placed first in public competition, Mr. J. M. Brydon being the assessor, and the view shows the principal front to Green-terrace, with the return to the small back lane. The main floor is placed about 8ft. above the pavement at corner of site, and has, adjoining the principal entrance, the secretary's room, inquiry office, janitor's room, principal's room, and common room for staff. On the left is the hall, suitable for examinations or public lectures, lit on both sides, with doors from the entrance hall, and a special porch at the opposite end. From the hall a main corridor gives access to classrooms, lavatories, &c., whilst two staircases lead to the upper floor. Above the hall is the chemical laboratory, with balance and combustion rooms. The corridor is immediately over the one below, and, similarly, gives access to the various classrooms. On the top is the caretaker's residence, and the corner tower contains a room for clock and chronometer testing, from which a staircase leads to the telescope dome above, nautical astronomy being one of the subjects for which special provision has to be made. In the basement are physical laboratories and physics lecture theatre, rooms for carpenters and plumbers, and spare rooms to be allotted for other purposes. Room is left upon the site for extension, and eighteen ordinary classrooms can be provided. The sum proposed to be spent is £17,000. The design is by Messrs. Potts, Son, and Hennings, of 9, Ely-place, Holborn, and 34, Victoria-buildings, Manchester, and was selected from about forty others.—*Second Premiated Design.*—This practical scheme, illustrated also by view and plans, obtained the second position in the same competition. The arrangements are clearly defined on our drawing, and so need little description here. The different treatment of the problem is very interesting, and, architecturally, the façades are equally diverse. Messrs. Woodhouse and Willoughby, of Manchester, are the authors of this design.

TOWER OF ST. JOHN THE BAPTIST'S CHURCH, CARDIFF.

IN the year 1473 (over four centuries back), the foundation-stone of this beautiful tower was laid, and it was owing to the munificence of Lady Anne, daughter of the Earl of Warwick, that this building was erected. It was designed by one Hart, an architect, who was also the author of the fine towers of Wrexham and St. Stephen's, Bristol. These three towers are all of the Perpendicular style; but St. John's is not so rich as the other two, possibly on account of the funds he had at his disposal (which too often hampers an architect very much in carrying out his designs). However, Hart has placed his ornamental work where it can be seen for miles around, for the embattled parapet, with its graceful pinnacles, is certainly a landmark of ancient Cardiff which the inhabitants of the present time should be justly proud of. One of the angle turrets was struck by lightning in 1860, and had to be rebuilt. The parapet was supported about 45 years back with iron bars, to which may be attributed much of its insecure condition at the present time. The carving on the pinnacles is much worn, but in the drawing I have shown it restored to its original form. The belfry windows are full of rich tracery, and no one would imagine from a distance that there was so much detail in them. This drawing also shows the windows restored. Time, weather, and smoke have done much to destroy the beauty of the work. The doorway is, no doubt, belonging to the early 13th century church, of which portions remain, and must have been built into the tower when it was erected. The street at the present time is about 2ft. 3in. above the original ground, thereby dwarfing the height of the west entrance. The drawings produced were prepared from actual measurement after the scaffolding was erected. The cost of the restoration will be about £2,800. Messrs. S. Shepton and Son, of Cardiff, are the contractors. C. B. FOWLER, Architect.

"BUILDING NEWS" DESIGNING CLUB: A GROUP OF STABLE BUILDINGS.

FOR descriptions and awards see page 6.

A RELIC OF THE TUILERIES.

THIS illustration shows a portion of the magnificent façade on the garden front which De l'Orme executed for Catherine de Medicis. It also shows one of the horseshoe staircases, by means of which the garden was reached from the raised arcade of the ground story. The building is shown as it appeared after the troubles of 1871, when, during the struggle between the Versailles troops and the Communards, the Tuileries were destroyed by petroleum and gunpowder. Even after this, the walls remained standing, and might have been restored; but they were fated to be razed to the ground, which was done in 1885, and the building, once the glory of Paris, has entirely disappeared. We are indebted to the *American Architect* for the illustration which we herewith reproduce.

STATUES, MEMORIALS, &c.

BRISTOL.—The foundation stone of the Cabot Memorial Tower was laid at Bristol last week. The design was furnished by Mr. W. V. Gough. The tower is to be a square structure of an ornamental character, adapted from a well-known example in the department of the Loire, in France. It will have buttresses at the angles from base to summit, and in order that it shall not appear heavy, the sides of the square, reckoning to the outside of the buttresses, will not exceed 27ft. There will be two stages, each of which will be relieved with an ornamental balcony, adding much to the appearance of the structure. The floor of the upper balcony is to be 75ft. from the base, and above this will be carried an octagonal spire of 30ft., making the total height about 105ft. A circular staircase of fair width will go up the centre of the tower to the first stage, and above that there is to be a spiral staircase for the second stage, and should a lift be required in the future, the well-hole of the tower forms a convenient position for it. The style of the design, although original, is typical of the style prevalent in England at the time of Henry VII. The spire of freestone is to be surmounted by the figure of Peace (or Commerce) mounted on a globe typifying the world, and it is proposed to gild these, so that they may be very conspicuous from a distance. Provision is to be made at the base for the insertion of panels with bronze bas reliefs, one of which will be reserved for the Bristol inscription, and the others are proposed to be filled in by the American subscribers and the Peace Society. The platform will be square, and it is proposed to make it about the same dimensions as the familiar circular inclosure on Brandon Hill—about 42ft. across. At its angles will be projected bold epaulments for the reception of the Russian trophy guns.

THE HIGH CROSS OF DOWNPATRICK.—After a strange eventful history and a long period of neglect and forgetfulness, the grand old Celtic cross of Downpatrick has been quietly re-erected in the ancient city in which it stood for so many centuries. The Dean and Chapter of St. Patrick's Cathedral have given a site for the cross, and it now stands erected on the grass triangular plot at the east end of the cathedral—facing the road leading up from the city. The stones of the cross consist of the base or die—the shaft—and the arms and nimbus ring, the coping or cap-stone being still undiscovered. These three stones, with an additional base stone, which was a necessary insertion owing to some injuries to the base proper, are now fitted together with care and precision, and form a cross 11ft. high. No attempt of any kind has been made to "restore" the ornament. The base stone has no trace of ornament left. The shaft on its east face has four panels, the two centre ones each containing three full length figures, and the upper and lower panels, which are only half the size of the centre ones, contain half-length figures, all evidently being Scriptural subjects, but now so worn as to be past recognition. The south side of the shaft has one panel its full length, containing a rich interlacing Celtic pattern closely worked at each end, and expanding to greater freedom in the centre. This is the most legible ornament on the cross. The stone above the shaft, which extends into the arms, bears in the centre the crucifixion of the Saviour—dimly visible on its weather-worn face. The angles of the cross bear evidence of having once had a round—possibly a rope—moulding; but this has suffered so much that many might consider it was splayed or chamfered. The work of restoration has been carefully carried out by Mr. Wm. Hastings, builder, Downpatrick, under the supervision of Mr. William J. Fennell, architect, Belfast.

WATER SUPPLY AND SANITARY MATTERS.

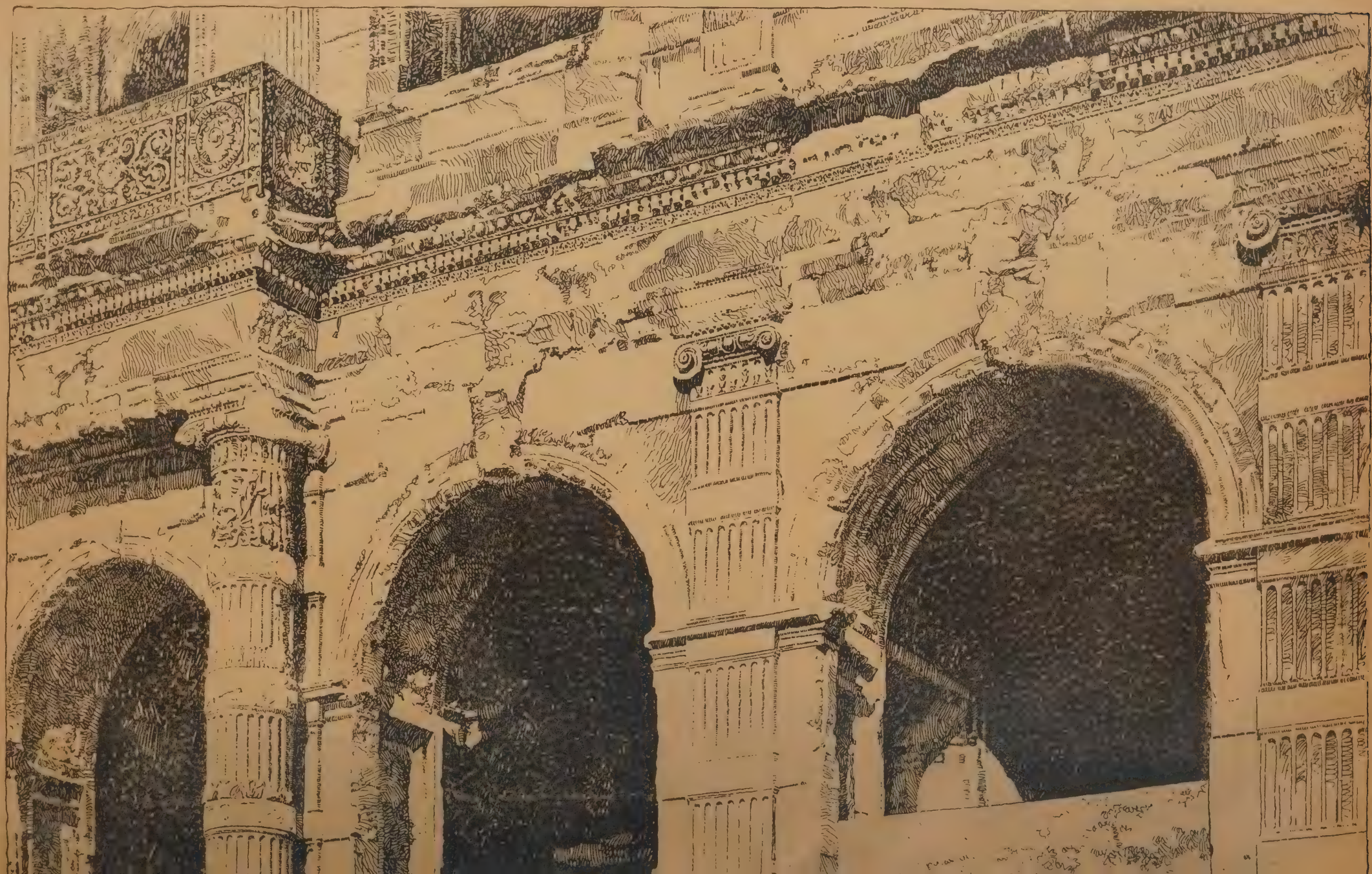
BEDWORTH.—Last week General Crozier, Local Government Board inspector, held an inquiry into an application of Foleshill Rural District Council to borrow £8,775 for the purposes of a public water supply. Evidence was given by Dr. John Orton (medical officer of health), Mr. H. B. Nicholls, Birmingham (engineer), and Mr. A. P. Oswin (clerk to the Foleshill Rural District Council). It was stated that the estimated population of Bedworth was 6,000, and that the yield of the well was 210,000 gallons a day, or more than double the requirements of the town, presuming that the consumption was 15 gallons a head. The inspector stated that the storage capacity was only five gallons per head, and the engineer replied that it could be easily doubled. General Crozier pointed out that the mains should be extended to Bulkington-lane canal bridge and the Woodlands. There was no opposition to the scheme, which, the inspector stated, appeared satisfactory with the exception of the points referred to.

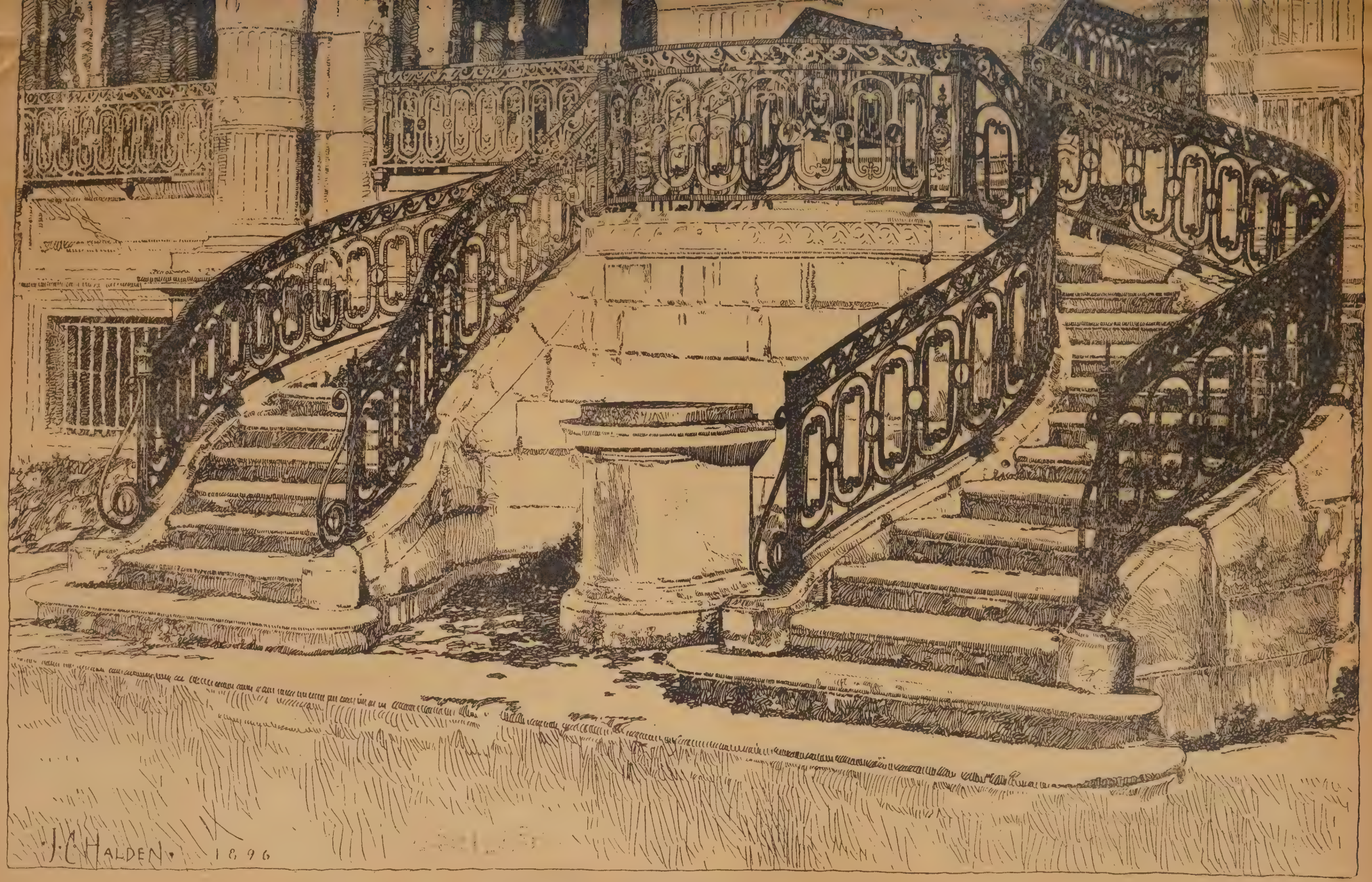
ETON SEWERAGE.—Fears having been entertained for some time past that the sewers of Eton are in an unsatisfactory condition, and that the storage tanks at Datchet permit of great leakage from the surrounding subsoil water, especially during times of flood, and that in consequence the annual cost of pumping the sewage on to the sewage farm at Eton Wick is much greater than it should be, the urban district council have requested Mr. E. Bailey Denton, M.Inst.C.E., of Palace Chambers, Westminster, to advise them thereon, and to report upon what steps should be taken to remedy existing evils. The college and masters' houses were redrained only a few years back, and are in a satisfactory condition; but the town sewers were laid and pumping-engines erected in 1869, when sanitary science was by no means so far advanced as at the present time.

SALFORD.—An application of the Mersey and Irwell Joint Committee for the issue of a peremptory order against the Salford Corporation, requiring them to proceed with a scheme ordered by the Local Government Board for effectually dealing with the sewage effluent, was before his Honour Judge Parry at the Salford County Court on Monday. In the course of the hearing the town clerk intimated that the application which the council had made to the Local Government Board for borrowing powers would be withdrawn, and for the purpose of carrying out the scheme of the corporation money would be borrowed under section 235 of the Public Health Act, 1875. They objected to being compelled to purchase more land, inasmuch as they could satisfy the joint committee by merely doubling the area of filtration. Ultimately his Honour adjourned the hearing until July 22.

WILMSLOW SEWERAGE WORKS.—At Wilmslow Sessions, on Tuesday, the Wilmslow District Council applied for an extension of time in connection with their sewerage works. It was stated that important works had yet to be carried out on the southern side of the district. The northern scheme has just been completed at a cost of nearly £7,000, and £12,000 has been expended in the southern district. The Mersey and Irwell Joint Committee had agreed to six months' extension. The Bench granted the extension.

Mr. E. Guy Dawber, of 22, Buckingham-street, Adelphi, has taken into partnership Mr. Francis A. Whitwell, and the firm will in the future be Messrs. E. Guy Dawber and Whitwell.





A RELIC OF THE TUILERIES.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and Sixpence for every eight words after. *All Situation Advertisements must be prepaid.*

NOTICE.

Bound copies of Vol. LXXI. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LIV., LVIII., LIX., LX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

*** IN response to complaints from readers that they are unable to get the BUILDING NEWS at Messrs. W. H. Smith and Son's bookstalls, we can only suggest that they should order the paper of some other newsagent. Messrs. W. H. Smith and Son recently requested us to allow them an extra discount beyond that allowed to the general trade, and because we declined they have ceased to send the paper out to their bookstalls. We have, of course, no remedy; but we do not think the demand was a fair one.

RECEIVED.—M. W. D.—C. L. I. Co.—H. S. F. (Bristol).—S. E. S.—A. T. F.—M. F. and Sons.

Correspondence.

NEW CITY HALL, BELFAST.

To the Editor of the BUILDING NEWS.

SIR,—Mr. Miller calls my attention to your having been under the impression that Messrs. Malcolm Stark and Rowntree's design was placed second in order of merit in the recent final competition. Will you allow me to explain that no official distinction was made as to the respective merits of this design and that of Mr. Miller?

The numbers referred to in my letter to you of April 15 were merely those assigned to the designs before examination by the assessors?

Perhaps you will kindly communicate this to your readers.—I am, &c.,

JOS. C. BRETLAND, City Surveyor.

Town Hall, Belfast, June 28.

DEVIATIONS TO CONTRACTS.

SIR,—Extras and deductions, as a rule, are bugbears. The former, if not the latter, cause frequently many bitter feelings between the parties concerned—client, builder, and architect—the latter in most cases being thanked by neither, but rather blamed by both.

Where to draw the line as to these is the question. Minor points, such as small deviations, are simple, but, say, if one of three or four of the buildings contemplated to be erected, and forming about equal proportions of contract price, were decided to be added to or deducted from contract as the works proceed, could the contractor be expected to stand by the schedule of prices deposited for carrying out such a purpose? In the matter I am interested in, it is a question of adding a building, probably increasing the contract by a sixth; but the legal adviser to the board proposed the work should be tendered for, as he says the contractor can scarcely be expected to do it at schedule prices, being an addition, and consequently more than an ordinary extra, yet no doubt he (the contractor) would equally demur to another builder coming on to the work in case he misses the job by tendering.

Hoping the subject may be of sufficient interest to cause the views of some of your experienced readers to be given on the matter—I am, &c.,

TOLOP HAX.

Intercommunication.

QUESTIONS.

[11694.]—**Sound.**—Is there any means of preventing the passage of sound through party-walls of semi-detached houses?—W. T. T.

[11695.]—**Pillars.**—What is gained by bolting pillar feet plates toordinary foundation pillar pier capstones?—for do not the bolt-holes weaken the stone at the angles, and in case of there being any strain on the bolts by the leverage of the pillar becoming ever so little out of the perpendicular, are not the outer angles and edges of stone liable to be forced off?—DOUBTFUL TOMMY.

[11696.]—**Reservoirs or Dams.**—Is there a good book published at a reasonable price on the construction of ordinary reservoirs or mill dams, with the necessary fittings and accessories required thereto, giving practical information, with examples of work, suitable for the supply of mills, villages, and small towns?—ENQUIRER.

[11697.]—**Continental Technical Schools.**—Can any of your readers give me the names of some of the most complete and up-to-date technical schools on the Continent, a visit to which would repay an architect during his holidays?—C. C. C.

[11698.]—**Heat-Resisting Paint.**—Will white-lead or red-lead, mixed with paraffin oil, dry hard, or will it always remain greasy?—G. A. HAIG.

[11699.]—**Vegetable Growth in Hard-Water Tanks.**—What is the reason of a peculiar vegetable growth which forms in the course of a few months on the surface of the water? It is very much like frogs' spawn, but of a darker colour, and about 2in. thick. What would be the remedy for it?—HARRY ABBOTT.

[11700.]—**Pond Water.**—Near my house is a large pond, from which I am desirous of taking water for laundry and other domestic purposes, but not for drinking. The pond is supplied by springs; but being stagnant, the water becomes green, and is unfit for use. I may state I have made a tank about 7ft. from the pond, and made a filter-bed of washed gravel for the water to run through; but this does not purify it enough to be fit for use. What can I do?—ONE IN A FIX.

REPLIES.

[11683.]—**Elliptic Arches.**—I am much obliged for the replies of "Voussoir" and "Geometric" in your issue of 18th ult. Neither of the formulæ kindly given by them is applicable to any proportion of span and spring of arch. What I want is a rule for striking an approximation of an elliptic arch from three centres—or, in other words, forming it of three arcs (or the complete approximate ellipse of four arcs from four or two pairs of centres)—and that from any predetermined span and spring (or height). "Voussoir" asks whether the five-centred arch is a more pleasing one. Yes, it is, and the rule for it is precise, but too long to quote here. It is to be found in Vere Foster's drawing book, "Practical Geometry," part R. 2, post free 2½d. (Blackie and Son, Paternoster-row.) In Angel's "Practical Plane Geometry" (Collins and Sons, Bridewell-place, E.C.) will be found the same rule extended to eleven centres. But both are too complicated for ordinary artisans' use: the more centres, the nearer the approximation, but the more complication. The rule is capable of extension from five centres to any odd number above five indefinitely. What I want is to simplify the rule from five to three centres, and from those three centres to draw three arcs, so as to set out an arch of an approximate semi-ellipse in any proportion, high or flat; but hitherto I have not been able to do so. The nearest I can get to it is a very empirical rule-of-thumb method. Draw an oblong with one of the longest sides as the horizontal base, bisect it with a perpendicular drawn down from the top of the oblong indefinitely below it; set off on each of the vertical ends of the oblong a point at one-third of the height from the bottom. From these two points draw lines to the vertex of the bisection of the oblong. Mark the points on the sides of the oblong A and C respectively, and the vertex of its bi-section B. These two lines from A to B and from B to C will form chords. Bisect these two chords, and so find a centre on the perpendicular line from which to describe an arc through the points A, B, and C. Then by trial find two centres on the base of the oblong, from which can be described arcs connecting the two ends of the base with the arc before described. Lines drawn from the bottom centre through the two last-mentioned centres and continued until they cut the arcs will give the points where the arcs truly join with tangents truly in the same line. Will any reader give me, or refer me to, a true rule instead of my empirical one? "Geometric" says the "trammel method is the most accurate." That is true for drawing an accurate ellipse, and there are other equally good methods—e.g., by ordinates and by a cord secured to the foci; but the essence of my question is that an arch of approximate semi-elliptic form may be struck from three centres without the use of any of the methods for drawing the true ellipse (which cannot be struck), and of any given proportion of span and height? It is usual in a semicircular arch springing from projecting imposts to slightly stilt it to correct the optical illusion which otherwise would make it appear less than half a circle. Is it necessary also to correct an elliptical arch in the same manner, and, if so, how much, and does the "how much" depend upon the proportion between span and spring, and upon the height from the eye?—J. W. S.

[11690.]—**Tile-Hung House.**—The walls may be covered with plain tiles fixed to battens of 1½ by ¾ of oak. These battens are fixed to the studs or uprights. Oak battens are the best to use, as the fir are apt to split. The tiles are hung in the usual way; nibs are cast along their upper edges, and angle tiles are made for the external and internal angles. The space between the studs can be filled in with brick; sometimes these are laid herring-bone fashion. There should be a springing fillet at the lower edge, and a moulded course of brickwork is sometimes seen; but the lower course of tiles should form a drip, and project 3in. or 4in. from the wall-face below. Against the window openings or reveal it is not necessary to have the tiles fixed unless the reveal is considerable.—A. G.

[11691.]—**Ornamental Plasterwork.**—The only comprehensive treatise is that lately published by Mr. Batsford, Holborn, and entitled "Plastering: Plain and Decorative," by William Millar, plasterer and modeller. It is a practical work, and dealt with by a practical plasterer?—G. H. G.

[11692.]—**Architect's Responsibility.**—It is not easy to answer the question put by "Justice": What is the extent to which an architect may be held responsible for defects? "Justice" may be sure that the architect is not responsible for such accidents as he mentions; if he were, he would be answerable for any trifling defect which showed itself, and this would be unreasonable.—G. H. G.

[11693.]—**Party-Walls.**—The four descriptions you refer to are given as follows by Emden:—A party-wall may mean, first, a wall in which the two adjoining owners are tenants in common, as in "Wiltshire v. Sidford" and "Cubitt v. Porter," the most primary meaning. Second: It may signify a wall divided longitudinally into two strips, one belonging to each owner, as in "Watts v. Hawkins." Third: It may mean a wall which belongs entirely to one of the adjoining owners, but is subject to an easement or right in the other to have it maintained as a dividing wall. Fourth: It may designate a wall divided longitudinally into two moities, each moiety being subject to a cross easement in favour of owner of other moiety.—G. H. G.

CHIPS.

Hampstead Vestry has decided to cease watering its principal streets on Sundays. This is a huge blunder. Hampstead is just the very place where the dust ought to be prevented by watering, and Sunday is the very day in the week when most people would be benefited from it in summer.

Mr. R. G. Thomas, architect, has received instructions to prepare plans, &c., for a new organ chamber and choir vestry for the Menai Bridge church, and the same architect has recently completed the restoration of the old parish church, the cost of which, together with a memorial window, was defrayed by Mrs. Norman, of Menai Bridge.

Three cottage homes, built by the Hunslet Board of Guardians for the accommodation of children hitherto inmates of the workhouse, were opened at Rothwell Haigh last week. Three of the homes have room for 20 children in each, and the remaining two for 14 each. The total cost of the undertaking has been £8,500. Mr. E. J. Dodgshun, of Leeds, was the architect.

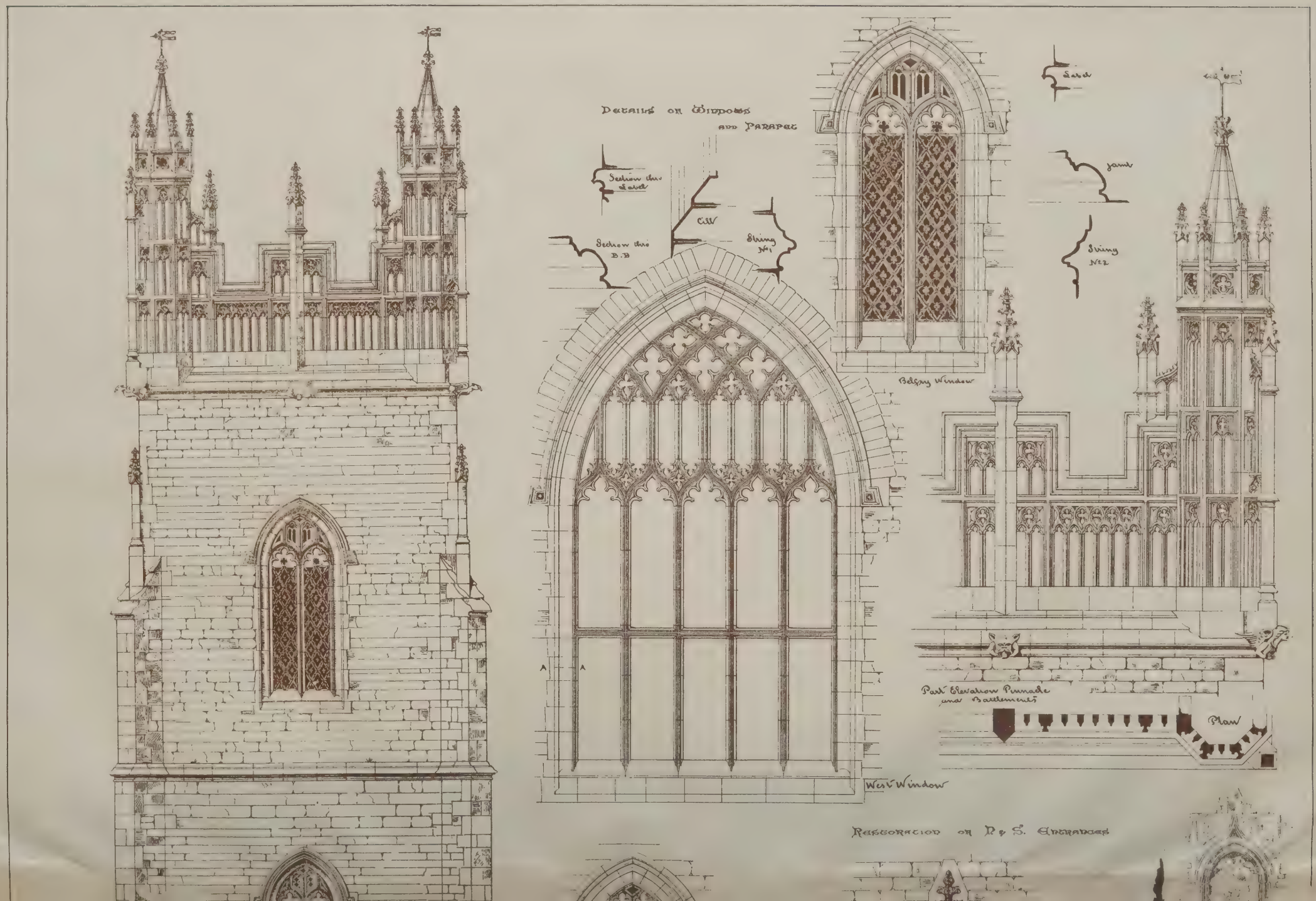
A new memorial window has just been placed at the east end of St. Matthias' Church, Barbados. It is richly coloured and especially painted for the strong light of the West Indies. This window, unlike many others in the same island, is constructed with stone mullions and tracery, which were carved in London. It is in the style of Early 14th-century Gothic, and was designed by Mr. C. P. Rogers, assistant surveyor, R.E. Civil Staff.

A memorial window has been placed in Livingston Free Church, N.B. It cost about £300, and occupies the south gable of the church, and consists of three lances 25in. in breadth, 13ft., 15ft., 13ft. in length, and a mullion of 14in. between them. Each lance has two groups of figures, filling up its length without crowding it, six in all. They represent the six scenes of the passage in Matthew xxv. 34-40. Messrs. Dickson and Walker, of Edinburgh, executed the window.

Messrs. E. H. Shorland and Brother, of Manchester, have just ventilated Baines school, Blackpool, by means of their ornamental patent exhaust roof ventilators and special inlet tubes.

It is proposed to erect a new chapel near to Hemsworth in Yorkshire for the Primitive Methodist Connexion, with seating accommodation for 200 people. Ultimately a much larger building will be erected, when the present proposed building will be used for school purposes. The architect is Mr. J. P. Earle, of Sheffield, who has erected several chapels for the same religious body.

New stables are being erected at Bretby, Burton-on-Trent, and special attention has been given to the ventilation, which will be carried out on the Boyle system.


Details of Windows and Parapet
Section thro Label
Cill
String No 1
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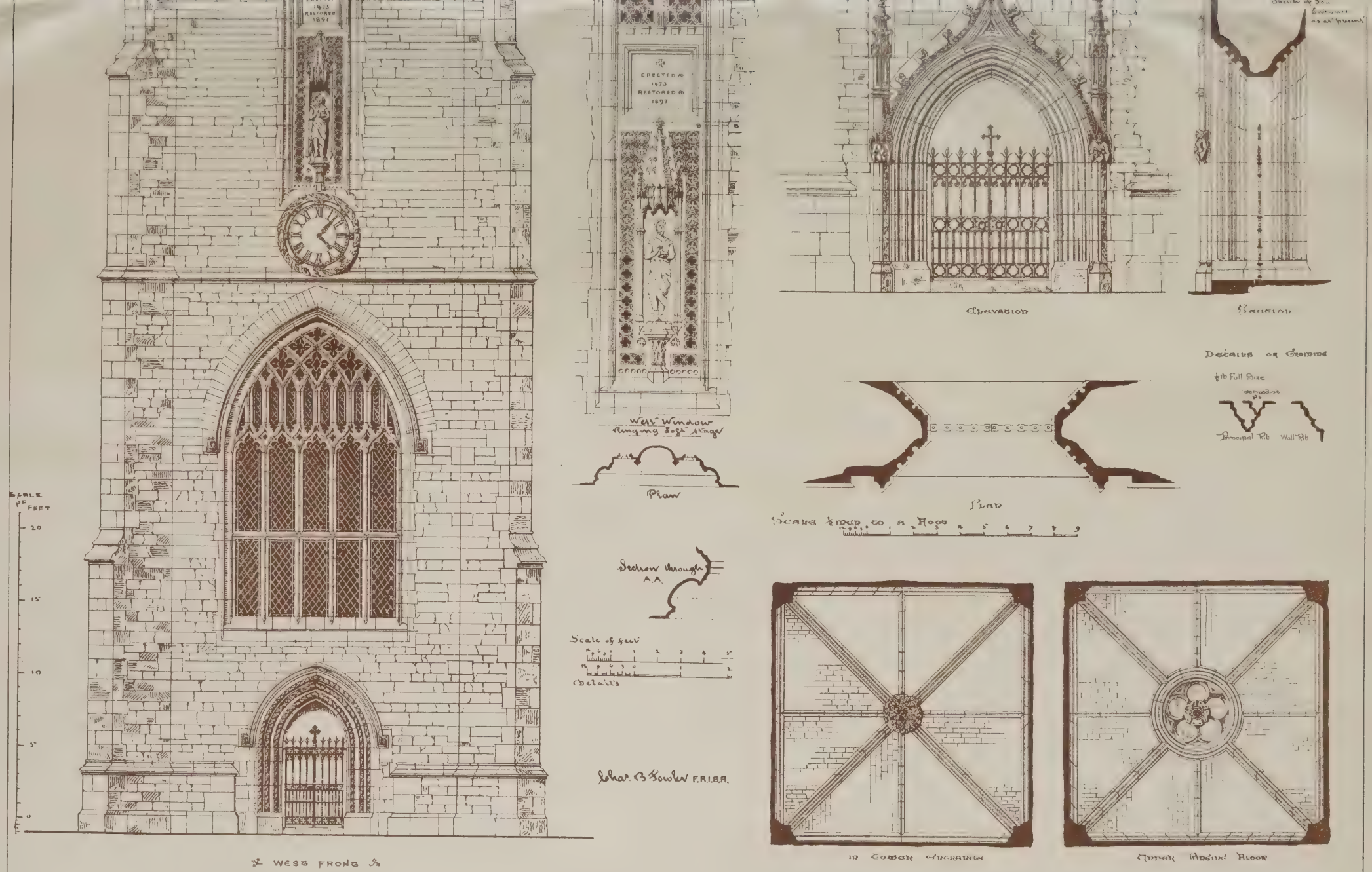
Label
Jamb
String No 2
Belfry Window
West Window
Part Elevation Pinnacle and Battlements
Plan
Restoration of N & S. Entrances

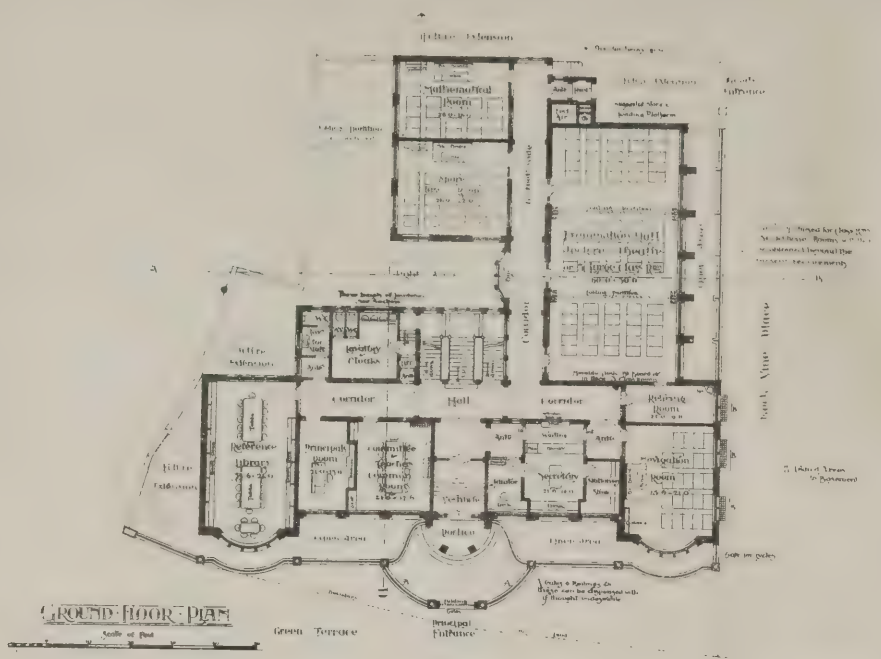


RESTORATION OF THE TOWER OF ST JOHN THE BAPTISTS CHURCH CARDIFF

Photo Lithographed & Printed by James Akerman 6 Queen Square

BOROUGH OF SUNDERLAND TECHN

MESSRS WOODHOUSE & W



GROUND FLOOR PLAN

Scale of Feet

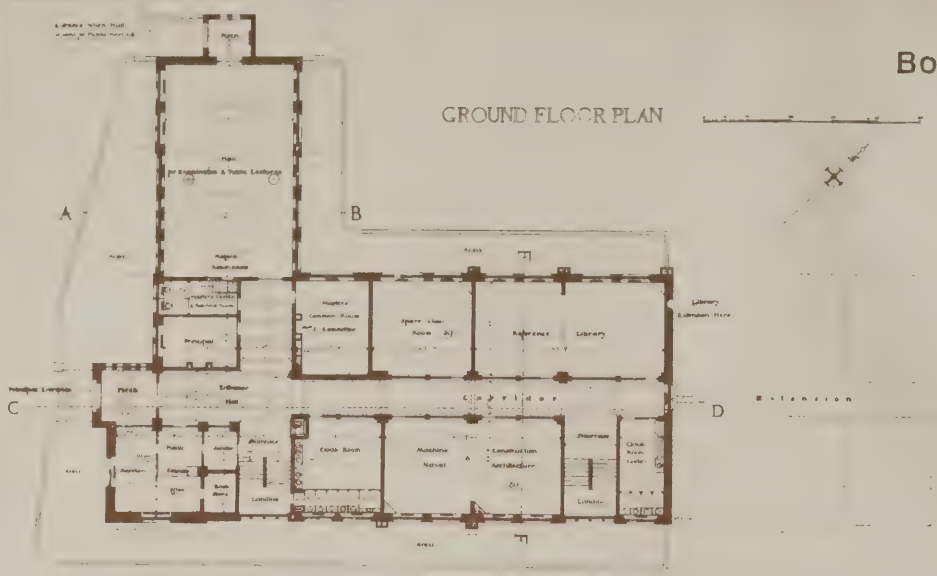
SCHOOL, SECOND PREMIATED DESIGN.

UCHBY, ARCHITECTS.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

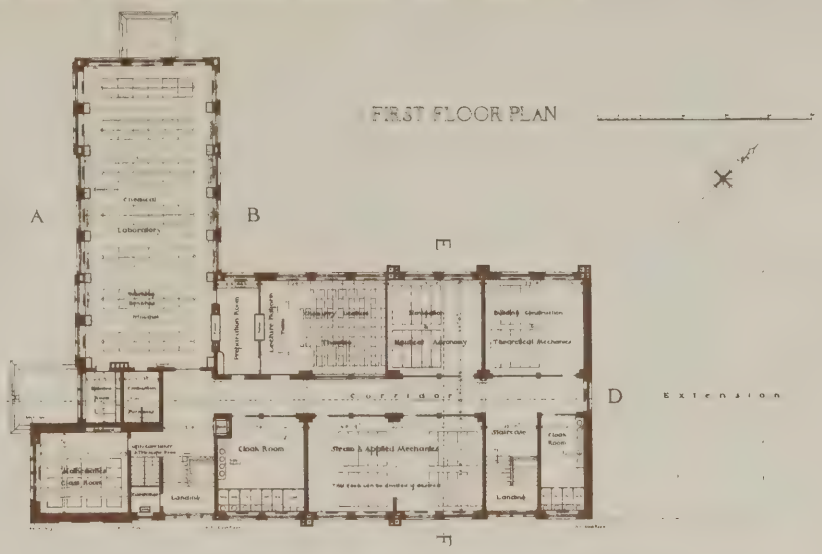
BOROUGH OF SUNDERLAND TECHNI

MESSRS POTTS SON & HEN



L SCHOOL. SELECTED DESIGN.

CS, ARCHITECTS.



"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.

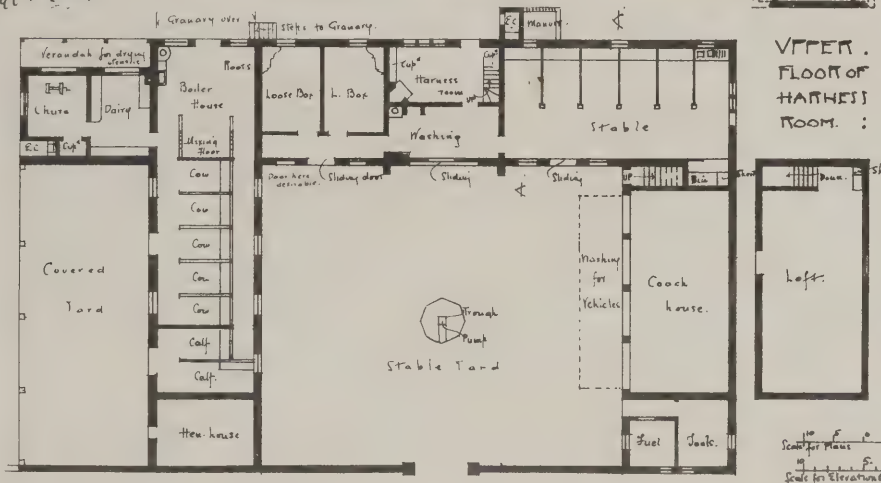
PLACED SECOND

FRONT ELEVATION:

. SECTION. A.

B.H.D.C. A SMALL BY COUNTRY. STABLE.

VIEW. OF COVERED YARD. ETC.



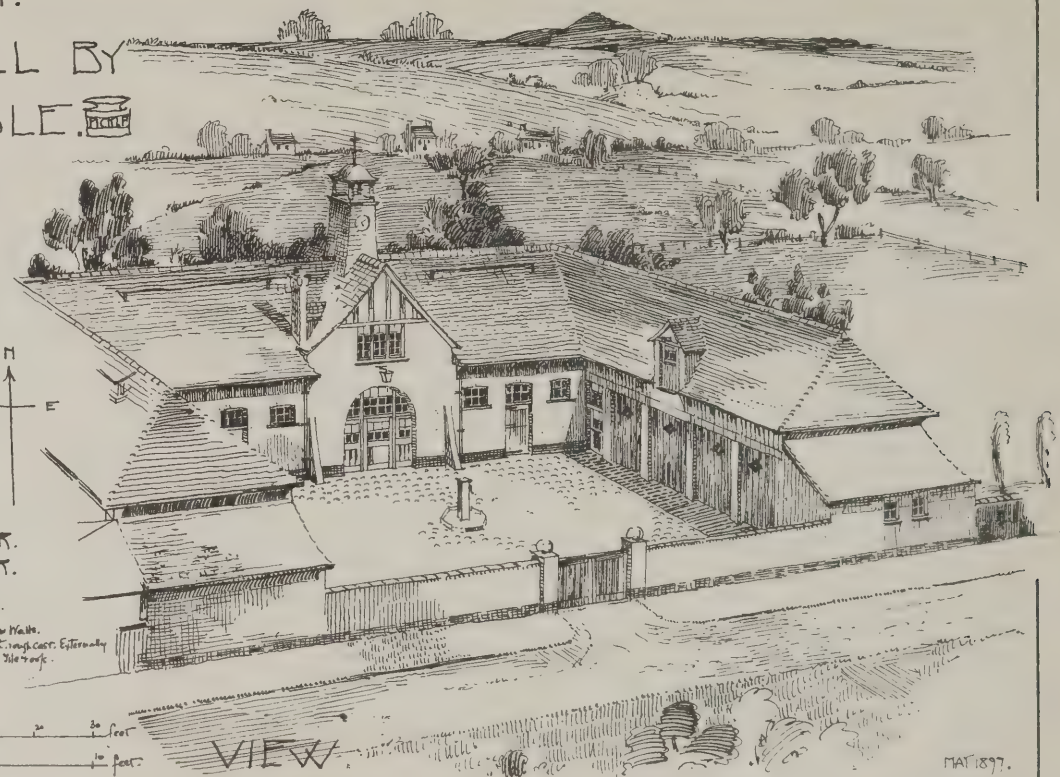
. GROUND PLAN.

UPPER. FLOOR OF HARNESS ROOM.

UPPER. FLOOR.

Materials.

Brick Hollow Walls.
Pointed with rough cast. Externally
Dark brown Tile roofs.



MAY 1897.

Photo-Lithographed & Printed by James Akerman, 6 Queen Square W.

PARLIAMENTARY NOTES.

THE PLUMBERS' REGISTRATION BILL.—On Wednesday, on the order of the day for the consideration of this Bill as amended by the Standing Committee, General Laurie (Pembroke and Haverfordwest) rose to move that the Bill be considered that day three months. He took this somewhat unusual course because the measure had obtained a second reading somewhat unexpectedly. That the Bill had not been carefully drafted was shown by the fact that the hon. member in charge of it had himself put down 20 amendments upon the paper on the present stage. Objection to the measure had been taken by the National Association for Promoting Technical Education, by the City and Guilds of London Institute, by the Association of Organising Secretaries and Directors, by the Association of Technical Institutes, by the London Polytechnic Council, by the committees and principals of London Polytechnic institutes, by the County Councils Association, and by the technical education committees of 32 county councils and county boroughs. The objects of the Bill were, he thought, desirable to a large extent, but the measure contained many objectionable features. In the first place, it did not prohibit the practising of unqualified plumbers. It further proposed to take the control of the training and examining machinery out of the hands of the bodies that were now efficiently supervising it, and to place it exclusively as regarded the whole of the United Kingdom in the hands of the master and wardens of the Plumbers' Company. This was an extraordinary proposal in face of the fact that since 1881 the City and Guilds of London Institute had examined more than 10,000 candidates for registration, and that when the Government of the day placed a large sum of money in the hands of the county councils for the purpose of carrying into effect a system of technical education, the City and Guilds of London Institute were called in to aid the county councils in establishing the necessary machinery. Why should these bodies who had done such good work be superseded by the Plumbers' Company, who were a new body altogether in connection with this subject? The Plumbers' Company had already a right under their charter to supervise the training and examination of plumbers within three miles of the City; but that was no reason why that power should be extended over the whole of the United Kingdom, to the exclusion of those possessed by other bodies. His object in moving the rejection of the Bill was that it should be sent back to the promoters with the view that it might be redrafted by them in conjunction with the City and Guilds of London Institute. He begged to move that the Bill be considered that day three months. Mr. Lloyd Morgan (Carmarthen, W.) seconded the motion. —Mr. Lees Knowles (Salford, W.) thought that the hon. and gallant gentleman had no right to complain that the Bill had passed a second reading, seeing that it had been approved by the House in 1892. With regard to his hon. friend's attack on the Plumbers' Company, he should explain that it was not the company who initiated this movement of their own accord. They were asked to do so by the great London Congress on Hygiene of 1884, and still more recently by the International Congress of 1891 in a resolution moved by the Lord Provost of Edinburgh and supported by representatives of municipal authorities in England and Scotland. The Plumbers' Company was, in fact, asked to deal with the subject because it was looked upon as the most competent body. The evidence given before the Select Committee showed distinctly that there was no desire to create a monopoly.—General Laurie: A monopoly of registration is what I complain of. —Mr. Lees Knowles said his hon. friend was honourably connected with the City and Guilds of London Institute, and he inferred that his chief object in opposing the Bill was to substitute the institute for the company throughout the Bill, at all events, to give it a prominent place. But he was credibly informed that the examination of the City and Guilds of London Institute could not be accepted for registration purposes, for various reasons. His hon. friend had found fault with the "machinery" of the Bill. The machinery already existed, and they wanted to legalise it. If there were any omissions from the centres of examination, they could be supplied by amendments. As to expenses, if the hon. gentleman thought insufficient provision was made in the Bill, he could move to amend the fees. The cost of this legislation was to be met out of the company's funds. If any reasonable and proper attempts were made to amend the Bill, he for one should be only too willing to accept them.—Mr. Hobhouse (Somerset, E.) said nobody would depreciate the long-continued labours of the hon. member for Salford on behalf of the measure, nor the excellence of the ultimate object at which they aimed — viz., the promotion of the public health. But grave considerations, educational and otherwise, were raised by the form in which the Bill came before the House; and he doubted whether it was possible in the limited time available this Session to produce a measure that would satisfactorily attain the object aimed at. He had been asked by the County Council Committee and by some of the great technical institutes which gave instruction in plumbing and the allied sciences to enter the strongest possible protest against the Bill in its present form, and to ask the promoters of the Bill and the Government, who had taken it under their patronage, to consider carefully whether large concessions ought not to be made to those who for many years had shown a very practical and substantial interest in the improvement of the plumbing industry. The object of the Bill was twofold — to improve plumbing, and to give the public protection against incompetent plumbers. As to the second object, the second subsection of clause 13 raised grave apprehensions that the Bill would do more harm than good. It proposed to put on the register every employer of plumbers in connection with the businesses of builders, ironmongers, sanitary engineers, or other like occupations who were engaged in the business prior to the 1st of March, 1892. It was a pretty large order that all these gentlemen were to be put on the register without any test examination whatever. He ventured to ask whether a register which began in that way was likely to be any protection to the public whatever. Was it not far more likely to mislead the public, when every person who came into any one of these wide categories was to be entitled to advertise himself as as a plumber registered under the Act? The second, and, perhaps, more important, object of the Bill was the improvement of the plumbing industry. Why he objected to the measure in its present form was that it practically ignored those authorities—with the exception of the Plumbers' Company—who had spent money and trouble for years past in improving the plumbing business. There were at least 15 county councils and 36 county boroughs in England alone that held plumbing classes in various parts of the country, and the students educated every year by these local authorities had increased from 1,550 in 1892 to 3,488 in 1897. These authorities, almost without exception, utilised the examinations of the City of London Guilds—an institution which the Bill practically ignored. The secretaries and others interested in technical education had, as a whole, agreed to certain resolutions proposing large modifications in the provisions of the Bill relating to the examinations, as they did not desire to see the Plumbers' Company made the statutory examining body, being satisfied with the complete and thorough tests of the City of London Guilds. This was the first proposal that had ever been seriously made to register the members of a trade as distinguished from the members of a profession, and the House ought to see that in establishing what might be a great guild, controlling a trade, and in close connection with a City company, such a measure as this was based on sound and satisfactory lines, which might be made applicable to other trades if need be. The local authorities that had spent so much money on technical education ought to be adequately represented on the council it was proposed to set up, and unless concessions were made in the directions he had indicated, he and others who felt with him would be under the necessity of voting for the amendment.—Mr. T. W. Russell (Tyrone, S.) desired to state at once what the views of the Government were upon this question. The House would do well to remember that this was not a Government Bill, but that of a private member, which received a second reading without any intervention on the part of the Government at all. The debate came on at half-past 11 o'clock at night, and the only way in which the Government interposed was that after the principle of the Bill had been affirmed by the second reading, they supported a motion referring it to a standing committee. The Bill went to such committee, of which it was quite true that he was a member, and he considered it his duty, as representing the Local Government Board —the public health department of the country—to do what he could to make the measure as workmanlike as possible. But in doing that he by no means took any responsibility for the Bill, which was one the House must deal with from its own standpoint. The proposal made had been described by his hon. friend as unusual. He himself thought it was not only unusual, but that it was perhaps a little unreasonable. What was the brief history of this question? This Bill had been before the House for something like six or seven years. In 1892 it was read a second time, and sent to a select committee. That select committee took evidence, and reported the Bill to the House. In 1893 the Bill was again introduced, read a second time, and referred to the standing committee on trade, that committee, he understood, refusing to proceed further with it because the Local Government Board was not represented upon it. Then the Bill was introduced this session, read a second time, and sent to the standing committee on trade, by whom it was largely amended, he admitted, at the instance of the Local Government Board. Neither in 1892, 1893, nor in 1897 had any local authority, guild, or institute demanded representation. The rejection of the Bill had been moved because claims had not been fairly considered which had never been made! The motion was not only unusual, but unreasonable. The Government approved of the principle of the Bill, thinking that in the interests of public health there should be registration of plumbers. (Hear, hear.) The Bill practically placed the entire control of the examinations, and everything connected with the Bill, in the hands not so much of the Plumbers' Company as of the general council, which consisted of eight master plumbers and eight operative plumbers. Urban and rural district councils, and councils of boroughs had been mentioned in the Bill, and not the county councils, because to the former was intrusted the carrying out of the law relating to public health. The great distinction between the examinations of the Plumbers' Company and those of the guilds and institutes was that the latter, as far as practical workmanship was concerned, were purely optional, but those of the Plumbers' Company were absolutely compulsory. The Lancashire County Council were so much impressed by this fact that they conducted their examinations under the Plumbers' Company's rules, because the company's examinations were not only theoretical, but practical. He admitted that in the clauses of the Bill there was room for improvement as regarded the machinery of the Bill. The Government would keep an open mind with respect to the amendments on the paper, and he asked the House not to prevent their consideration by rejecting the Bill.—Mr. Whittaker (York, W.R., Spen Valley) objected to the Bill, owing to the source from which it sprang, and the purposes at which it aimed. The object of the promoters of the Bill was not the improvement of the public health, but to secure a monopoly for a trade and privileges and powers for a City company. The latter were taking advantage of the feeling about plumbers to get traders and workpeople generally into their hands. The masters and workmen were willing to assent to an arrangement of the kind, because examinations and fees would tend to keep men out of the trade. The plumbing trade had suffered severely in recent years, because of the tendency of large firms to undertake the plumbing with the gas-fitting, decorating, drains, and the electric light. Plumbers could not embrace other trades and so other trades were embracing theirs, which was being gradually squeezed out as a separate trade. This was why the plumbers were supporting this Bill. Mr. Anderton, president of the United Operative Plumbers' Association of Great Britain, in his evidence before the standing committee, admitted his desire to have plumbers' work taken out of all general building contracts and made separate. He thought that a man who was a plumber pure and simple would give more time and attention to his business than a general builder or contractor could give to the plumbing. The general builder, he added, should not capture profits that would come to the plumber alone. Mr. Anderton's evidence showed that a monopoly for his trade was alone what they were aiming at, and not the improvement of the public health. It was the little men who did the work badly, and these little men wished to secure these special advantages. Registration would not secure better work. But the difficulty in the trade was not want of knowledge, but want of conscience—not want of skill, but want of honesty. No system of registration would provide honesty and conscience, and the Bill would do nothing in securing competent workmen. The employer of a plumber might be a competent man and get registered, but the Bill made no provision that the men that he employed were competent men. The whole thing was a delusion, and would do a great deal of harm. It would create false security. Then it was said the jerry-builders gave plumbing work to a Jack-of-all-trades; but the Bill would not prevent that. As showing the methods by which the City companies worked, only the previous night the Plumbers' Company were dining members of that House. It was not a creditable thing to the company or the House.—Mr. Lees Knowles: I did not attend the dinner.—Captain Pirie (Aberdeen, N.): I attended it. (Laughter.)—Mr. Whittaker went on to argue that the general council would give no protection; it would merely transfer the powers of the company. The Plumbers' Company wanted to retain in their own hands the training of teachers in their technical schools, as well as the registration of plumbers, for it all meant big fees. No wonder that strong protests against the Bill had come from the great technical education institutions of the country under the control of the county councils. Mr. Lees Knowles pointed out that the Plumbers' Company had, at the suggestion of county councils, held their examinations in five centres. Mr. Whittaker contended that the registration of plumbers should not be in the hands of a City company; and, even if it should, this was a clumsy and impossible measure. It should be withdrawn and introduced next session, with the City company wiped out of it and a body thoroughly representative of technical education formed for the purposes of the Bill. This was the first occasion on which the House was asked to provide registration for an ordinary trade. It would

be looked upon as a precedent in the future, and it was therefore worth while to see that the first measure was a reasonable, sensible, and workable measure.—Dr. Farquharson (Aberdeenshire, W.) hoped that the House would be allowed to get the discussion of the practical part of the Bill.—Mr. Burns (Battersea) was going to oppose the Bill lock, stock, and barrel. He dissented entirely from the view that there was a need for the Bill to the extent represented. When the Bill was conceived 10 or 15 years ago, local authorities neglected plumbing and were somewhat indifferent to sanitation, and the plumbing trade was perhaps at its lowest ebb. But since that time there had been a revolution, he was glad to say, in domestic hygiene and sanitation, and local authorities had made considerable headway in undoing the mischievous neglect of the past. The Bill put a ring fence and a protectionist inclosure round the small master plumber, who was being knocked out by the more scientific large builder and the skilled master plumber who employed good workmen at excellent rates of wages. He did not believe there was any public necessity for the Bill or a particular demand for it, or that, given those conditions, this was the best way to bring the reform about. A man might pass the highest examination as a plumber, and he might be smothered in certificates; but if economic pressure on the master and commercial incentive in the workman made both conspire to poison a customer with typhoid or sewer gas, no amount of certification or registration would prevent that undesirable end. What they had to do in the matter of plumbing was what public authorities had done in regard to everything. They had to test the work when performed, leaving complete freedom of action in carrying it out, just in the same way as the local authority did in the matter of house and other drains. The plumbers would would have on the council an overwhelming majority against the sanitary inspectors; but the history of all sanitary reforms in construction of drains and sewers was that improvements had been secured by outside experts and educated public opinion, and so it would be with plumbing. Of course, he was in favour of men of all crafts being educated, plumbers included; but the Bill would interfere with the educational authority of the many institutions that had sprung into existence in connection with technical education. The certification and registration of plumbers would have no effect in producing good working; the Bill was not wanted, and would simply lead to espionage. It would create a class of workmen who would cram through the examination, and rest content, not seeking to develop the trade through their merit, their polytechnic, or their master. It was an attempt to construct a ring fence round a trade against the interests of sanitation and the public welfare. Because the Bill was not wanted; was badly drafted; because it would create a class of city corporation plumbers, fortified with certificates and disliking hard work; and because it would, by local registration, tend to interfere with the mobility of labour and check the versatility of industry, he should vote against the third reading. —Mr. Bucknill (Surrey, Epsom) said the county of Surrey had taken an active part in technical education, and had taken an interest in the education and improvement of practical operative plumbers, and he therefore wished to say a few words about this Bill. The Surrey County Council had expressed a strong opinion in favour of the object of the Bill, and thought that it was a good Bill, which, however, required amendment. After listening to the speeches which had been made, he had come to the conclusion that the Bill should be allowed to proceed. He admitted that there were clauses which would apparently clothe the company with too much power, and which, it might be argued, would injure those bodies and associations which had spent a considerable amount of money in the education of the operative plumber. The London County Council had not criticised the Bill in a hostile manner, but had confined themselves to an amendment of a purely formal character. Everyone had spoken in favour of the principle of the Bill except the hon. member for Battersea. It would not injure the plumber, but would place him in a better position. The recorded opinions of the plumbers themselves in their resolutions passed at various meetings were in favour of registration, and the British Medical Association and municipal corporations and county councils had petitioned in favour of the Bill.—Mr. Acland (York, W.R., Rotherham) said that what they had to take into account in considering whether they were to support this Bill was what the attitude of the House of Commons ought to be in setting a precedent in regard to the registration of this or other trades. Though the principle of the Bill might be a good one, its method was thoroughly unsatisfactory. Since this Bill was first introduced the great county and urban authorities had been set up, and in view of the steps they were taking to improve technical instruction, it would seem that they were the bodies to whom the duties involved in this Bill should be intrusted. By Clause 9 the Plumber's Company was constituted the chief authority under the Bill for examination and registration. Surely it was possible for the company to show its interest in education in the way in which other companies had done. It seemed to him that the local authorities, who both in London and many parts of the country were developing their work in connection with technical instruction, ought to hold a position entirely different from that which they held under this Bill.—Mr. Wolff (Belfast E.) failed to see why a London company should be set up as the examining authority in this matter. He thought it was most unjust and most unfair. The Bill seemed to him about as defective as any Bill could be. He objected both to its principles and its details. It was most unfair that any class of workmen should get a degree, as it were, by examination by a private London company, and so assume a superior position to other workmen. — Mr. John Ellis (Nottinghamshire, Rushcliffe) wished to say a few words as chairman of the grand committee to which the Bill had been referred. What the House had heard that day was really a second reading debate. He had noticed in the committee that both the promoters and opponents of the measure were without that guidance which a useful second reading debate always afforded. The promoters of the Bill were rather at sea when amendments were proposed in committee, and the result was not satisfactory. That afternoon's debate ought to have taken place before the Bill went before the grand committee. It would be a serious thing if the House of Commons were to place crude legislation of this kind upon the Statute Book. Even if all the amendments which appeared upon the paper were inserted in the measure, he doubted whether it would thereby be made satisfactory. He noticed that the promoters of the Bill themselves had put down a large number of amendments. In the circumstances he was inclined to think that the House would be wasting its time by proceeding further with the measure.—Sir J. B. Maple (Camberwell, Dulwich), thought that the Bill was unnecessary, and condemned it as a crude attempt at legislation.—Mr. Holborn (Lanarkshire, N.W.), supported the Bill on the ground that it was in the public interest. He agreed that sanitary plumbing had made an enormous advance in the past ten years, and he thought that the chief object of the Bill would be to keep workmen abreast of this advance by means of education.—Sir J. Leng (Dundee) thought that if any trade should be registered, it was the plumbing trade. Plumbing work was concealed, and bad work was only known by its effects. Disease was spread in our homes and generated in our cities by bad plumbing work; therefore it was desirable that the education of plumbers should be attended to. Mr. Brigg (Yorkshire, Keighley) asked why plumbers should be selected for special treatment in this way. They were not the only workmen connected with the hygienic construction of our buildings. Why should similar plans not be taken to examine and classify builders and the men who lay down drains as well as plumbers? The real cause of the deficiency in the work of plumbers and others connected with the construction of houses was to a large extent due to the cheap system of contracting and the cheap materials which were employed. It should be remembered also that there were a large number of tramp plumbers, whose services were utilised by cheap contractors. These men were exceedingly careless in carrying out their work. It was absolutely necessary plumbing work should be inspected before it was covered up, so that it might be ascertained whether it had been properly done. The present system of registration of plumbers was good as far as it went, and he objected to its being interfered with. The system provided by the Bill was not one he felt justified in accepting, and he should vote against the Bill. (Hear, hear.)—Mr. Wylie (Dumbartonshire) said the Bill was an honest attempt to grapple with the subject, and it would be successful in spite of certain deficiencies in the measure. He insisted on the importance of inspecting the work of repairs, especially in the dwellings of the poorer classes. Faulty repairs too frequently led to disease and death.—Mr. Pickard (York, W.R., Normanton) said as a labour representative he should support the Bill, and there were strong reasons why labour members should vote for it. Because the Bill might be badly drafted, that was no reason why it should be rejected, and the promoters of the Bill were willing to accept any reasonable amendment.—Mr. Goddard (Ipswich) opposed the Bill on the ground that it afforded no guarantee that the public health would be promoted by it. It set forth that certain people should be registered as qualified and certificated plumbers, but there was no guarantee that certificated plumbers would be generally employed. The Bill did not insist on plumbing being done any more efficiently than now. Much mischief was done by jerry builders who ran up cheap houses for the poorer classes, and there was nothing to compel them to employ registered plumbers so that the sanitary arrangements of the houses of the poor might be efficient. — Mr. Bayley (Derbyshire, Chesterfield) considered that the Bill in its present shape did not carry out a single principle it professed to deal with.—Mr. Muntz (Warwickshire, Tamworth) regarded the Bill as objectionable in the form in which it had been presented, and failed to see why plumbers should be registered any more than bricklayers.—Sir W. Foster (Derby, Ilkestone) observed that the Bill had been before the House for some years, and he was sorry that during that period it had not developed into a better Bill than it was at the present time. Still, it had the germs of good in it, and he should be sorry to see any amendment carried which would postpone its consideration. The argument that plumbers should not be registered because bricklayers were not had neither justice nor logic in it, and if adopted would put an end to registration in any trade whatever. He wanted to begin with the registration of those trades on the efficiency of whose work the health of the people depended. Plumbers were more intimately connected with health than any other trade. If bricklayers desired registration, they could have it, and if in the mean time the registration of plumbers would have the effect of saving a few lives annually in this country, they should endeavour to secure its adoption. It was objected that the Bill proposed to register persons who had been practising as plumbers since 1892. Anybody who had studied the history of registration would find that was the course which had always been followed; and they were bound to recognise the members of the trade or profession it was proposed to register who were practising at the time a Bill such as this passed. But afterwards they would only put people on the register who had passed an examination which he hoped would go up step by step until it became more perfect, and until they had in this country a body of registered plumbers who knew their business properly, who had learnt that amount of science necessary for effective sanitary plumbing, and whose knowledge would prove invaluable in protecting public health. The object of the Bill was a good one. It sought to introduce into a very important trade the system of selection by which competent persons would do the work, and on that account he thought it ought, at all events, to receive the sanction of the House as regarded the present stage. The Bill was not a perfect one, and was open to amendment in many ways; but believing that if it were passed it could be made a measure that would be of benefit to the country, he should vote against the amendment, being convinced that in so voting he should be voting in favour of a step in advance in sanitary legislation. The House then divided. For considering the Bill, 200; against, 77; majority for, 123. The House then proceeded with the consideration of the Bill. Clause 1, giving the short title of the Act, having been agreed to, on Clause 2, "This Act shall commence and take effect from the first day of January, 1898, hereinafter referred to as the commencement of this Act," Sir C. Dilke (Gloucester, Forest of Dean) moved as an amendment to substitute for the words "from the first day of January, 1898," the words, "such date after the first day of August, 1898, as the Local Government Board may fix by order published in the *London Gazette*." If there was any real intention of passing the Bill in the present session it would have to be very much simpler, and would have to be virtually framed by the Local Government Board. If this amendment were carried, he should be prepared to move to leave out the greater portion of Clauses 3 and 4, and the schedules, and to propose that the rules for the election of the governing body should be left entirely to the Local Government Board. — Mr. Burns hoped the amendment would be accepted. Unless the rules were framed by some such body as the Local Government Board, he predicted that many of the authorities who had petitioned for the Bill, and some of the educational institutions that were not opposed to it, would abandon the Bill, or ask to have it repealed, in consequence of the complexity of its machinery.—Mr. T. W. Russell said he must decline to accept the amendment of the right hon. gentleman. He did not believe that the arrangements for the establishment of the general council were unworkable; but, at all events, the Local Government Board could not take the responsibility of devising the perfectly new machinery which was proposed.—Mr. Warner said it was not a question of the Local Government Board nominating the members of this council, but simply of their drawing up rules for their election. After some further conversation the House divided on the amendment. For, 97; against, 176; majority against, 79.—Mr. Kimber (Wandsworth) moved to omit from the proposed title of the council "General Council of Plumbers' Education and Registration" the words "Education and." The object of the amendment was to limit the operations of the council to registration.—Mr. Hobhouse supported the amendment. The proposed council would be a body entirely unsuitable for the supervision of the education of plumbers. For the whole of England and Wales (exclusive of London, in regard to which a more reasonable proposal was made) two-thirds of the General Council of 24 members were to be connected with the

plumbing trade; and the remaining eight were to be members of the council of a borough, or other urban or rural council, or medical officers of health, or inspectors of nuisances, who were to be elected of large constituencies consisting of persons carrying on any trade employing plumbers, operative plumbers, and the members of the borough, urban, and rural councils. Could any body so elected be regarded as a proper educational authority? The largest proportion of this enormous electorate would be connected with the plumbing industry; and the result would undoubtedly be that the council would consist almost entirely of persons belonging to that industry. Such a body might be a very suitable one for registration; but it could not be said to be a suitable body to regulate without any control from a central authority the education and examination of plumbers. It was true that 20 additional members were to be elected by the general council from the nominees of a long list of sanitary institutes, technical colleges, and plumbers' associations; but this addition could not be said to render the general council a fit body to exercise control over education. Except in the case of London, there was no guarantee that the whole of this council would contain a single representative of the local authorities which were doing so much for the technical education of plumbers at present.—Mr. Lees Knowles hoped that the amendment would not be pressed.—Mr. Burns supported the amendment.—Sir W. Foster said that all registering bodies were necessarily concerned with education. The council would supervise without attempting to compete.—Mr. T. W. Russell resisted the amendment. The Committee divided, and the numbers were—For the amendment, 123; against, 153; majority against, 30. It being after half-past five o'clock, the debate stood adjourned.

LEGAL INTELLIGENCE.

Plant v. Bourne.—(Court of Appeal, June 24, before Lords Justices Lindley, Lopes, and Chitty). This was an appeal against a decision by Mr. Justice Byrne. The action was brought by a vendor for the specific performance of a contract for the sale of land. The purchaser resisted specific performance upon the ground that the contract did not contain a sufficient description of the land to satisfy the Statute of Frauds. The agreement was in the following terms:—"An agreement made the 12th day of February, 1896, between Robert Plant, of Putney, in the county of Surrey, gentleman, of the one part, and Robert Henry Bourne, of Trentham, in the county of Stafford, station-master, of the other part. The said Robert Plant agrees to sell, and the said Robert Henry Bourne agrees to purchase, at the price of £5,000, 24 acres of land freehold, and all appurtenances thereto, at Totmonslow, in the parish of Dracott, in the county of Stafford, and all the mines and minerals thereto appertaining; possession to be had on March 25th next, the vendor guaranteeing possession accordingly." The agreement was signed by both the parties. The plaintiff proposed to adduce evidence to prove that he was the owner of freehold land at Totmonslow, containing 24a. 1r. 26p.; that at the date of the agreement the defendant was well acquainted with the land; that he had, on Feb. 12, 1896, by appointment, gone over and carefully examined the land with the plaintiff; and that the agreement was afterwards entered into. The learned Judge refused to allow this evidence to be admitted, and held that the requirements of the statute were not satisfied. He accordingly declined to enforce specific performance. The plaintiff appealed. The Court allowed the appeal. Lord Justice Lindley said that he was unable to take the same view as the learned Judge had taken. The objection to the agreement was that it did not specify what 24 acres the purchaser agreed to purchase. The vendor contended that he was at liberty to show, by parol evidence, what was the subject-matter of the contract. The learned Judge held that the evidence was not admissible. He conceded that parol evidence was always admissible to identify the property; but he said that the property which was to be identified must be more clearly specified. In "Ogilvie v. Foljambe" (3 Mer., 53) (in 1817), Sir W. Grant, M.R., said that parol evidence could be admitted to show to what house and what premises an agreement to purchase "Mr. Ogilvie's house and to give £14,000 for the premises" related. That being so, all difficulty vanished in the present case. That decision of Sir W. Grant had always been regarded as an authority. It was followed by the Court of Appeal in "Shardlow v. Cotterell" (20 Ch. D., 90). The Court would be simply splitting hairs and making a distinction without a difference if it were to adopt the view put forward by Mr. Astbury for the defendant. The appeal must be allowed. Lord Justice Lopes and Lord Justice Chitty gave judgment to the same effect.

The Industrial Dwellings Co. and the Public Health Act.—At Southwark Police Court on June 24 Mr. Slade gave judgment in regard to an important sanitary prosecution, which had been before the Court at various times during the past three months. Mr. Slade said the Metropolitan Industrial Dwellings Company (Limited) was summoned before him by St. Saviour's District Board of Works for disregard of a certain sanitary notice served upon them in respect to No. 7 Block, Mowbray Buildings, Red Cross-street. At the commencement of the hearing it was contended that the notice was bad, inasmuch as it ought to have specified the nuisance complained of under subsection B of the second section of the Public Health Act; and also that the company were not liable under section 4, as persons "by whose act, default, or sufferance" the nuisance arose, and "Reg. v. Parlby" was relied upon. He thought that in the circumstances the notice was sufficient, and that the defendants were the persons upon whom it was properly served. He was aware of the difficulty which existed in carrying out the necessary alterations, owing to the limited space of ground upon which Mowbray-buildings stood, and he could not allow the question of expense to influence his decision, seeing that the Industrial Dwellings Company was a commercial speculation, competing with the common lodging-houses, which were carried on under stringent regulations. In his opinion the building could not at present be considered to be in a sanitary condition. He imposed a fine of 40s., and ten guineas costs. It was arranged that similar summonses with regard to six other blocks of the same dwellings should stand adjourned, in order that the defendant company might consider whether they would appeal against the magistrate's decision.

Rights of Owners of Building Plots.—The Master of the Rolls delivered the judgment of the Court of Appeal on June 24 in a matter affecting the rights of parties who buy land for building purposes. Some years ago a Mr. Brawn purchased of Lady Robinson a plot of land at Kingsthorpe, and built a house upon it, when, afterwards, a Mr. Revitt bought an adjoining piece of land, and erected upon it a house which Mr. Brawn complained obstructed his light and air. An action was brought by the latter, but it was dismissed by the Northampton County Court judge, whose decision was affirmed by a Divisional Court. The Court of Appeal now held that as Lady Robinson had reserved the right to deal with the other plots of land in any way she pleased, the plaintiff's claim against her successor in title failed, and the appeal was dismissed.

Liability for Repair of Sea Walls.—The storms having damaged the sea-wall known as the Esplanade at Sandgate, a question arose between the Kent County Council and the Sandgate District Council as to who was liable for the expense of the repairs. The arbitrator appointed by the Local Government Board decided in the main for the District Council. Last Friday the Court of Appeal reversed this decision, on the ground that the promenade which was injured was intended as an attraction to visitors, and was not a highway for the use of the county generally.

The London County Council and the Building Act.—At the South-Western Police-court Mr. J. L. Schiefer, of Grove Mansions, Clapham Common, was summoned by the London County Council for having committed a breach of the Building Act by erecting wooden structures at the rear of the mansions without a license and did suffer the same to remain. Mr. Chilvers represented the Council, and Mr. W. R. Warren defended. The defendant was fined 10s. a short time since for erecting the structures without a license and the contention of the Council was that he was liable to daily penalties as long as the building was allowed to remain. Mr. Warren argued that as the defendant had sold his interests in the buildings he could not go on another man's premises and pull the buildings down. Mr. Francis said if he accepted the contention the defendant would be liable to penalties until the end of his days. He was of opinion that the summons had been taken out under the wrong section and therefore dismissed it.

Builders and By-Laws.—At the Birkenhead Borough Police-court, before Messrs. Wm. Jackson and T. L. Dodds, Cecil Edward Maples, of 14, Cook-street, Liverpool, was summoned for that he being a person laying out a new street exceeding 150 yards and not exceeding 300 yards in length—viz., a street in continuation of Mulberry-road there—unlawfully did lay out such street so that the width thereof is not 36ft. at the least. Mr. Fearnley, prosecuting solicitor for the Corporation, appeared for them, and Mr. Layton represented the defendant. Mr. Fearnley said the defendants had deposited plans for laying out a new street 30ft. wide continuing Mulberry-road from Wycliffe-street to the Mersey Railway and then to be continued about right angles in a southerly direction under the name of Ashley-street, continuing as such on the western side of the railway for 83 yards and then turning again at right angles towards Wycliffe-street again in a westerly direction. The street thus formed three sides of a square, the back of Wycliffe-street forming the fourth side. The Corporation contended that though this street had two names it was really one street, as the length of a street had to be taken from the point of entrance to the point of exit. Treating this street in this commonsense way Mulberry-road and Ashley-street formed one street exceeding 150 yards in length and therefore should be 36ft. wide. By consent of the defendants, who wished the point settled, they were to be treated as though the street were actually laid out, but as a matter of fact the street as yet existed on paper only. Mr. Charles Brownridge, borough surveyor, was called to prove the plans and show that these two streets were in fact one and should be treated as such. For the defence Mr. Layton contended that in reality this was three streets, and should be treated as such. Mr. W. Jackson said that after hearing the surveyor and examining the plans they had decided that what should be looked at was the object of the by-laws under which these proceedings were taken. These were for the purpose of securing proper ventilation and preventing a congestion of traffic. In this case there would be no ventilation interfered with, because the end of the street abutted on the Mersey Railway, neither could there be a congestion of traffic, because carts would prefer the direct line along Wycliffe-street. The Bench were therefore of opinion that these were practically three streets and not one continuous street, and gave a verdict for the defendant, with costs—three guineas.

Re Robert Campbell.—This debtor was examined by Mr. Dibb at the Manchester Bankruptcy-court. He had carried on business as a joiner and builder at Altrincham and Broadheath. Liabilities, £325; assets, £115, leaving a deficiency of £210. The causes of his failure, he said, were loss on a contract through miscalculation and want of capital. In a contract he had omitted to allow for £157 10s. for plumbing work. He had also lost £11 in bad debts and £25 in law costs. He expected that his assets would not realise a penny. If he had had time he believed he could have paid all his creditors 20s. in the pound. He had looked after the books of a friendly society for a number of years, and had neglected his own.—The examination was closed.

Re E. Capps, Builder, Felixstowe.—This was also an adjourned examination, the statement of accounts filed on the last occasion showing a deficiency of £1,010 19s. In compliance with an order made by the Registrar the debtor had filed a further statement showing how his deficiency had arisen. He was now examined by the Official Receiver upon certain items included in this first statement, and he stated that he had undervalued the houses he had at Felixstowe, and the mortgagees were content with their security, the effect of which would be to reduce his liability by £600. Questioned by Mr. Messent as to certain other items, the debtor said there was £80 claimed by Messrs. Palfreman and Foster for goods for two houses at Chiswick, for which he was once contractor, but he had thrown up the contract, and the goods were sent afterwards. Judgment was, however, given against him in respect to that amount, but that was because the item was included in a bill in which were items of goods for which he was indebted, and he had not money enough to put in a defence, which would have involved his paying the larger amount first. The examination was provisionally closed.

Re John Limn.—A receiving order has been made in the case of John Limn, of Gough-street and Canton-street, Poplar, builder and contractor, Messrs. E. C. Kilsby and Son being the solicitors to the proceedings. The liabilites were estimated at under £1,000.

Surface Water Sewers.—Durrant v. Branksome Urban District Council.—This was an appeal (before Lords Justices Lindley, Lopes, and Chitty) against a decision of Mr. Justice North (reported in the *Times* of April 12 last, and in the *Times* Law Reports, Vol. XIII. p. 359). An important question arose as to the right of local authorities, in making up new roads, to turn new surface-water sewers into the natural watercourses of the basin in which those roads lie. The plaintiffs are the owners, as trustees, of the Durrant Estate, a large property, in its general character a building estate, situate partly in West Bournemouth and partly in the district of the Branksome Urban Council. The upper part of the river Bourne flows in a deep valley through the plaintiffs' property, the channel through which the river now flows being an artificial one. A portion of the valley is let to the Bournemouth Corporation for the purpose of public gardens. Owing largely to the nature of the soil, the stream, which in times of flood is liable to overflow, brings down a quantity of sand and silt, much of which is deposited in the bed of the stream and tends to choke the channel. Measures are taken by the owners of the estate, by means of "stops" or dams, and by from time to time digging out the deposited silt, to obviate the evil thus caused. It was stated that the average amount of sand dug out of the stream within the plaintiffs' estate in the course of a year amounted to 50 tons before the defendants constructed the drains which are the subject of complaint in this action. The defendants have recently taken in hand the making-up of a number of

roads in their district, situate almost entirely in the basin of the Bourne, and in so doing have laid down new surface water drains or sewers, which discharge into the upper part of the Bourne, where it flows through the Durrant Estate. The usual gullies and catchpits have been constructed, and thus stop a great deal of the silt from the roads; but, especially in times of storm, a large quantity of this material is washed with the rain-water into the stream. The roads thus drained by the defendants are mainly under their own jurisdiction, but are as to a small portion—viz., the Poole-road, which is a "main road"—drained by them by virtue of an agreement with the Dorset County Council. The plaintiffs complained that the increased flow caused by the defendants' works produced extra flooding and extra deposit of sand and silt, and they sought an injunction to restrain this discharge of water, sand, silt, or solid matter through the defendants' drains or other artificial works into the Bourne. Section 15 of the Public Health Act, 1875, provides that "Every local authority shall keep in repair all sewers belonging to them, and shall cause to be made such sewers as may be necessary for effectually draining their district for the purposes of this Act." By section 16, "Any local authority may carry any sewer through, across, or under any turnpike road, or any street or place laid out as or intended for a street, or under any cellar or vault which may be under the pavement or carriageway of any street, and after giving reasonable notice in writing to the owner or occupier (if on the report of the surveyor it appears necessary), into, through, or under any lands whatsoever within their district." By section 17, "Nothing in this Act shall authorise any local authority to make or use any sewer, drain, or outfall for the purpose of conveying sewage or filthy water into any natural stream or watercourse, or into any canal, pond, or lake, until such sewage or filthy water is freed from all excrementitious or other foul or noxious matter such as would affect or deteriorate the purity and quality of the water in such stream or watercourse, or in such canal, pond, or lake." And by section 308, "Where any person sustains any damage by reason of the exercise of any of the powers of this Act, in relation to any matter as to which he is not himself in default, full compensation shall be made to such person by the local authority exercising such powers." By section 9 of the Private Streets Works Act, 1892, (this Act has been adopted by the defendants), "The urban authority may include in any works to be done under this Act with respect to any street or part of a street any works which they think necessary for bringing the street or part of a street, as regards sewage, drainage, level, or other matters, into conformity with any other streets (whether repairable or not by the inhabitants at large), including the provision of separate sewers for the reception of sewage and of surface water respectively." Mr. Justice North dismissed the action with costs, holding that the above quoted sections authorised the defendants to do what they had done. The plaintiffs appealed. The Court dismissed the appeal with costs. Lord Justice Lindley was of opinion that the learned Judge had rightly construed the sections of the Public Health Act. It was important that section 308 gave a right to full compensation to the landowner. All the roads in question were in the defendants' district. His Lordship thought the point about the Poole-road came to nothing, for the duties of the defendants in relation to that road were, by section 11 of the Local Government Act, 1888, the same as if it were not a "main road." The plaintiffs had canalised the Bourne in 1877; whether it would properly be called a "canal" his Lordship did not know. His Lordship read section 15, and said that by the definition section (section 4) the word "sewer" included not merely a sewer for the removal of filth, but also a sewer for ordinary drainage purposes. The defendants were draining some roads in their district. Section 16 was important. (His Lordship read it.) It had been urged that no report of a surveyor as to the necessity of what the defendants were doing had been obtained. But that point was not really raised in the action. The action was brought for a much more important purpose—to contest the defendants' right to make the sewers altogether, not for the mere purpose of delay till the report of a surveyor had been obtained. The word "lands" in section 16 must include land covered with water. Though section 17 was not an enabling, but a prohibitory, section, the inference to be drawn from it, taken in connection with the other sections, was very strong. It said in effect, notwithstanding the previous enabling sections, You shall not pour filthy water into any stream, watercourse, or canal. What was the inference? That you may pour in any other water. That was the view taken by Mr. Justice North. Reading the sections together, his Lordship thought that the defendants were right. The appeal must be dismissed—Lord Justice Lopes concurred. Section 15 was very clear, distinct, and large. Section 16 was very important, and if there was any doubt about its meaning it was made clear by section 17. The inference was irresistible—viz., that if water was free from the impurities mentioned in section 17 the conveying of it into any stream, watercourse, or canal was authorised. In the present case there was nothing affecting the purity of the water carried by the defendants into the Bourne. And full compensation for any damage caused to the landowner was provided by section 308. Lord Justice Chitty had formed a clear opinion that the defendants were justified in what they were doing. Section 15 imposed on them a duty to make sewers, and section 16 gave powers for the carrying of the sewers which it was their duty to make. Section 17 must be read partly as a proviso and partly as an enabling clause. The first part of the section was prohibitory, the second part was explanatory. His lordship would not say that section 17 of itself conferred a power; it was explanatory of section 16. The Legislature assumed that what they had already said justified the pouring of pure water into a stream, watercourse, or canal. There could be no question that silt was not foul or excrementitious matter. The value of section 308 was very great. As a rule, the Legislature did not interfere with private rights without providing compensation, and under section 308 the plaintiffs could obtain full compensation for any damage done to them by an increase of the sand or silt carried into the Bourne by the defendants' drain.

RE JAMES BROS.—Upon the application of Messrs. Pownall and Co., a receiving order was made on Saturday under a petition presented against Messrs. James Brothers, trading as builders at 8, Clifton-street, Finsbury. The petitioning creditors were Messrs. Daniel Norton and Sons, of Wharf-road, City-road. No particulars transpired.

Our Office Table.

THE electric-lighting works of the Shoreditch vestry, which were opened by Lord Kelvin last Monday, constitute a very remarkable municipal enterprise. The undertaking comprises, in addition to the electric-lighting plant, a dust destructor and public baths and washhouses, while a public library and museum and a municipal technical school are built on the same site. The destructor cells are capable of burning 20,000 tons of ashbin refuse a year, and the heat given off by the process is calculated to be sufficient to provide electric light and power for public street lighting and for private purposes for Shoreditch, and also to heat the adjoining baths and washhouses. It is stated that at a preliminary test 150lb. pressure of steam has been raised from dust alone, without the use of any coal, and that the results promise to be more favourable even than has been calculated.

A LETTER has been received by the Yeadon District Council from Mr. Vickers Edwards, the county surveyor, in reference to the gift of Mrs. Brown, of Bramley, of the sum of £500 for the object of planting trees on the Dudley Hill and Kilinghall-road, from the Four Lane Ends, near the Peacock Inn, to Coney Lodge Bridge. In this letter Mr. Edwards states that the County Council most distinctly object to any trees being planted on the wayside likely to interfere with the width of the road, as the boundary extends from fence to fence. The reason for objecting to an avenue of trees is, that when such trees have had a few years in which to grow, they practically meet overhead, and exclude the action of the sunshine and wind from the road, which, of course, would have a very detrimental effect on the road. A road when covered in by trees is always wet, is bad to maintain, and is cut up with the slightest amount of vehicular traffic. Of course, if the council persisted in doing this, the county council would have to take such steps as the law allowed.

A SAND-BLAST apparatus was experimented with in removing the paint from the hull of the United States cruiser *Atlanta*, with the result of doing the work with great rapidity. A similar experiment was made later on the columns of the viaduct at One Hundred and Fifty-fifth-street, New York City, which were erected in 1890, and needed repainting. The removal of the paint and scale, exposing the clean iron surface, was most thorough, the rate being about 1sq.ft. in two minutes.

IN furtherance of their desire to remove the remaining bars and gates which obstruct the street traffic of London, the Highways Committee of the London County Council have been considering what course they should pursue. In a report which they will shortly present to the Council they state that upon full consideration of the circumstances they have come to the conclusion that as regards six places only it is expedient that powers should be sought by the Council for the removal of the obstruction. They accordingly recommend that powers should be sought in the next session of Parliament for the removal of the bar in Brunswick-square, Camberwell, the toll-gate in College-road, Camberwell, the gate in Duncan-terrace, Islington, the gate in Nelson-square, Blackfriars-road, the gates in Montague-place, Tooley-street, and the walls in Cæsar-street, Shoreditch.

THE arrangements for the summer meeting in Bristol of the National Association of Master Builders are approaching completion. The Mayor, High Sheriff, and President of the Chamber of Commerce have promised to give the delegates an official welcome to the city about mid-day on July 20. This will be followed by a meeting of the council of the Association and a general meeting of members; and in the evening the delegates will be entertained at a banquet at the Victoria Rooms by the Bristol Association. On the following day, by invitation of the president and members of the Bristol Association, there will be an excursion to Chepstow and Tintern *viâ* the Severn Tunnel. On July 22 the Bath Association have invited the delegates to visit that city.

A SALE of estates with which the Liberator Building Society was connected will take place at Winchester House on Wednesday, July 7, at two o'clock. The value of the estates to be sold is upwards of £250,000, and this represents the principal part of the remaining estates associated with the failure of the Balfour group. The estates are situated at Romford, Chingford, Norbury, Tilbury, and Clapham. One of these is Gidea Hall, which lies along the main road to Ipswich, at the eastern extremity of Romford town. The second property to be offered to auction is the Chingford-rise estate. This estate comprises 27 freehold villas, detached and semi-detached, all of which are let and produce over £1,500 per annum. When fully developed, the building land will give a total building frontage of over 25,000ft. The Clapham Park estate comprises three mansions, each standing in timbered grounds, with lodges, stabling, gardens, &c., in all about 43 acres. The Tilbury Dock estate, which is another of the properties, was laid out at the time of the formation of the Tilbury Docks, a large number of small houses being built for the accommodation of dock and riverside labourers. There are 349 houses and shops, and 26 acres of building land partly developed and available for building houses. The remaining estate is that at Norbury Park, near Croydon. This property forms the outlying portion of the estate occupied by John Hobbs, whose residence, Norbury Hall, with its adjoining grounds, occupies the central portion. The estate extends over 68 acres. The auctioneers are Messrs. Douglas Young and Co.

IT has long been a matter of wonder on what principle the architectural drawings shown at the Academy year after year are selected, and it would seem that the pictures are judged more by size than excellence. According to the "Debats," amongst the pictures submitted for approval to them was a landscape by M. Harpignies. It was rejected as, apparently, not good enough for Burlington House. But the Hanging Committee have recently learnt that M. Harpignies has obtained, at the Salon of the Champs Elysées the Medal of Honour—or, in other words, one of the highest distinctions that artists in France can hope to acquire! As a matter of fact, M. Harpignies is a veteran painter nearly seventy years of age, well known and appreciated in France. It hardly says much for the Hanging Committee's knowledge of foreign art that the work of a man so celebrated in his country should have met with the scurvy treatment vouchsafed to a humble dauber. But they seem to have acted in sheer ignorance, and probably never carefully inspected the picture sent to them.

ONE of the new occupations of women, for which they are said to manifest a peculiar aptitude, is that of the sign-painter. Every observant passer-by in the streets of Berlin, says the *Industrielles Echo*, cannot fail to notice the number of women who are now busy at this branch of work. The ladies, like their male colleagues, have adopted a loose grey linen blouse for protection from the droppings of the paint-brush, and they adorn their heads with a neat

hood. The employers speak very warmly of the excellence of the women's work, which is not confined to merely letter-painting, but extends to the more decorative branches of the sign-painter's art. For sign-painting, in the mediæval cities of Germany, was certainly an art of a very high quality, and there is no reason why it should not become as exquisite and flourishing as it was of old. An increasing part of the interior decoration of rooms and shops is now confided to the women-painters, whose quick sense for beauty of form and colour expressly fits them for such work.

FROM Washington we hear that Supervising Architect Aiken has resigned his post, and Secretary Gage, it is said, proposes to fill the vacancy by a competitive examination conducted by the Civil Service Commission. A committee of architects will assist. In this way the general and technical skill of the candidates is to be determined. But how the administrative ability of the candidate is to be tested by examination it is certainly difficult to say. Art and administrative qualifications cannot be gauged in this manner.

THE erection of public buildings in the Treasury Department of Washington, U.S., is to be open to general competition. Secretary Gage has consulted a number of prominent architects, and has found a willingness on their part to assist him in putting the Treasury law into effect. Architects are to be invited to compete for plans and specifications for the next Government building to be erected, and Congress will be asked to reimburse the unsuccessful architects for the actual expenses they are put to.

THE adjournment of the debate on the report stage of the Plumbers' Registration Bill leaves that measure the first order for next Wednesday (the only day left open to private members for the remainder of the session), but even if the amendments relating to it which still stand on the paper should be disposed of, there is not likely to be enough time afterwards to enable the Bill to become law this session.

MR. ALEX. KOCH has just issued his yearly little volume of reproductions done to a concise scale of several of the architectural drawings shown at the Royal Academy, and to these he adds selections from other galleries, and a series of Continental buildings from photographs and drawings, making an entertaining collection, in which the British work shows to great advantage. As we have given in our own pages many of the subjects in our selection of illustrations from the Royal Academy, there is no occasion to individually particularise these smaller copies, which, however, are capitally rendered, and make a gathering for ready reference. This is enhanced by some photo-prints of sculpture, English and foreign, while several plans are added of the buildings represented. Several of the usual contributors are conspicuous by their absence, but this is due to their not being represented at the Academy this season.

"AMONGST the many Jubilee gifts," says the *Western Daily News*, "probably none gave greater all-round pleasure than did the only two received by the Little Sisters of the Poor at Hartley, on the outskirts of Plymouth. They were strikingly different in character, but each delighted the good mother and her fifteen Little Sisters, as well as the three or four score broken-down old fossils—men and women after their kind—whom the good sisters so tenderly care for and 'do' for in their beautiful home on the heights beyond Mannamead. The one was a case of prime old Scotch whiskey, accompanied by a request that on Jubilee Day every venerable grand-fer and every grand-dam might drink to her Majesty's jolly good health. The other was an exquisitely-carved oak crucifix to stand upon the Tabernacle in the Sisters' Chapel. The cross stands upon three steps, said to represent the three cardinal graces of Faith, Hope, and Charity—known as a Cross of Calvary. The cross and figure are from the studios of Messrs. Harry Hems and Sons, Exeter."

SUPPORTERS of the movement in favour of the construction of a tunnel between Scotland and Ireland are greatly disappointed by the answer given by the President of the Board of Trade to the deputation who waited on him on Tuesday. But though disappointed, the supporters of the movement are not discouraged. On the contrary, they are determined to agitate until they get behind them such a force of popular opinion as will compel the Government to give them some help. Certainly the paltry £1,500 asked for towards the expense of making borings might have been more graciously refused by Mr. Ritchie.

THE new American tariff law will have an important effect upon building interests, and American architects and contractors, as well as owners, are ruefully studying the debates of Congress. At present, the prospect is that the new law will nearly double the price of plate-glass, by imposing a duty of 80 per cent., in place of the present rate of 25 per cent.; lumber will rise about 10 per cent., as a consequence of the imposition of a duty of 2del. per thousand, and manufactures of lumber will rise still more, through the protective duty which is to be laid upon them; hardware, nails, and screws will also receive a protective duty, and plumbers' pottery will be greatly enhanced in price, for the same reason.

ON Wednesday the old-established and well-known business of the St. Pancras Ironworks was converted into a limited liability company under the style of the St. Pancras Ironwork Company, Limited. All the shares are held by the present partners, who become managing directors, and no change will be made in the system of carrying on the business, established in 1849 by the former proprietors, Messrs. Cottam and Cottam; nor, we are sure, in the measure of success so deservedly achieved and steadily maintained.

Trade News.

WAGES MOVEMENTS.

LEEDS JOINERS.—The master builders of Leeds have received notice from the Joiners' Society that the members of the latter organisation will henceforward decline to fix machine-made woodwork which has not been produced under what are regarded as fair conditions of labour. It is supposed that this is chiefly directed against a local firm with which the unionists had a dispute. It is felt that the decision places masters in an awkward position, inasmuch as they do not always know the conditions under which such material in their hands has been produced.

IPSWICH BUILDING TRADE DISPUTE.—The principle of arbitration has been accepted by both parties to the dispute in the Ipswich building trade; but some preliminary difficulties have arisen, and the men have not yet returned to work. We understand, however, that the men make two principal requests—firstly, that a day shall be fixed for the arbitration, so that it may not be kept hanging back for an indefinite period, and, secondly, that the men shall go to work under their own rules pending the result of arbitration.

At a meeting of the Leamington Parish Church Completion Committee, on Monday, a report was read from the architect, which included estimates for the contemplated completion of the fabric. The first estimate of £3,757 was for the whole extension up to the sills of the aisle windows. The second estimate, which comprised the whole extension complete, amounted to £10,768, with £486 extra for roof in oak. A further estimate for the completion of the tower amounted to £3,800. It was directed that a contract for the first-mentioned scheme should be obtained from Messrs. Smith and Sons, Milverton, at a cost not exceeding £3,750. The funds received and promised amount to £4,750, £2,000 of which will be required for repairs to the present building.

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	Per ton.		Per ton.
Rolled-Iron Joists, Belgian	£5 15 0	to	£6 0 0
Rolled-Steel Joists, English	6 0 0	,,	6 10 0
Wrought-Iron Girder Plates	5 15 0	,,	6 10 0
Bar Iron, good Staffs	7 0 0	,,	8 0 0
Do., Lowmoor, Flat, Round, or Square	17 0 0	,,	17 0 0
Do., Welsh	5 15 0	,,	5 17 6
Boiler Plates, Iron—			
South Staffs	7 17 6	,	8 5 0
Best Snedshill	10 0 0	,,	10 10 0

Angles 10s., Tees 20s. per ton extra.

Builders' Hoop Iron, for bonding, &c., £6 15s. 0d. per ton.

Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.

Galvanised Corrugated Sheet Iron—

	No. 18 to 20. Per ton.		No. 22 to 24. Per ton.
6ft. to 8ft. long, inclusive gauge	£10 15 0	...	£11 0 0
Best ditto	11 5 0	...	11 10 0

	Per ton.		Per ton.
Cast-Iron Columns	£6 0 0	to	£8 10 0
Cast-Iron Stanchions	6 0 0	,,	8 10 0
Cast-Iron Sash Weights	—	,,	4 2 6
Cast-Iron Socket Pipes—			
3in. diameter	5 10 0	,,	5 15 0
4in. to 6in.	5 5 0	,,	5 10 0
7in. to 24in. (all sizes)	4 15 0	,,	5 0 0

[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]

Pig Iron—	Per ton.
Cold Blast, Lilleshall	105s. to 110s.
Hot Blast, ditto	57s. 6d. to 62s. 6d.

Wrought-Iron Tubes—Discount off Standard Lists f.o.b.			
Gas-Tubes	75p.c.	Fittings	77½p.c.
Water-Tubes	70	,,	72½
Steam-Tubes	62½	,,	65
Galvanised Gas-Tubes	60	,,	62½
Galvanised Water-Tubes	55	,,	57½
Galvanised Steam-Tubes	45	,,	47½

	10cwt. casks. Per ton.		5cwt. casks. Per ton.
Sheet Zinc, for roofing and working up	£22 10 0	to	£23 15 0
Sheet Lead, 3lb. per sq. ft. super.	14 0 0	,,	15 0 0
Pig Lead, in 1cwt. pigs	13 10 0	,,	14 10 0
Lead Shot, in 28lb. bags	16 10 0	,,	17 10 0
Copper Sheets, sheathing and rods	60 10 0	,,	61 0 0
Copper, British Cake and Ingot	51 15 0	,,	52 15 0
Tin, Straits	62 7 6	,,	63 7 6
Do., English Ingots	64 0 0	,,	64 15 0
Spelter, Silesian	17 10 0	,,	18 0 0

	Per ton.		Per ton.
Cut Clasp Nails, 3in. to 6in.	£8 15 0	,,	£9 15 0
Cut Floor Brads	8 10 0	,,	9 10 0

Wire Nails (Points de Paris)—

0 to 7	8	9	10	11	12	13	14	15	B.W.G.
8/6	9/0	9/6	10/3	11/0	12/0	13/0	14/9	16/9	per cwt.

TIMBER.

Teak, Burmah	per load	£14 0 0	to	£16 10 0
,, Bangkok	,, ...	11 10 0	,,	15 10 0
Quebec pine, pitch	,, ...	—	,,	—
,, yellow	,, ...	1 15 0	,,	3 15 0
,, Oak	,, ...	5 5 0	,,	6 5 0
,, Birch	,, ...	3 15 0	,,	5 10 0
,, Elm	,, ...	4 0 0	,,	5 5 0
,, Ash	,, ...	3 5 0	,,	4 10 0
Dantsic and Memel Oak	,, ...	2 10 0	,,	3 10 0
Fir	,, ...	2 15 0	,,	4 15 0
Wainscot, Riga p. log	,, ...	2 0 0	,,	4 5 0
Lath, Dantsic, p.f.	,, ...	4 10 0	,,	5 10 0
St. Petersburg	,, ...	5 0 0	,,	6 10 0
Greenheart	,, ...	8 0 0	,,	9 0 0
Box	,, ...	4 0 0	,,	15 0 0
Sequoia, U.S.A.	per cube foot	0 1 9	,,	0 1 10
Mahogany, Cuba, per super foot 1in. thick		0 0 4½	,,	0 0 6
,, Honduras	,, ...	0 0 5	,,	0 0 6½
,, Mexican	,, ...	0 0 4	,,	0 0 5
Cedar, Cuba	,, ...	0 0 4½	,,	0 0 5
,, Honduras	,, ...	0 0 4	,,	0 0 5
Satinwood	,, ...	0 0 7	,,	0 1 0
Walnut, Italian	,, ...	0 0 3½	,,	0 0 7

Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 11in.:—

Quebec, Pine, 1st		£19 10 0	to	£25 10 0
,, 2nd		14 0 0	,,	16 10 0
,, 3rd		6 10 0	,,	10 0 0
Canada Spruce, 1st		10 10 0	,,	12 0 0
,, 2nd and 3rd		8 0 0	,,	9 5 0
New Brunswick		7 15 0	,,	8 5 0
Riga		7 10 0	,,	8 10 0
St. Petersburg		9 10 0	,,	13 10 0
Swedish		9 10 0	,,	16 10 0
Finland		9 0 0	,,	9 10 0
White Sea		10 10 0	,,	17 0 0
Battens, all sorts		5 0 0	,,	20 0 0
Flooring Boards, per square of 1in.:—				
1st prepared		0 8 6	,,	0 15 6
2nd ditto		0 7 0	,,	0 12 0
Other qualities		0 5 3	,,	0 6 9
Staves, per standard M:—				
Quebec pipe		—		—
U.S. ditto		35 0 0	,,	42 10 0
Memel, cr. pipe		230 0 0	,,	240 0 0
Memel, brack		200 0 0	,,	210 0 0

OILS.

Linseed	per ton	£14 5 0	to	£14 10 0
Rapeseed, English pale	,, ...	26 15 0	,,	27 10 0
Do., brown	,, ...	23 10 0	,,	25 10 0
Cottonseed, refined	,, ...	14 10 0	,,	15 0 0
Olive, Spanish	,, ...	29 0 0	,,	29 15 0
Seal, pale	,, ...	23 0 0	,,	24 0 0
Cocoanut, Cochin	,, ...	26 0 0	,,	27 0 0
Do., Ceylon	,, ...	23 5 0	,,	23 10 0
Palm, Lagos	,, ...	20 15 0	,,	22 10 0
Oleine	,, ...	19 0 0	,,	20 0 0
Lubricating U.S.	per gal.	0 6 3	,,	0 7 6
Petroleum, refined	,, ...	0 0 4¾	,,	0 0 4¾
Tar, Stockholm	per barrel	1 2 0	,,	1 5 0
Archangel	,, ...	0 12 6	,,	0 15 0
Turpentine, American	per ton	21 0 0	,,	21 10 0

LIST OF COMPETITIONS OPEN.

Howth—Presbyterian Church	£20 (merged) and £10	Rev. James Wilson, 4, Rhoda Villas, Howth, Co. Dublin	July 20
Rugby—Municipal Buildings (no Assessor)	30gs. (merged), 20gs.	D. G. Macdonald, Surveyor, Rugby	,, 21
Bootle—Technical School, Balliol-road (£15,000 limit)	50gs., 30gs., 20gs.	J. A. Crowther, Borough Engineer, Bootle	,, 31
Surbiton—New Council Chamber	£30, £15	Jas. Bell, Council Offices, Victoria-road, Surbiton	Aug. 13
Bury, Lancs—Art Gallery and Public Library (£16,000 limit)	£75, £50, £25	John Haslam, Town Clerk, Bury, Lancs	,, 31
Carlton, Victoria—Children's Hospital	£100, £50, £25	J. Nicholson, Hon. Sec., Pelham-street, Carlton, Australia	(1898) Jan. 30
Chesterfield—Enlarging Stephenson Memorial Hall (£3,500 limit)	£25, £10	Borough Surveyor, Salter Gate, Chesterfield	—
Wadhurst, Tunbridge Wells—Vicarage Hall (£1,500 limit)		Secretary Jubilee Committee, Wadhurst, Kent	—
Hereford—Bridge over Wye (£1,200 limit)	£10	T. W. Meats, Secretary Jubilee Bridge Committee, Hereford	—
Huddersfield—Victoria Tower on Castle Hill	20gs	R. Welsh, Hon. Sec., Jubilee Committee, Town Hall, Huddersfield	—
Kirkham—New Workhouse for 300 Inmates	£150, £100, and £30	J. Thompson, Clerk to Fylde Board of Guardians, Kirkham, Lancs.	—
Brighton—Artisans' Dwellings (local Architects only)		F. J. Tillstone, Town Clerk, Brighton	—
Cardiff—Town Hall and Law Courts	£500 (merged), £300, £200	The Town Clerk, Cardiff	—
Boscombe—Hospital Enlargement, Shelley-road		J. Pratt, Assistant Sec., 126, Christchurch-road, Boscombe	—
Tottenham—School Board Offices		J. F. Adams, Clerk, School Board Offices, Tottenham, N.	—

LIST OF TENDERS OPEN.

BUILDINGS.

Shoreditch Church—Repairs to Tower and Portico		The Vicar, Hoxton-square, E.	July 3
Alnwick—Three Blocks of Cottages, Wagonway-road	Duke of Northumberland	C. E. Moore, *Gazette* Office, Alnwick	,, 3
East Harlsey—Pair of Semi-detached Houses		Thos. W. T. Richardson, Architect, 57, High-street, Stockton-on-Tees	,, 3
Luton—Baptist Schools, Park-street		J. R. Brown and Son, Architect, Luton	,, 5
Enniskillen—Town Hall	Commissioners	Wm. Cleland, Town Clerk, Enniskillen	,, 5
Porth—Additions to County School		J. Rees, Architect, Hillside House, Pentre	,, 5
Batley—Houses, &c.		J. H. Brearley, Architect, Batley	,, 5
Luton—Schools, Dunstable-road	School Board	W. Hoyle, Clerk, Waller-street, Luton	,, 5
Carlisle—Alterations, Viaduct Hotel		Moffatt and Bentley, Architects, Whitehaven	,, 5
Hampton-on-Thames—Fire Station at Thames-street	Hampton Urban District Council	John Kemp, Surveyor, Council Offices, Park House, Hampton-on-T.	,, 6
Belfast—Alterations, Infirmary	Guardians	Young and McKenzie, Engineers, Belfast	,, 6
Aberdeen—Additions to House	Mr. Chalmers	Wilson and Duffus, 146, Union-street, Aberdeen	,, 6
Bristol—Factory	Mardon, Son, and Hall	H. Williams, 24, Clare-street, Bristol	,, 7
Ipswich—Additions to Borough Asylum	Corporation	E. Buckham, Borough Engineer, Town Hall, Ipswich	,, 7
Draughton—New Church		W. H. Read, Draughton, near Skipton	,, 7
Hailsham—Repairs	Guardians	Master, Union Workhouse, Hailsham	,, 7
Douglas—Municipal Buildings, Ridgway-street	Corporation	A. Ardron, F.R.I.B.A., 39, Victoria-street, S.W.	,, 7
Belfast—Two Villas		Young and McKenzie, Engineers, Belfast	,, 7
Conway—Market Hall, Armoury, and Public Hall	Town Council	T. E. Parry, Town Clerk, Conway	,, 7
Alton—Sunday School		T. W. Witts, Hon. Sec., Alton	,, 7
Cork—Parish Church	Parish Priest	A. Henessey, M.S.A., 74, South Mall, Cork	,, 8
Batley—Co-operative Stores	Batley Co-operative Society	W. Crawshaw, Branch-road, Batley	,, 8
Bedminster—Stables	Bedminster Co-operative Society	A. Bullock, Sec., Bedminster	,, 9
Harrow—Bacon-curing Rooms	J. Adamson and Co.	Johnstone Brothers, Architects, 3, Lowther-street, Carlisle	,, 9
Brighton—Alterations, School of Art	Town Council	F. J. Tillstone, Town Clerk, Brighton	,, 9
Rooksbridge—New Baptist Chapel		E. W. House, Rooksbridge, near Axbridge	,, 10
Cardiff—Alterations	Guardians	E. Seward, F.R.I.B.A., Queen's Chambers, Cardiff	,, 10
Dalton—Mission Church	Vicar	Rev. E. A. Stockdale, Dalton	,, 10
Londonderry—Six Houses		W. Barker, 3, Richmond-street, Londonderry	,, 10
Leeds—Alterations, Gas Inspector's Office, &c.	City Council	R. H. Townsley, Municipal Buildings, Leeds	,, 10
Beetham—Alterations, Vicarage		J. F. Curwen, Highgate, Kendal	,, 10
Odiham—New Schools	Odiham School Board	Colson, Farrow, and Nisbett, 45, Jewry-street, Winchester	,, 12
Abertillery—School	Aberystruth School Board	I. A. Jones, Blaina, Mon.	,, 12
Boscombe—Bank	Wilts and Dorset Bank Co.	G. M. Silley, 17, Craven-street, W.C.	,, 12
Ilford—Lunatic Asylum Foundations	West Ham Town Council	Lewis Angell, Borough Engineer, Town Hall, Stratford	,, 13
West Malling, Kent—Additions to Infirmary	Malling Union Guardians	Fredk. J. Allison, Clerk, West Malling, Kent	,, 13
Halifax—Mill	Blackwood House Estate	Horsfall and Son, Lord Street Chambers, Halifax	,, 14
Pontefract—New Vagrant Wards	Guardians	Greaves and Co., Corn Market, Pontefract	,, 14
Barry—Infants' Department, Palmerstown-road Board Schools, Cadoxton (290 children)	Barry School Board	W. H. Lewis, Clerk, School Board Offices, Barry	,, 15
Penygroes—County School		E. Evans, 8, Castle-street, Carnarvon	,, 17
Arisaig, N.B.—Hotel		D. Cameron, Architect, Inverness	,, 17
Walsall—New Infants' School	Walsall School Board	Bailey and McConnall, Bridge-street, Walsall	,, 19
Baslow—Twelve Workmen's Cottages	Urban District Council	V. R. Cockerton, Clerk, Baslow	,, 19
Oulton—Annex Workhouse Infirmary	Guardians	A. Clarke, 126, London-road, Lowestoft	,, 20
Felixstowe—Shelter	Urban District Council	Chairman, General Purposes Committee	,, 21
Bourton-on-Water—Hall, &c.		E. W. Kendal, Bourton-on-the-Water	,, 24
Blackpine—Four Cottages		Phil Stohoe, 71, Durham-road, Blackpine	—
Rochdale—Six Houses and Shop, Meanwood Brow	Provident Co-operative Society	G. A. Hammond, Architect, Rochdale	—
Leeds—Ten Houses and Two Shops, Lowood-street		W. Broadbent, 11, St. Ann's Mount, Burley, Leeds	—
Huntly, N.B.—Boot Factory	Arnott and Sons	Jas. Jamieson, Architect, 2, Commerce-street, Elgin	—
Streatham Hill and Clapham Junc.—Completing Nine Houses		F. H. Harvey, 183, Lavender Hill, S.W.	—
Lydgate—Alterations to Friendly Inn	J. Kenyon and Co.	C. Parsons, Architect, Burnley	—
Morecambe—Ten Houses, Kensington-road		A. Gorton, Architect, 10, Morecambe-street, Morecambe	—
Mansfield—Two Houses, St. John-street	J. Wharmby	W. Dodsley, Architect, Mansfield	—
Ramsey, Isle of Man—Hotel, the Morragh		W. T. Ganson and Son, Architects, 10, Marsden-street, Manchester.	—
Penwortham Bridge—Grand Stand	Leyland Agricultural Society	T. F. Hutchinson, Secretary, Peel House, Leyland	—
Rotherham—Five Houses, Newton-street		Owner, Newton House, Newton-street, Rotherham	—
Skibbereen—Residence	J. McMorrogh	A. Hill, F.R.I.B.A., 22, George's-street, Cork	—
Woking—Conservative Club, Commercial-road		M. F. W. Austin, 20, Cheapside, E.C.	—
Nottingham—Alterations to Huntingdon-street Schools	School Board	W. J. Abel, Clerk, Victoria-street, Nottingham	—
Goldhanger—Farm Buildings		C. E. Butcher, Architect, 3, Queen-street, Colchester	—
Frizinghall, Bradford—Loom Works	Shipley Fields Mills	Mawson and Hudson, 2, Exchange Buildings, Bradford	—
Fordham—Public Hall and Institute		Gordon and Lowther, Architects, Finsbury House, E.C.	—
Buckley—United Free Methodist Chapel	Trustees	G. E. Bolshaw, Architect, 189, Lord-street, Southport	—
Burnopfield—Alterations to Premises		J. W. Rounthwaite, A.R.I.B.A., 13, Mosley-street, Newcastle	—
Nottingham—Additions to Clarendon-road Schools	School Board	W. J. Abel, Clerk, Victoria-street, Nottingham	—
Camborne—House in College-row		E. Rogers, Trelowarren-street, Camborne	—
Doncaster—Boot Shop, St. Sepulchre Gate	W. H. Franklin	Gelder and Kitcher, Architects, 76, Lowgate, Hull	—
Cardiff—Congregational Church, Richmond-road		Habershon and Fawckner, Architects, Pearl-street, Roath	—
Clacton-on-Sea—Villa, Thorogood-road	G. Hughes	J. W. Martin, Architect, Station Chambers, Clacton-on-Sea	—
Belfast—Shop Fronts, Albert Bridge-road		H. Sykes, M.S.A., Ann-street, Belfast	—
Belfast—Villa and Additions to Factory	Whiteabbey Bleaching Co.	W. J. Fennell, Architect, 11, Chichester-street, Belfast	—
Leeds—Empire Palace and Shops		F. Matcham, Architect, 9, Warwick-lane, Holborn, W.C.	—
Baildon—Detached House		Walker and Collinson, Architects, Swan-arcade, Bradford	—
Cornholme, Todmorden—Alterations to Peeping Tom Inn	J. Kenyon and Co.	C. Parsons, Architect, Burnley	—
Halton, Leeds—House		Percy Robinson, Architect and Surveyor, 72, Albion-street, Leeds	—
Chesterfield—Additions, Stephenson Memorial Hall	Corporation	J. Middleton, Town Clerk, Chesterfield	—
Harefield—Dwelling House at High-street		F. W. Marchant, Supply Stores, Harefield, Uxbridge	—
Hurst Brook—Butcher's Shop and Storeroom	Co-operative Society	Samuel Shirt, Clerk of Works, 81, Hillgate-street, Hurst Brook	—
Frizinghall, Bradford—Pair of Semi-detached villas		Walker and Collinson, Architects, Swan Arcade, Bradford	—
Waterfoot, Rossendale—Tuckett's Arcade	H. W. Tuckett, J.P.	S. T. Williams, Architect, St. James's Chambers, Waterfoot	—
Bradford—Detached House		Walker and Collinson, Architects, Swan-arcade, Bradford	—
Grimsby—New Premises	International Trading Co.	H. C. Scaping, Court Chambers, Grimsby	—
Belfast—Two Houses		Henry Bros., Talbot-street, Belfast	—
Hereford—Shedding for Show	Horse Society Committee	W. T. Wilkins, 6, John-street, Hereford	—
Ilkley—Extensions, Grammar School		C. H. Hargraves, Exchange Buildings, Bradford	—
Heywood—Shops	Heywood Bill-Posting Co.	Secretary, 57, Church-street, Heywood	—
Hurst—Dwellings and Shops		J. Heys, 196, Curzon-street, Hurst	—
Merthyr—Artisans Dwellings	Pendydarren Works Club	Johnson and Williams, Architects, Merthyr Tydfil	—
Middleton St. George—Foundations, Asylum		J. W. Dyson, 67, Grey-street, Newcastle-on-Tyne	—
Salisbury—Steam Laundry	Fisherton House Asylum	F. Bath, Crown Chambers, Salisbury	—
Sleights—Two Villas		J. Milligan, 77, Baxter Gate, Whitby	—
Stafford—Rebuilding Tavern	Hornby and Baillie	N. Joyce, Architect, Stafford	—

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REASONABLE SUPERVISION.

FEW questions give rise to more doubt than the liability of the architect for buildings erected under his supervision. We generally like to trace back such questions, and endeavour to find out what the custom and tradition have been. In Mediæval times, when the architect was master builder or craftsman and superintended the execution of his own design, and was exclusively engaged on it, there can be no doubt his responsibility was conterminous with his appointment, and was much more onerous than it is now. But the profession has vastly changed since those times: the modern architect's sphere is more limited, and chiefly consists in making designs and directing the execution of the work. The builder or contractor undertakes to carry out the building according to the designs and specifications furnished to him, and to make himself responsible for the performance of the work. According to this division of duties, the architect's chief responsibility appears to be that of preparing a skilful design that can be practically carried into effect—to use that amount of reasonable care and judgment that may be necessary in the preparation of working drawings and details, and in the specification. If this is a just view of the case—and we think it is—the architect's liability is limited to questions of construction, strength of parts to bear the weight and stress of various forces, the specification of proper materials, and further, to such skill in design and artistic arrangements as may be considered reasonable and necessary. All matters of actual execution necessary to carry out these intentions appear to belong to the builder as contractor. The first is required to bring art and skill; the second, management and mechanical skill in execution, and superintending the workmen employed, in finding proper labour and material. We can understand such a division of duty, and of the responsibilities attached to each, as they seem to be the natural result of the modern system of architectural practice. If the architect is no longer required to give his whole time to one building, and to superintend the laying of every brick and stone and the framing of every timber, it is no longer expected of him that he should become liable for any default in these matters. The one seems to follow the other. Strange to say, however, this distinction is not so clearly recognised in practice. The architect is expected to look after the work done by the builder, and to make himself responsible for a great deal that is done wrongly or that shows any serious defect. Legal tribunals have occasionally held the architect liable for defective materials and bad workmanship. In lawyers' phrase, there is an "implied warranty" on the architect's part that he is reasonably competent in the discharge of his functions, and if by neglect in superintendence bad material is used, or the owner derives no benefit, from any cause or defect in the building, the architect is held liable. By the French law the architect, as well as the builder, is held liable for negligent construction. Take the case of foundations. Is the architect liable for their failure or cracking of the walls? In one instance, "Schreiner v. Miller," 1885, he was held liable for his want of skill and care in not examining the foundations, and had to pay damages. A legal authority writes: "The fact that the builder is liable under an entire contract for making proper foundations will not lessen the liability of the architect for neglect to examine them, and the employer has a double remedy, and can sue either builder or architect, or both together."

The main question which concerns the profession is, What is reasonable in the way of supervision? Although not expressed in so many words, those who write textbooks are careful not to define this point very clearly. The Courts only deal with actual cases before them, and if anyone reads over the rulings of some judges carefully, he finds very little to help him on the subject of superintendence. Juries know little of the details of the work or circumstances which often render it impossible for the professional man to give the attention necessary. We have the dicta of judges that an architect is not compelled to make a personal examination in every case, but is liable if he uses incorrect data. A general opinion among those who administer the law is that the professional duty of the architect is to examine and test by his own knowledge, statements or plans made by others upon the work in which he is engaged. Thus, if he is about to build an addition to an old building by raising it a story or more, he is held liable for any neglect to sound the walls or test the foundations. But we will suppose the building is miles away, a long railway journey, or the architect has other more pressing work to do, is he to be held liable for not testing the masonry or the soil, if any mishap or settlement takes place? He has given sections of the foundations founded on data; his walls and counterparts are thick enough, and the specification provides every precaution as to shoring, underpinning, and every care in the execution. The builder is held responsible for any negligence or the employment of inefficient methods. According to the above dictum, the liability will rest partly, at least, with the architect for not making a personal examination. And yet it seems no part of his special duty, which is to supply plans and specifications. Or take another case. An architect has to build or restore an edifice, and to make an estimate of the cost. For this purpose he takes general observation of the subsoil with which he is satisfied, and begins to prepare his sections. He does not discover the existence of a spring or bed of sand in one part till the trenches are dug out, and he thereupon incurs increased expense in pile-work, pumping, and shoring—greater depth is necessary, and the cost comes to far more than the owners expected. Now, this is quite as hard a case as the other. How is it possible for a professional man to excavate trial pits in every part, or to divine there is a spring or a bed of sand or peat? Notwithstanding this, in "Moneypenny v. Hartland," it was held that the architect could not recover his charges. According to this principle, the architect is supposed to be constantly on the works—an unreasonable supposition.

If we apply this principle to an architect's liability for any defects that may appear in any building carried out under his superintendence, it will appear that he would be responsible for a great many things—for every item, in fact, provided in the specification, which amounts practically to this, that he must not only specify everything necessary, but see that it is carried out. And this appears to be the prevailing opinion of the many. They think, when they engage an architect, he will see to everything; even the laying and jointing of drains, the preparation and laying of concrete; that he is responsible for every brick that goes into the building. But how is it possible for him to do so? An architect has his office miles distant from the building. Is it possible for him to see how the concrete has been mixed and laid in the trench, or the quantity of bad bricks that go into the wall? Or he is absent some days, and in the mean time some work is done that turns out defective. We are supposing there is no clerk of works. A correspondent the other day asked, "What is the actual extent to which an architect may be held responsible for any defects in a building carried out under his superintendence?" As he very justly said, some clients imagine that an architect is responsible "for every nail driven and every brick laid," and he gave a case in his own experience. An architect is absent, the contractor takes advantage of this absence by hurrying on the plasterwork. For this purpose he leaves all the windows open on the hottest summer day, with a wind driving through the building. The first coat of ceiling is dried in 24 hours. Some time afterwards a part of the ceiling falls; the rapid drying had taken the "nature" out of the lime. Is the architect responsible?

To take a few trades which often bring upon the architect much vexation and trouble. What workman requires more watchful attention than the bricklayer? Some specify a number of requirements which they cannot possibly see carried out, like "flushing up" joints with mortar or "grouting" every few courses. Unless someone looks after it, the vertical joints are never filled with mortar. Wetting the bricks before use is another requirement absolutely necessary in dry weather. Who looks after it? The architect cannot. Quite as important is the provision that "headers" are not to be snapped. In face work there is a strong temptation to do this, as it saves facing-bricks. Selecting facing-bricks demands particular and close attention. In the absence of the architect, even for a day or two, some rods of porous and badly-burnt bricks can be put in; the particular kind of brick of the right thickness may be dispensed with. But is the architect to watch and see if every course of facing-bricks is of the same thickness as the backing, or that facing and backing are properly bonded together? Supervision may often be remiss in the matter of pointing brickwork. It is often specified that the work is to be pointed as it proceeds: is it expected the architect can be always on the alert to see if it is done? An owner blames him if the pointing crumbles and falls out of the joints during the first winter, because the builder has not done the pointing as specified, but after the completion of the work. Allied to "pointing" is the dishonest practice of colouring, and making brickwork look uniform in tint, by rubbing down and filling in with putty or cement cracks and inequalities. All these disguises soon disappear and leave behind a rough thick-jointed wall for which the architect is blamed. Is he responsible? Take again, slates. How is it possible for an architect to see that he gets exactly the slates specified; that they ring when struck, are of the right kind and colour? or see that the artistic qualities of variety in tint, &c., are obtained? It would be simply impossible to expect the five per cent. professional, with other work to look after, to do so. In plastering and painting there are numerous ways and means of ignoring specifications, in using inferior materials and pigments, which it would be extremely difficult for the architect to find out, unless he is a technical expert in those trades. So in the qualities of glass and the modes of glazing. Thin glass is often put in, despite the specification formula about ounces to the foot super., or thickness in fractions of an inch, or the mode of fixing. The windows let in the rain. How is it? The contractor says they have been properly made and glazed. This may be because the glass has not been properly puttied in the rebates, the sheets of glass have not been "back puttied," and the architect is held responsible. Other items on which the blame is laid to him will occur to

all practical readers. The same question arises in each. How far is the architect liable for his personal negligence in not seeing that what he has specified is carried out? Advisedly we say he cannot reasonably be held liable for any of these matters if he has specified them properly, and has visited the works at regular intervals. The frequency of his visits must depend on distance, importance of the building, and other circumstances. When there is a clerk of works, of course, his visits may be much less frequent. But the law and the ordinary client will hold him responsible, all the same, for many of these things, and it will be for him to prove that his personal supervision has been as frequent and thorough as the case demanded. At the present moment, one popular notion of the architect's value is that he is a superior builder, and that, by his appointment, everything will go right—an opinion which is, after all, a sound one as far as it goes. Were people to think otherwise, the professional architect would have still less to do than he has already. For a great many already think his duties and functions are ornamental and superfluous, and that his engagement, instead of meaning a better designed and constructed building, means the addition of a percentage which is of doubtful value in the result.

AN EXPANDED-METAL FLOOR.

THE strength of expanded metal floor construction has been the subject of a series of tests, some of which we have reported. These tests have been conducted in New York among official lists of various types of fireproof construction under the Department of Building. In one case a floor 14ft. by 12ft. was built on three 4ft. panels supported by 10in. steel I-beams. On the top flanges were placed expanded metal of 3in. meshes horizontally, and covered with a 3in. layer of concrete, made of Atlas Portland cement, sand, and cinders, in the proportion of 1 part cement, 2 sand, and 4 parts cinder. This concrete imbedded the webs and lower flanges of beams. A 2in. filling of similar concrete, with twice as much cinder, was put on top of first bed, and the ceiling was plastered. The latter was exposed to a high temperature for five hours, and the fire was quenched by a hose stream, which removed the plaster and exposed the wire mesh. The plunger of the testing machine or hydraulic ram was applied through yellow pine blocks 12in. square. The pressure was applied at a uniform rate, and after a lapse of 3¼ minutes a load of 12,500lb. was reached. After this, pressure was increased to 13,200lb., and then relieved, and again increased to 13,500lb., the maximum. The pressure was again relieved until 10,800lb. was registered, and after increased to 12,000lb., at which a continuous failure of the arch took place. The strength seemed to vary up and down, and there was an intimate contact between the concrete and the expanded metal. Each time the arch was relieved of pressure it recovered some strength, and at 5,400lb. cracks appeared on the underside of slab. At 6,000lb. the strands of wire mesh parted. This test has proved, according to the experiment made by Mr. George Hill, M.Am.Soc.C.E., whose figures we quote, the great strength of this form of floor construction, and the active part the expanded metal plays when covered with a layer of concrete and the steel beams protected.

THE PERILOUS CONDITION OF SOUTH KENSINGTON MUSEUM.

THE Select Committee of the House of Commons met again on Tuesday, Sir John Gorst, the chairman, presiding. The principal witness, Sir John Taylor, chief surveyor of the Board of Works, said that at South Kensington there were many old and some new temporary structures in close proximity to the galleries, which were of an extremely inflammable character. Most of them were erected prior to the year 1875, when the department took over their control. Besides these, there were in the Cromwell-road some old and dilapidated buildings of a very inflammable character, occupied for residential and office purposes. These buildings had, he believed, been taken over with the land. The residences of the three chief officials had been built by the Department of Science and Art, but the houses in Cromwell-road were of the ordinary character, and had no pretensions to being fireproof. The whole of the temporary buildings should be removed as rapidly as possible. The danger of the buildings had been placed before them by Mr. Street, an expert, who had been called on to report on the question. Since then very little had been done to improve their condition. There was no practical difficulty in renewing the roofs and making them fireproof; the only question was one of cost. The buildings on the south side had no pretence to fireproof construction. The floors and the roofs were both of wood. If money were provided by the Treasury, the Office of Works could at once proceed with the rebuilding. The plans were in part ready, and the only question was as to the front. He thought it impossible to make the present temporary buildings safe. The only plan would be to pull them down and put up another building. The report of Mr. Street had told them nothing they did not know; but it would be of value if it had the effect of forcing the Government to do something. The designs for the new building had been selected five years ago, and part of the working drawings had been completed, but there was no money to carry them further. He advocated the rebuilding of the Museum as a whole, and not in departments, and thought it could be completed in five years. He suggested that during the rebuilding place could be found for part of the contents of the Museum in the Tate Gallery at Millbank, which was nearly ready. The committee then adjourned.

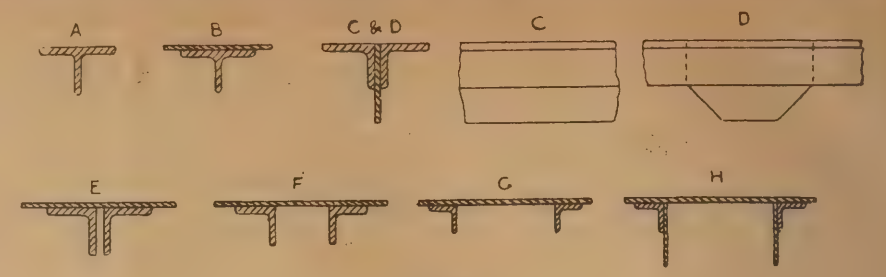


FIG. 126.

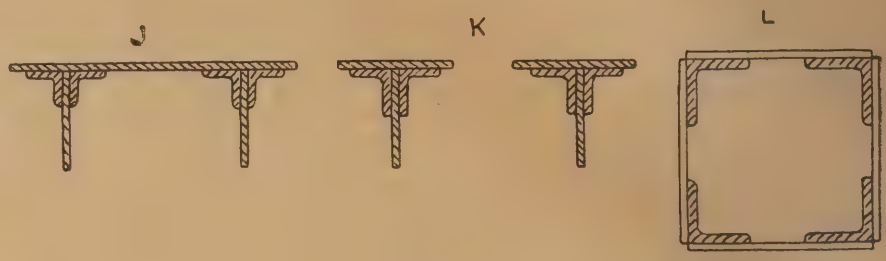


FIG. 127.

WROUGHT-IRON AND STEEL IN CONSTRUCTIONAL WORK.—XXIII.

THE limit to the economical use of the solid-plated, single-webbed girder, or the double or treble webbed box-girder is soon reached. Though the metal is massed heavily about the top and bottom flanges there is the objection that there is a great deal of material about the central web which is practically inert, taking little or no share of the stresses, while adding to the dead weight. The next advance, therefore, is to proportion the web in such a way that the metal shall be arranged in definite lines corresponding with the nature and intensity of the different stresses transmitted; thus are developed the many types of lattice or trussed girders embodying different kinds of triangulation, and which form a wide study in themselves. In these, every strut and every tie is proportioned according to the stress which it is calculated to bear, and lightness is gained without sacrificing strength. In the lattice-girder, too, very much more variation in design is possible than in the plate-girder, since the ties and struts may be composed of flats, or flats and angles, or tees, or channels, or other sections, while the top and bottom booms may be made of flats and angles, or flats and tees, or channels in many combinations, examples of some of the principal of which will follow. The problems that arise in connection with the design of plate-girders do not, therefore, make so great demands on the technical and practical skill of the designer, as do those which are associated with the forms of the braced girders; in the latter there are so many combinations possible of the elements of which they are composed that it is often very difficult to make suitable selection. These supply a most interesting study of the building up of simple elements into forms more or less complicated to stand stresses of varying kinds. Economy of material, minimum of weight, strength, stiffness, each and all have to be considered at once in such designs. No hard and fast rule can be laid down, and very dissimilar therefore are the means by which similar ends are attained by different engineers.

The elements of any lattice-braced girder are

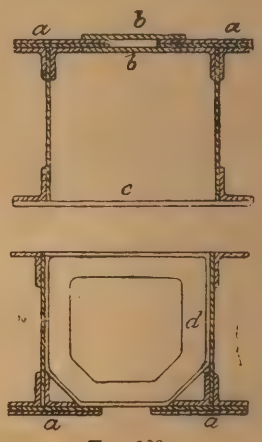


FIG. 128.

the booms, and the web-members comprising ties and struts. The principal among the various arrangements which are adopted in the building up of booms of braced girders must receive brief notice first; these arrangements depend on various conditions, chief of which is the dimensions of a girder. The group of figures, 126, illustrate several of the sections which occur most frequently, proceeding from the smaller and lighter to the larger and heavier. In this group of figures, 126, A is the simplest form of boom, consisting of a tee only, to the web of which the bracings, of bar or of angle, are riveted. This is suitable only for very light, shallow, and short girders. B is the next advance, in which a plate is riveted to the tee, giving higher moments of resistance, so that the boom offers better resistance both to vertical and lateral deflection; but these forms are only suitable for shallow or thin bracings, which can be riveted to the outside of the web. When it is desirable to place the bracings centrally, then

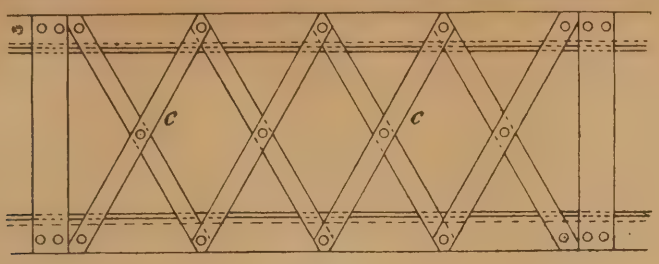


FIG. 129.

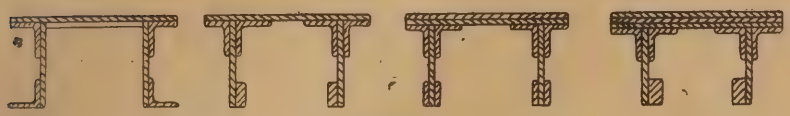


FIG. 133.

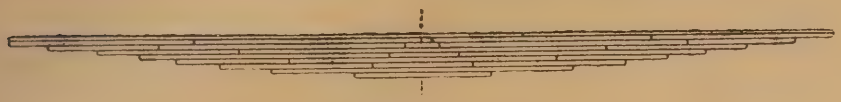


FIG. 134.

two angles may be riveted to a continuous web-plate, as in C, or gusset-plates may be riveted between the angles at intervals, as at D, for the attachment of the ties and struts. E is the same construction, but with a covering-plate added. When girders become wider and deeper, the angles are placed farther apart, as at F, the angles inclosing struts of H-section, or of various built-up sections; while the ties may be of the same width but of lighter section, or, alternatively, bar-ties may be used attached separately to each angle on opposite sides. G is a section of a boom for specially wide girders, in which the

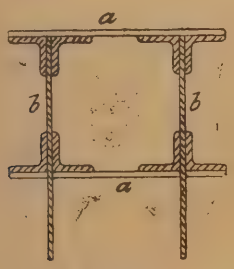


FIG. 130.

angles are placed far apart, and both struts and ties are riveted to each angle, the space about the centre being unoccupied except for cross or bracing ties, which frequently pass transversely in pairs. H is a stiffer section, in which deep web-plates are added, being riveted to the angles to receive the bracings, and to stiffen the boom depthwise. In the group Fig. 127, J is another form

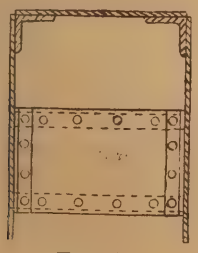


FIG. 131.

in which the width of the plates renders desirable a stiffening in the form of internal angles. K is another type in which, in order to avoid the use of very wide and correspondingly short lengths of flange-plates, two separate booms are placed side by side, and the girders are connected with diaphragms or narrow plates. L is a form built of four angles connected with bars riveted upon the outside flat faces. Fig. 128 shows a top and bottom boom, each composed of a pair of flanged vertical webs. On one side, the top and bottom respectively of each, continuous narrow flange-plates *a a* are riveted to the webs with angles. Short lengths of narrow covering plates *b b* riveted at intervals unite the flange-plates of the top boom, the angles on its lower edge being connected with transverse bars and diagonal bracing *c*. The inverted plan of the lattice bracing is seen in Fig. 129, and many of the largest booms are built up by these or by methods similar in principle. The difference in weight in solid flange-plates and bracings is considerable; bracings can be used in some sections only, and then bracings alternate with solid plated portions. The webs of the bottom boom in Fig. 128 are united with diaphragms, *d*, at intervals. Fig. 130 is an example of a boom built up with angles chiefly. The bars or stays, *a a*, are but a few inches wide, and riveted to the angles at intervals of 3ft. or 4ft. The bars *b* are

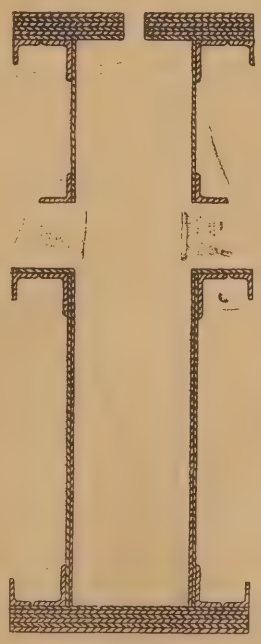


FIG. 132.

similar; but at intervals gussets are riveted of the same thickness as *b b*, and riveted between the angles similarly to *b b*. In this construction, therefore, the angles only are continuous, and the place of the ordinary webs is taken by bars and gussets. Fig. 131 shows a boom section built of continuous plates united with angles, the sides being rendered rigid with diaphragms of plate and angle riveted between. The bracing is riveted outside in this example. Fig. 132 illustrates heavy top and bottom booms built of continuous plates, and stiffened with external angles in a rather elaborate fashion.

Frequently the edges of heavy booms have to be stiffened thus along the free edges; this is effected variously, as by the riveting of angles or of flat bars along them. The arrangements for stiffening will be controlled partly by the conditions imposed by the forms and nature of attachment of the bracings, partly by the extent of the stress in any given sections. The type and section of longitudinal stiffening may therefore vary in certain cases in different localities of the same boom; but, from the point of view of simplicity of construction, uniformity of section is usually desirable. Fig. 133 illustrates various methods of stiffening and strengthening both the edges of vertical webs and of flange-plates.

In Fig. 132 the super-position of flange-plates is shown. In order to proportion the various parts of boom flanges to the strains which they have to bear, the thickness often must be increased about the centre, diminishing to the ends. Fig. 134 is a diagram of flange-plates, showing the end-joints of the several plates of which it is composed; in a developed drawing of this kind the thicknesses are exaggerated in order to show the separate plates and joints. The utility of thin plates in the building up of flanges is clear; in a long girder the discontinuity of any single thickness is scarcely noticeable, so little does the general curve depart from the parabolic outline which coincides with the load. The several stresses on the booms are calculated from the maximum to the minimum, and the plates are cut to length to give the strength required in the several localities and joint-plates added where required. There are fewer joint-plates on a boom built up thus than in one the flange of which is composed of a single plate only, because some of the plates act as joint-plates to others on which they are super-imposed.

In these figures the metal is for the most part massed about the outer sections where it is arranged to the best advantage; in other words, the moment of resistance is high. Except in the plainer sections in Fig. 126, no metal occurs in the neutral axis. In nearly every case the flanges are wider than the distance over the webs, and continuous webs project beyond the angles.

J. H.

NATURAL WOOD FINISH.

THE growing scarcity of the first quality of white pine lumber suitable for house finishing has made this wood actually more expensive than oak or some of the other so-called hard woods. For this reason, and because householders generally seem to prefer it, the use of hard wood trim has become more and more general. One reason is that natural finish is easier kept clean, and does not show finger-marks like the old-fashioned flat white paint. This of itself is sufficient to commend it to the careful housewife. It was what made graining so popular in the days when hardwoods were articles of luxury, and it was the custom to grain the dining-room, the bathroom, and some of the other most used apartments. Alas, for the grainer, oak became cheap enough for everyone to use—the real wood actually costs less than white pine grained to imitate oak. Hardwood finish has come to stay, and it has driven much profitable business in the way of interior repainting away from the master painters.

The two most essential things to a good job of natural wood finishing are good workmanship and the right materials—materials specially adapted to the work in hand. The day was when this kind of work was but imperfectly understood by the house painter, and one kind of varnish was supposed to answer a multitude of purposes. In those days the painters and architects alike pinned their faith to English coach-body varnish for outside work, and to shellac for interior finish, without regard to the special wood that has to be treated.

To-day we have house varnishes for exterior and for interior work, for floors, for use over enamel finish. In addition to these we have the so-called hard-oil finishes—only another name for a special class of varnishes—and the liquid fillers or first coatings. Carriage varnishes have been practically driven out of use for house painting, since they are not so well adapted as the specially made varnishes for obtaining the results desired, and though a good carriage costs more money to make than a house varnish, it will not give as satisfactory or durable a finish under the conditions to which it is subjected in the ordinary dwelling-house.

When hardwood finish was first introduced—or, rather, we should say, when natural finishes

first became popular—it was the custom to employ shellac as a first coating. The expense of shellac led some of the manufacturers to experiment, until, finally, liquid-fillers or first-coatings were put on the market for use on white pine and other close-grained woods, which have proved in every way as satisfactory as shellac, and at the same time are easier to manipulate. The general nature of these fillers is well understood, and the painter who chooses to do so can make them for himself, perhaps with an apparent saving of money; but much of this shop-made filler is of little or no value, and it is more economical in the end to buy the factory-made product, because, being made by machinery in large quantities, the silex and other ingredients of which they are compounded are much more thoroughly and intimately mixed, and more uniform in their quality than can possibly be obtained by stirring these materials together with a paddle.

The first thing essential in a good job of natural finishing is that the wood must be clean, smooth, and free from dust. All pencil-marks must be sandpapered off, and all the rough edges and surfaces left by the carpenters must be carefully smoothed down.

If the wood is coarse and open-grained, such as oak, ash, chestnut, or mahogany, it must be given a coat of paste-filler, which should match the wood in colour as near as possible. When antique or other coloured finishes are desired, such as the forest green, now so popular with oak, the colouring matter must be added to the filler to produce the tint required. The filler is mixed with turpentine to the proper working consistency. One or two hours after the filler is applied it should be wiped off with tow, as this fibre has less tendency to pull the filler out of the pores of the wood than burlap or some other substances. In about 24 hours, or when the filler has become perfectly hard, the surface may be rubbed down with fine sandpaper, and then dusted off thoroughly preparatory to applying the first coat of varnish.

There is a little oil in paste-filler, which tends to darken the wood, so if it be desirable to retain the original colour of a light wood, instead of filling it, as just described, it should be given a coat of white grain alcohol shellac varnish, which fills the pores, and, as it contains no oil, does not stain the wood. But, unless it is particularly desirable to keep the wood very light, it is not advisable to use shellac on any wood except pine, as the varnish put on over it is very apt to scale and chip off. On yellow pine shellac must be used to kill the sap.

Close-grained woods, which include white pine, poplar or whitewood, cherry, birch, maple, sycamore, gum, and hemlock, need no filling, but require surfacing. Having no cellular tissue to fill up, it is merely required that the surface be sealed up, so that it will not suck the oil out of the varnish.

For this purpose either shellac may be used or a good liquid filler. A liquid filler of the right quality will cost less than shellac, hold out the varnish and assist it to retain its brilliancy, will dry flat and require little or no sandpapering.

The wood having been properly prepared and thoroughly freed from dust it should be given two coats of varnish, which will suffice for the better grade of dwelling-house work if a good quality of varnish is used. Three or more coats are applied in the finest grade of work, the effect being to aid a certain quality to the finish known as depth or fulness. The painter may save himself much worry and expense if he will use only such varnishes as are made by reliable manufacturers, and are adapted to the particular work under way. Many of the troubles that arise in using varnish are not due to inferior material, but to carelessness in the application of the varnish, or to the use of a varnish not adapted to the requirements of the case.

Proper light and ventilation are absolutely necessary to facilitate the proper drying and hardening of varnish. Applied in damp buildings, or in buildings that are not properly heated in cold weather, the drying and hardening will be materially retarded. Extremely hot weather will also keep varnish soft for some time. Each coat of varnish should be allowed to become thoroughly dry and hard before the subsequent coat is applied. All but the last coat should be rubbed with curled hair to cut the gloss, as, in order to produce a high gloss finish, the under coats must always be dead. If a high lustre is wanted, the last coat should be flowed on liberally. If a partial gloss or "egg-shell" finish is desired, rub the finish coat with fine powdered pumice-stone and rubbing-oil, wiping off clean and dry with a soft woollen rag. To produce a "dull finish," somewhat more dead than the eggshell, use water and pulverised pumice-stone for rubbing.

A polish finish is obtained by first rubbing with pumice stone and water and then with pulverised rottenstone or water, or furniture polish, and wiping off with a dry cloth.—*Hardwood.*

THE SEPTIC TANK SYSTEM OF SEWAGE DISPOSAL.

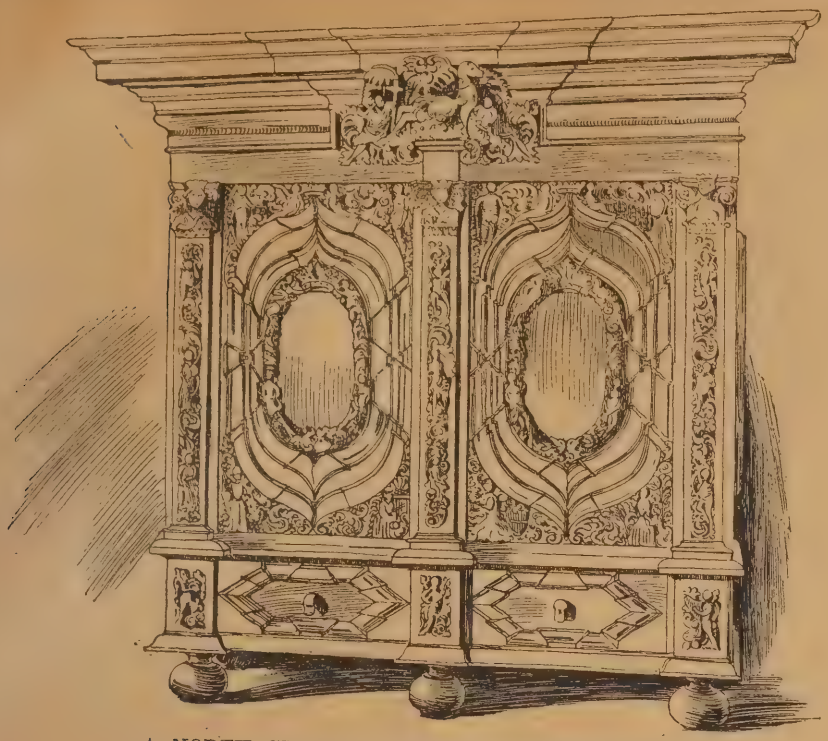
THE application of the remarkable discovery made by Mr. Donald Cameron, city surveyor of Exeter, is seen in the "Septic Tank System of Sewage Treatment," an installation of which, writes Mr. Robert Anstey in the *Western Daily Press*, by the courtesy of Mr. F. J. Commin, F.S.I., I recently visited. It is situated about half a mile from the Cathedral-square, in a meadow adjoining the river Exe. There is little to indicate that anything unusual is taking place. In one corner of the field the eye catches a grass-covered mound, with some lines of masonry standing a few inches above the level of the meadow—the whole being inclosed by an iron paling. There are no buildings, no noisy machinery, no besmirched attendants. The cattle are grazing quietly a few feet from the mound. The fresh green trees are vocal with the song of birds, and in pleasing harmony the hum of city traffic mingles with the murmur of the weir. Closer inspection shows the mound to be a partially submerged tank formed of masonry and cemented on the inside. It measures 64ft. by 18ft., with a depth varying from 7ft. to 10ft., and deals with the sewage from a district containing about 2,000 inhabitants, its capacity of 55,000 gallons representing an average daily supply. Through a manhole on the outside of the septic tank the raw sewage can be seen arriving at this point. There is a coarse grating to keep back large pieces of stone, wood, &c. Here the flow is divided, and enters the tank by two inlets placed near the bottom. Below each inlet there is a grit chamber for the reception of road gravel brought down by storm water. At the opposite end there is the outflow, a 9in. pipe placed transversely, projecting into the tank about 16in. below the sewage surface, closed at the end, but having a slot running its entire length. This arrangement of inlet and outflow insures a comparative absence of movement. Upon entering the still waters of the tank the solids present in the sewage, to a large extent, rise either to the top or sink to the bottom, forming at the bottom a thin layer of dark earthy matter, and at the top a somewhat solid scum from 3in. to 4in. in thickness. Light and air are, as far as possible, excluded. Under these favourable conditions, the micro-organisms or bacteria present in the raw sewage increase enormously, feed upon the solids, and excrete the same in a new and liquid form, the final results of this decomposition in the tank being the disappearance of the solids and the formation of ammonia, carbonic acid, marsh and other gases. The installation has been in operation since August last. Into the septic tank there has been flowing without a moment's intermission the sewage from a tenth of the inhabitants of Exeter. During that time nothing whatever has been added, and nothing whatever taken out, the solids having been decomposed by the growing bacteria. I entered the tank by means of an inspection well, placed in the centre, having a series of windows. At the bottom there is a settlement of about 3in. of earthy matter, and at the top a scum of from 3in. to 4in., neither having materially increased during the past four months; in fact, it would appear from the examination of another tank that had been in use for thirteen months, that it could be used for an indefinite period without requiring to be cleansed.

The question will naturally arise: What of the gases that must be evolved by the decomposing sewage? All analyses by Dr. Rideal of those present between the surface of the sewage and the roof of the tank show that they are composed of hydrogen—carbonic acid, nitrogen, and marsh gas—with an entire absence of oxygen. At the time of my visit the tank had not been opened for some days. Upon lifting the covering of the manhole a slight, but not very objectionable, odour was perceptible, and Mr. Commin assured me that he never felt anything objectionable when standing outside the paling that inclosed the tank and filters. This statement receives negative confirmation from the fact that no complaint has been made by any of the residents in the neighbourhood.

The houses are of the better class. One, standing in its own grounds, on the same level, is not more than 50 yards distant. The dissolved sewage, or effluent, as it flows from the tank, is slightly discoloured, and gives off a faint odour, and, like the air of the tank, is deficient in oxygen. It falls first into an iron trough, over the sides of which it flows in thin smooth sheets. It will be seen that this arrangement of discharge brings a large surface into contact with the atmosphere, from which it freely absorbs oxygen. This dissolved oxygen is of vital importance in the second, or filtering, stage. The filter-beds are five in number, and are formed of open, submerged tanks, each having a surface area of 80 square yards, with a depth of 5ft. Four are filled with crushed furnace clinker and one with crushed coke. Four are used in a cycle for a week, thus giving the fifth a week's rest. By an automatic gear (difficult to describe without drawings) the filters are filled and discharged without any attention from the attendant; in fact, all the manual labour required is an occasional oiling, and the alteration of the gear once a week in order that each filter in its turn may get a rest. This can be done by one man in an hour and a half. Supposing No. 1 filter is being filled, directly the liquid reaches within a few inches of the top the automatic gear cuts off the inflow and turns it on to No. 2. While this is filling, the liquid remains in No. 1. When No. 2 is full, the inflow is stopped, and turned on to No. 3, and at the same time the discharge-valve of No. 1 is opened. The filtered sewage or filtrate rushes out to the river. At the first rush the filtrate is very faintly discoloured, but a few minutes later it has a beautiful crystal clearness, and a flavour by no means unpalatable. An analysis of the filtrate shows that it contains nearly five times less of organic nitrogen than the 0·3 parts per 100,000, the amounted suggested by the River's Pollution Commission as being permissible—a standard of purity not often attained by other systems of treatment. It is important to note that the changes that take place in the filter-beds are not the result of a straining process, but are due to the presence and growth of bacteria. These are of a different kind to those that broke down the solids in the septic tank. Were it otherwise, the filter-beds would soon become foul and useless. I took some of the crushed clinker from a few inches below the surface, and found it smelt very little different to ordinary garden mould, and this after nine months' constant use.

Scientists have for some time been aware of the fact that micro-organisms are killed by the results of the chemical changes they have themselves produced, and that the condition which is fatal to the family that produced it is a favourable one for the growth and increase of a near relation. In this fact we have a partial explanation of the changes I have attempted to describe. An important question will naturally suggest itself: What effect has this system upon the pathogenic, or disease-producing, germs? If in both stages favourable conditions are set up for the growth and development of bacteria, is there not a danger of retaining the disease germs alive, and also of greatly increasing their number? Without giving the technical data upon which the conclusion is based, it may be stated with emphasis, upon the authority of several eminent specialists, that "the chances of microbes surviving the passage through the filters are infinitesimal."

The system has now passed the experimental stage. At the instance of the city council it has been subjected to most exacting tests by chemical and bacteriological experts, and has come through the ordeal in a manner that must be gratifying alike to Mr. Cameron and the people of Exeter. Upon the expert reports the council have decided to lay down a plant for dealing with the whole of the sewage of the cathedral city. In comparison with the system of chemical precipitation, now in vogue at most sewage farms, the tank system has many distinct advantages. A few may be mentioned: Smaller initial outlay, working expenses practically nil, ability to cope with any sudden increase of sewage, no troublesome sludge, no depreciation of property in the vicinity, and results quite equal to any, and far better than most, other systems of treatment. Exeter was one of the first English cities to construct sewers, and it seems fitting that it should be the scene



A NORTH GERMAN CABINET OF DARK WOOD.

of the first application of a discovery that bids fair to solve the great question of sewage disposal.

NORTH GERMAN CABINET.

THIS Cabinet is full of curious and elaborate carving containing many small figures. The two panels of doors are intricately moulded, as also are the two drawer-fronts. This being a type of cabinet-making not often seen in this country, it is well worthy of study. The total width is about 9ft., and the height is about 7ft. 3in., and it is solidly made in dark walnut.

THE SCIENCE OF BRICKMAKING.*

THIS is a reproduction in a handy book-form of a series of articles that appeared in the *British Clayworker* last year, which has been published by permission of the proprietor of that journal. Mr. George F. Harris, the author, treats his subject in an elementary manner, and the book will be of value to brickmakers and clayworkers. Mr. Harris begins his subject in an interesting way by telling us of the characteristics of brick-earths as found near Erith or Ilford, in Essex; their fluviatile origin; the remains of extinct animals found in the brick-earths of the Thames Valley; the flint implements, and shells, the evidence of which points to a river-channel or fresh-water origin. It is supposed the brick-earths of Kent and Essex accumulated in the river-channel were raised partly by a natural upheaval, partly by the channel becoming deepened by natural means, the mollusca and other fresh-water remains finding their way thither by being washed down by rivulets or by floods. All these facts are explainable by geology, and show how certain brick-earths in the Thames Valley are of fresh-water origin. Mr. Harris shows the practical bearing of these geological considerations, and he lays down some important rules for the guidance of the brick-maker. These deposits are, of course, not very deep, and they very in character horizontally. We advise all brickmakers and others to read this opening chapter. The mineral constituents of brick-earths are next considered—such as alumina, lime, iron, &c. The size of the granules composing the earth and the way the silica is combined chemically. The author observes the chemical composition of a brick-earth does not give an accurate idea of the possible active agents in the brick earth being subjected to the kiln. These agents are, to a large extent, imprisoned in the mineral grains, and do not become involved in the partial melting of the mass. The author says "In many instances the value of a brick depends almost entirely on incapacity for fusion on the part of a large proportion of the minerals of which the brick is made. Possibly a good all-round brick would be where the bulk of its mineral particles were infusible at the temperature employed, and where the remainder were fusible enough to partially run, so as to cement or agglutinate the infusible particles firmly together." To this end we must know (1) the nature of the mineral particles involved in the whole operation; (2) their behaviour under high temperatures; and (3) a knowledge of certain branches of metallurgical chemistry. Chemical analysis, Mr. Harris shows, is only useful up to a certain point, beyond which we must appeal to the microscope to aid us. The behaviour of mineral earths when under a high temperature is also necessary to be known. Describing the principal minerals found in clays used in brickmaking, such as kaolin or pure clay and felspar, the silica group, quartz, mica, iron, &c., the author goes on to deal with the chemistry of brick-earths. Little value can be attached to the analysis of brick-earths made by brickmakers without some knowledge of this subject. The author introduces his readers to some useful and easy methods of examining earths by the blowpipe, which gives a useful insight into the chemical constitution of these earths. Some earths, however, do not submit themselves to this test. The blowpipe only gives a qualitative, and not a quantitative analysis. So, also, the microscope is powerless to reveal the amorphous elements in earths. The blowpipe is, as our author says, handy, and can be carried about by the prospector. He can discover in a few minutes whether a white earth is a good china clay; whether an undesirable element like fluorine is present, or iron. The use of the blowpipe and its outfit are described. Later chapters deal with drying and burning, and durability. The author gives some useful information under drying, and the "doctoring" of raw earths to prevent cracking like sand, clay, lime, each of which ingredients may be useful for a certain class of brick-earth; but what may prevent cracking, will be bad in the burning. If care is exercised in the drying, cracking is not likely to take place: it is often due to the wetness of the earth. Of course, for clayey earths, the addition of sand or brickdust is useful; but it should be well incorporated before being placed under the press, and ground very fine. Again, the author refers to another cause of cracks in the indentations made by stamping the maker's name or trade mark on the bricks. Under the head of the "Micro-structure of Bricks," the author alludes to the use of the microscope, by which the structure and homogeneity of the brick after burning can be examined. It enables one to detect things which the chemist cannot, what has taken place in the burning; the deleterious constituents are detected at their work, the small underburnt ingredients, semi-vitrified matter. Useful information is given as to the kind of instrument and its adjuncts. Few treatises give so much general and useful information of the nature and property of brick earths, their chemical constituents, and the mode of testing the qualities of good bricks. As a handbook on the physical properties of brick-earths and brickmaking it will be found very useful.

* The Science of Brickmaking. By GEORGE F. HARRIS, F.G.S., &c. London: H. Greville Montgomery, Essex-street, Strand.

A BOAT BUILT OF IRON AND CEMENT.

ALTHOUGH we have been for some time prepared, partly from articles published in the BUILDING NEWS, and partly from perusing others, to anticipate a considerable extension of the present application of metal and concrete or cement to constructive purposes, we scarcely expected it would assume the form it has done. A brief description of this novel craft will, however, suffice to demonstrate that no insuperable "engineering difficulties" are entailed in the building of it, and that there are no details in its construction which are in the slightest degree likely to tax one's credulity. The ribs or framework of this Italian bark, for it hails from classic shores, consist of round wrought iron bars, about ½in. in diameter. When these are fixed in place, they form a complete skeleton, which is covered and protected by a close network of iron, with meshes ¼in. wide, and securely fastened to it with metal clips. The network is subsequently coated both on the inside as well as on the outside with layers of concrete composed of pure cement, mixed with a given proportion of sand. Presumably the number of coating layers necessary, or the total thickness of the concrete skin, would depend upon the size of the vessel. As a final touch, the external surface of the skin is fine polished, which, in the first place, serves to preserve it from cracks and fissures, and what is equally important, greatly diminishes the liquid friction, and thus facilitates its passage through the water.

As might be surmised, a ship thus built is a good deal heavier, and consequently has a larger displacement than one constructed of wood; but she would be very much lighter than one built altogether of iron or steel, with a heavy inner and outer skin of solid metal plates. Again, the cost of the double skins in cement concrete is very considerably less than that of a corresponding plating of metal. It is stated that the strength or resistance of a vessel thus constructed is in no degree inferior to that of other ships built on very different lines. Be that as it may, but still the new departure is significant, and without for a moment either eulogising or depreciating the apparently *fin de siècle* attempt at shipbuilding we await the future development of it with both interest and circumspection. T. C.

SANITARY APPLIANCES.

MESSRS. BROAD AND CO., Limited, South Wharf, Paddington, issue a comprehensive illustrated catalogue of their sanitary and drainage specialities, fireclay and earthenware closets and fittings, ridge and roofing tiles, moulded bricks, &c. The illustrations are coloured, and show every variety of sanitary goods, many of new design, white enamelled ware of a superior manufacture. We particularly direct attention to several new designs introduced by Messrs. Broad and Co., Ltd., such as their channel interceptors on white enamelled ware, designed specially for use in inspection chambers. In this interceptor the cap of the cleaning arm is made with a Stamford joint. All sizes and prices are given in this very perfect form. Broad and Co.'s "Locking Cup" for cleaning arm is a security against displacement. The "School Board Interceptor," made in white ware for the London School Board, 6in. or 9in. dia., and 4in. arm, and Broad and Co.'s patent white enamelled channel bends (half-circle section), and a specially designed bend to prevent oversplashing from subsidiary drains (three-quarter circle section) are worth notice, and the sizes, curves, and prices are clearly stated. The deep-section channels are worth notice. The 6in. channels are made 4½in.

deep, and the 4in. channels 3in. deep. Broad and Co.'s "connecting pieces" for making a good junction between these channels, and a similar pipe in brown ware, are useful, and illustrations are shown. Complete disconnection between waster and gully-trap can be secured by Broad and Co.'s "channel-shoe and reversible gully-trap" (p. 30), which is a clever combination of pipes. The trap is reversible and can be fixed at any angle, which allows the intakes to be kept in line with wall.

Other illustrations show some excellent channel blocks (white enamelled) for lavatories or traps, yard-gullies, grease-traps. Broad and Co.'s "Impermeable" pipes made of cream Bristol stoneware perfectly non-absorbent; a patent sink of glazed cane ware, besides various forms of stoneware goods; Broad and Co.'s white enamelled fireclay closets, on the flush-down system, drain plugs for testing, and an improved water-waste preventer. The terracotta goods, red moulded bricks, finials, roofing tiles, paving bricks, and clinkers are well selected in design and make. The catalogue will be found useful for reference.

CONSTRUCTION OF ARCHES IN CONCRETE.—VIII.

IN a previous article we drew attention to the Melan, the Roebling, the Metropolitan, and the Expanded Metal system, all of which belong to what we have already classified as the combined or compound system of arches constructed in concrete. While obviously possessing some features in common, they are all, nevertheless, rendered separate or distinct from one another by one or more distinguishing characteristics which claim our attention. For the present, we leave the first mentioned of the four systems alluded to, insomuch as it has been previously described and illustrated in our columns. Of the next two, we are not in the possession of so much information as we should wish; but so far as the last—that is, the Expanded Metal system—is concerned, we have before us the results of an extended investigation and analysis of experiments conducted by engineers of unquestionable ability and reputation. Although the principle of combination remains constant in all these three systems, yet the last mentioned has some very essential properties of its own which merit attention. Following the order or method we have laid down, the Roebling system demands our notice, of which a partially isometrical view is represented in Fig. 1. It is, at any rate for the present, essentially a floor design, and not to be compared in point of span and accompanying dimensions with some of the examples which have been laid before our readers. It consists primarily of small concrete arches, turned between the stereotyped rolled wrought-iron or steel joists, the span of which latter, and consequently their size and sectional area, will depend upon, and vary with, the especial requirements of each particular case. In arches of comparatively very limited spans, the rule already stated for the proportion or the ratio between the span and the depth is frequently not adhered to. For, let R and R_1 = the respective ratios for a large and a small span concrete arch, put S S_1, O, and D_1 for the corresponding spans and depths, then for the large arch we have—

$$R = \frac{S}{D} = \frac{1}{10}.$$

and for the smaller example—

$$R_1 = \frac{S_1}{D_1} = \frac{1}{8}.$$

But although the value of R remains fairly constant as defined by theory, that of R_1 is often determined more by practical than any other considerations. In Fig. 1, A A are the rolled floor beams, B B, in thick black curved lines, are arched bands of wire netting, peculiar to this system, which are further stiffened by iron rods ½in. in diameter at about every couple of feet apart. The concrete, sleepers, and wooden flooring, not required to be shown in the cut, are laid in the ordinary manner. Wire netting is also fixed horizontally along C C, upon which the plastered ceiling is secured.

While there is undoubtedly considerable latitude of selection allowed to the inventors, designers, and patentees of compound constructions of concrete and metal, and also to those who may desire to adopt them, there are nevertheless certain well-recognised and well-appreciated

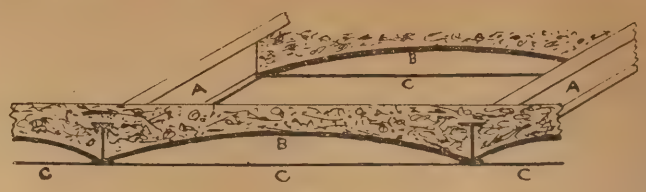


FIG. 1.

principles which ought to govern the selection. One of the chief objects of the dozen or more different combinations now more or less in actual use was to diminish the great weight of the old brick jack arches, as they were usually termed, or, in other words, to reduce the total weight of the flooring to a minimum per square foot. In the first place, the ordinary rolled iron or steel joist with equal upper and lower flanges is, *par excellence*, the proper section to be employed, both as regards strength and economy for the beams or joists. Independently of practical experience, theoretical dictates, founded partly upon the value of the moment of inertia of this particular type of beam, have established the superiority of this form of section. It is represented in Fig. 2, and a very slight acquaintance with the principles of the calculus will enable its moment of inertia to be determined.* The expression for it is simply a particular application of the well known general equation for the moment of inertia of solid rectangular beams, in which if b be the breadth, d the depth of the beam, putting I for the value of the moment of inertia—

$$I = \frac{b \times d^3}{12}$$

In the example in Fig. 2, let b be the breadth of each flange, which are equal, and t the thickness, d the depth from outside to outside of flange, and t the thickness of the web of the joist. Then if I be the moment of inertia of the section with respect to an axis $x\,x$, the expression is—

$$I = \frac{[b\,d^3 - (b - t_1)(d - 2\,t)^3]}{12}.$$

It will follow therefore that the rolled steel or iron sections selected should have a somewhat similar formula for the value of their moments

FIG. 2.

of inertia; or, what practically amounts to the same thing, their shape and the proportions of their relative dimensions should not greatly vary from the example shown in Fig. 2. It may be here pointed out that the wire netting at B B of the Roebling floor system in Fig. 1 constitutes a permanent centring for the arch, and consequently no temporary or false centres are required when the erection of the arches is in course of construction. This is a decided advantage, although, perhaps, a small one, and it is possessed also by the Expanded Metal system, in which the expanded metal replaces the wire netting. Having determined upon the proper section for the floor-beams, there is one point more to which attention should be given, and that is to their spacing or distance from centre to centre. In a word, they should not be placed too closely together, unless the loading is so abnormally heavy as to constitute a case calling for especial treatment. Under ordinary loading—although it may be stated that no two engineers or architects agree as to what is ordinary loading—if the floor-beams are packed too closely together, and as their spans are comparatively limited, they will have but a proportionally small depth, which may not be deep enough to inpart to them that amount of rigidity which they ought to possess. It has already been laid down as a rule admitting of no exception, that any system which relies, except to a very limited extent, upon the tensile strength of the concrete, should be sedulously avoided. One might just as well depend upon the tensile strength of cast iron.

A reference to Fig. 1 of the present article, or to similar sectional views of the compound systems of the construction of arches in concrete in former articles, will not fail to draw the attention of the reader to the fact that a much greater quantity of the one material is present in the design than of the other. It might be remarked that as the one material is much stronger than the other, so necessarily must the relative volumes, bulks, and massses of the two materials vary accordingly. To a certain extent, this assumption is admissible, but it does not go far enough. It nevertheless unquestionably leads up to the question, Is there any proper proportion to be observed between the absolute quantities of the two or more materials, as the case may be, which constitute the component parts of the whole design? This is an important part of our present subject, as many people are apt to imagine that a few tons of concrete more or less are of no consequence, and that the whole conglomerate mass is pitched in, and piled up in a happy-go-lucky, haphazard, half-reckless kind of manner. This is not the case, at any rate in good engineering and architectural practice; nor would it be permitted in even moderately high-class work. Before proceeding to another example of the combined system of building concrete arches, it will be as well to enter a little more in detail regarding the part played, and the relative quantities of the different materials needed, in that particular class of design.

The employment of steel and iron in almost an infinity of different sections, from wire of actual minimum diameter to heavy bars, to strengthen arches of concrete is now a very common occurrence, the object being in all instances to increase the ultimate resisting powers of the concrete arches where they may become subjected to stresses of a tensile character. The exact analysis or solution of the problem presents many difficulties, and, in fact, like numerous others of a similar nature, does not admit of a strictly or rigorously accurate adjustment. But at the same time, it is quite possible to arrive at a solution sufficiently approximately accurate to serve for all practical purposes. There are at first, two data to be obtained, which will vary nearly with every individual example, although the discrepancy will not be of any particular importance. In any case, whether large or small, an average can be calculated, which, from the number of experiments undertaken at different times for the purpose of establishing the data required, may be regarded as safe and reliable. Two of the most important of these are—(1) the modulus of elasticity of the particular description of concrete used, and (2) the length of time which has intervened between the date of the fabrication of the concrete and that when it is first subjected to actual working conditions. It is at this latter date that the value of the modulus of elasticity is to be determined, which will obviously depend upon the nature of the ingredients of the concrete, their respective quantities, either in terms of their weights or volumes, and the manner, more or less efficient, in which the whole mass is mixed and thoroughly incorporated. The very best ingredients will fail to give satisfactory results, if the mixing process be not of a most intimate character. Clearly the question of the quantity of water to be added to the mixture crops up here, and it is unfortunately one for the solution of which it is simply impossible to lay down any hard-and-fast rule. The opinions, and consequently the practice, of engineers with respect to the amount or proportion of water with which the ingredients should be mixed varies so widely that the one extreme may be represented by an almost fluid mass, and the other by an almost desiccated mixture. Between this limit, the nature of the site, when the concrete is to be

* It may be mentioned here, for the benefit of our younger friends, that in nearly all examinations for professional situations worth anything at all, a certain amount of acquaintance with both the integral and differential calculus is required.

used for foundation purposes, will no doubt in some degree regulate the supply of water.

The value of the modulus of elasticity for concrete will depend altogether upon the composition and description of that material, but for the fairly good ordinary Portland cement specimens may be put at 1,000,000. But when the compound is used in the form of clinker or cinder concrete, which latter is common in the construction of fire-proof flooring for stores, warehouses, and other large buildings, the modulus of elasticity drops down to about 100,000. It may be accepted that in the combined systems of building arches in concrete which we are now considering, the working load, or loads, will be borne by the different members or component parts of the structure in direct proportion to their respective rigidities. Rigidity, or as it is frequently termed, stiffness, is that property of a body, by virtue of which it resists any force or forces tending to cause it to alter its shape or form. If we put W to represent the load upon any beam, L equal the length, a the cross-sectional area, b the breadth, d the depth, and V = the deflection for the load W, then the rigidity or stiffness of the beam is found from the general formula—

$$E = \frac{W \times L^3}{4\,V\,a\,d^2},$$

in which E is the modulus of elasticity of the material. Since the rigidity of a body is inversely as the deflection, it follows that in a compound structure for similar areas, or quantities of component parts, the relative rigidities will have to each other the same proportion as their respective moduli of elasticity. The modulus of elasticity of ordinary Portland cement concrete has been assumed to be equal to 1,000,000, while the usual value for the same coefficient for steel is 28,000,000. It necessarily follows, therefore, from the preceding statement, that a single inch of sectional area of steel will oppose the same resistance to a deformation or alteration of form as 28sq.in. of concrete would do in a similar position. The resistance of the combined system may be determined by substituting a quantity of concrete for the steel wire or bar equivalent to twenty-eight times the sectional area of the latter, placed in the horizontal plane of the steel bar. This arrangement, in which D may be regarded as simple concrete beam, is shown in Fig. 3.*

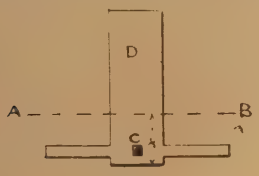


FIG. 3.

Having found the moment of inertia for the beam, its strength, when the concrete fails by cracking on the tension side, may be then determined. Make M = moment of the resistance of the beam when the concrete cracks, I = the moment of inertia of the Transformed section, T = the ultimate tensile strength of the concrete, and x the distance from the neutral axis, A—B, in Fig. 3. The value of M is given by the equation—

$$M = \frac{T \times I}{x}.$$

We shall subsequently refer briefly to some particular applications of this general formula, but must first discuss the remaining combined systems introduced to our readers. It will be both interesting and instructive to compare the results of the experiments conducted in England with those arrived at by the trials and tests undertaken in Austria and on the Continent.

* Those who wish to pursue this subject further are referred to a valuable work just published, "The Materials of Construction," by J. B. Johnson, C.E., Professor of Civil Engineering in Washington University, St. Louis, from which we have quoted. For a discussion of the case where the concrete cracks and the elastic limit of the steel bar is reached, as well as for the case where the concrete cracks on the tension side and then fails in compression because of the strength of the steel bar, see an excellent article by the author in *Engineering News*, Jan. 3, 1895.

ARCHITECTURAL ASSOCIATION EXCURSION, 1897.

ARRANGEMENTS are now being made for the annual outing of the Architectural Association. Mr. Hampden Pratt, the new president, will conduct the party, and Mr. Talbot Brown is the hon. sec. The following places, near Lancaster, are proposed to be visited (the County Hotel, Lancaster, is to be the headquarters):—Claughton Hall, Lancaster, a very quaint 15th and 16th-century house, partly gone; Chesford-by-Hall, having a fine coat-of-arms over the west door; Melling and Tunstall churches; the bridge and church, Kirkby Lonsdale; Cark Hall, an old mullioned house of the 16th century, with very thick walls; Cartmell Priory; Borwick Hall, of the time of Charles I., where Charles II. stopped the night, sharing the hospitality of Sir Robert Bindloss—the hall was illustrated by a perspective and plans in our issue of Dec. 31, 1886; Beetham Hall; Hornby Church; Houghton Tower; Samlesbury Hall, some half-dozen miles from Preston, on the high land between the Ribble and Darwen. This was a most secluded spot until 1825, when the new turnpike road from Preston to Blackburn was carried within 3ft. of the house. A view of the hall is given in Rimmer's "Old Halls of Lancashire," 1852, and a valuable monograph on the "History of the Ancient Hall at Samlesbury," enriched by copies of old deeds and pedigrees, was published by Mr. James Croston, F.S.A., in 1871. The hall was "restored" in 1835, and was afterwards used as an inn; it was once quadrangular and moated. The minstrels' galley was added during the restoration, when to make a front for the gallery parts of the beautiful screen and of a Jacobean bedstead were chopped up. The old windows, which are figured in Parker's "Domestic Architecture," have been replaced by others with attenuated mullions. Other particulars of the house are given in Alram's "History of Blackburn." The members will also visit Livesey Hall; Levens Hall, of formal-garden fame, illustrated by the late J. D. Sedding in his book on "Gardening"; Holker Hall, a seat of the Duke of Devonshire, on the banks of an estuary of the Leven, situate in a fine park; additions to the house were made by Messrs. Paley and Austin, who also restored Thurland Hall after a fire. It is a moated house, and sometimes is called a castle. This mansion will be included in the programme, to which for the final days Furness Abbey and Lancaster are given.

OBITUARY.

MR. JAMES W. GRUNDY, senior partner of the firm of Messrs. J. W. Grundy and Son, architects, of Brogden-street, Ulverston, died suddenly at his residence, Richmond-terrace, on Thursday morning in last week, from syncope, in his 76th year. Deceased was a native of Bentham, but commenced business as a joiner and builder over half a century ago, subsequently adding to it that of an architect. He was the architect for the Stone Cross mansion, the Ulverston, Dalton, and Millom Co-operative Stores, Croftlands, Ulverston Temperance Hall, Market House, Post Office, Sun Hotel extensions, Hinning House, Bootle; he also put up the Savings Bank clock, and remained the custodian of it to the time of his death; he was also architect for many other public and private buildings in the town and district. For years deceased was clerk to the Lighting and Watch Inspectors, sergeant and quartermaster in the local Volunteer corps, and was also a member of the local lodge of Freemasons. For some time Mr. Grundy has been in failing health, but has not been confined to the house. Up to recent years he took an active part in the affairs of the town.

The Bath City Council have raised the salary of Mr. Gilby, assistant waterworks engineer, from £250 to £350 a year.

The death is announced, at an advanced age, of Mr. Josiah Thomas, for very many years city surveyor of Bristol. Mr. T. H. Yabbicom, borough engineer, has been appointed by a committee to carry out the duties of the office pending a permanent appointment, which will probably not be made until the committees of the council have reconsidered the positions of the officers in the event of the Boundaries Extension Bill passing into law.

The foundation-stone of the new out-patients' wing which is to be added to the West Kent General Hospital at Maidstone as a memorial of the Queen's long reign, was laid on Tuesday week. The wing is being built at a cost of £2,800, Mr. Hubert Bensted, of Maidstone, being the architect. Mr. T. Elmore is the contractor.

COMPETITIONS.

BURY, LANCS.—The corporation adopted at their last meeting the following recommendations of the art gallery committee: That the following instructions be given to the architects submitting competitive designs of the proposed art gallery—viz., that the size of the rooms for the Wrigley Collection be 90ft. by 35ft. for oils, 37ft. by 23ft. for water-colours, and 30ft. by 23ft. for engravings; that the building line be set back as follows—viz., Moss-lane and Silver-street 12ft., Back Knowsley-street 2ft., and on the side near the Textile Hall 6ft.; that there be no caretaker's house on the premises; that the cost of the building be £18,000; that the question as to heating the building be left open; that the entrance to the gallery be in Moss-lane; that August 31 be the last day for sending in competitive drawings.

IPSWICH.—At the last meeting of the School Board, the works committee recommended for adoption the conditions under which they proposed that architects practising in Ipswich should be invited to send in competitive plans for new premises for the Higher Grade School to be erected on the Tower-street site. No premiums are offered; the board will pay the architect from whose plans the school is erected the usual commission of 5 per cent. on the amount of the accepted builder's tender; plans to be delivered on July 13th. On the suggestion of Mr. William Eade, F.R.I.B.A., a member of the board, it was decided to extend the time for sending in plans till September 14th.

NEWCASTLE NEW INFIRMARY.—A meeting of the Newcastle Infirmary Building Committee was held on Friday. Thirteen firms of architects, it was said, had intimated their acceptance of the invitation to send designs in competition for the new building. With regard to the application made to the Town Improvement Committee of the Newcastle Corporation, for a piece of ground adjoining the site at Forth Banks, a deputation was appointed to wait on the committee at their next meeting. As soon as the negotiations with the corporation for the site are completed, instructions will be issued to the architects. The premiums for the competition are as follows:—First, the execution of the work at the usual commission; second, £150; third, £100; and fourth prize, £50. It was agreed that the architects should be allowed six months from the issuing of instructions to send in their plans. The following is the list of competitors:—William Henman, Birmingham; T. Worthington and Sons, Manchester; Simpson and Milner-Allen, London; Gibson and Russell, London; Dunn, Hanson, and Fenwick, Newcastle; Oliver and Leeson, Newcastle; Armstrong and Knowles, Newcastle; Newcombe and Adams, Newcastle and London; Dyson, Newcastle; Marshall and Dick, Newcastle; Haswell, North Shields; Clark and Moscrop, Darlington; and F. Caws, Sunderland.

CHIPS.

While a steeplejack named John Booth, aged 60, was working on a chimney at the Jarrow Steel Works, on Thursday week, he fell a distance of 90ft., and was killed.

At the last meeting of the Rochdale Town Council, allegations were made that weak timber is being used in the erection of houses. The borough surveyor, Mr. S. S. Platt, has since been instructed to prepare a statement fixing the minimum strength which, in his opinion, should be allowed.

A bust of the late Sir John Pender, executed by Mr. E. Onslow Ford, R.A., was formally presented to University College, Gower-street, W., on Friday, together with a cheque for £5,000, to be applied to the endowment of the electrical laboratory of the college.

The Finance Committee of Aberdeen Town Council had under consideration on Friday a report by the burgh surveyor for the extension of the sewerage system of the city. The total cost of the works as recommended by the burgh surveyor is £75,000, but the committee agreed to recommend that a section of the scheme should meantime be departed from, leaving the estimated expenditure at fully £40,000.

A few days ago the representatives of the late Mr. J. H. Williamson formally opened their new brickworks (the Non-Porous Brick and Tile Company), situate by their colliery at Chesterton, by giving a dinner to the whole of their employés, including those from Goldenhill Colour Works, numbering over 300 in all.

Building Intelligence.

BIRMINGHAM.—Princess Christian visited Birmingham on Wednesday for the purpose of opening the new buildings of the General Hospital. The structure is of red brick and terracotta, and has been erected from the designs of Mr. William Henman, F.R.I.B.A., of that city, at a cost of £210,000. The central pile is in the Later Victorian style, with projecting wings flanked by towers and connected by transverse corridors, with a number of semi-detached blocks or pavilions harmonising in style with the central group, and extending over an area of some 500ft. in length by 400ft. in depth. The combined frontages measure 1,470ft. The site occupies the whole of one side of St. Mary's-square, in the rear of the new Victoria Law Courts. The predominating idea of the design is the employment of octagonal forms in the towers, turrets, buttresses, and gable terminals, the vertical lines of which are broken by horizontal bandings and panel work. Messrs. Barnsley and Sons, of Birmingham, have been the contractors.—Carr's-lane Chapel was re-opened on Sunday, after restoration. The old gallery fronts, which have been the subject of various experiments in decoration, have now been superseded by fronts of solid English oak. In the galleries the whole of the pews have been removed, and for them have been substituted single lift-up seats, similar in structure to those with which theatre-goers are now familiar. The walls and ceiling have been redecorated, and also the iron columns and arcading. The iron girders and supports at the entrance to the body of the chapel have been hidden under mouldings of fibrous plaster. Screens have been erected in the vestibule, and additional exits have been provided at the pulpit end of the chapel. The chapel is now lighted by electricity, chiefly by means of light brass pendants. The expenditure altogether will amount to about £6,000. Messrs. A. R. Dean, Limited, have undertaken the internal reconstruction and decoration.

FOLKESTONE.—The Hotel Metropole, on the West Lees at Folkestone, has just been opened under the auspices of the Gordon Hotels, Ltd., and furnished and decorated by Messrs. Smee and Cobay, of Moorfields, E.C., and 139, New Bond-street, London. The architect, Mr. T. W. Cutler, F.R.I.B.A., has designed the building in the Late Victorian style. The building is squarely designed with rectangular wings at the rear, forming courtyard, and the façade is relieved with square projecting bays and loggias and balconies. A copper-covered central dome with balcony round it surmounts the edifice. The sanitary work has been carried out by Mr. G. Jennings, of Lambeth. No soil or slop-drain has been permitted inside the building. All baths, w.c.'s and lavatories are detached from the main building by aërated lobbies. The grounds are laid out with walks, lawns, and flower-gardens, and a band-stand is situated in the centre. The walls are damp-proof, and the roof, floors, corridors, staircases, and walls are fireproof and sound-proof. No wood lathing or bratticing is used throughout the building. All communicating doors are double and sound-proof. The wiring for electric light requires no protection, and is Andrews' concentric wiring and cables. All corridors and principal rooms are warmed and ventilated with warmed fresh air. Fire-alarms are distributed over every floor, and fire hydrants cover the whole building. The foundations of the hotel were executed by Mr. H. Lovatt, of Wolverhampton, and the building has been erected and finished by Mr. W. J. Adcock, J.P., of Dover, Mr. Chedgey acting as the resident manager. The building is faced with dark red bricks from the High Broom Brick Co., Tunbridge Wells, and terracotta executed by the Burmantofts Company. The roofs covered with light green Tilberthwaite slates, the dome to centre roof being covered with copper by Messrs. Braby and Co. The constructional iron and steel work, some 700 tons, has been supplied by Messrs. Drew-Bear, Perks, and Co. The fire- and sound-proof floors by Banks' Fireproof Construction Syndicate, together with all coffered and other ceilings, cornices, encasement to iron columns, &c., which were covered with helical steel lathing, no wood lathing being used throughout the building. The partitions, where not brick, are constructed of iron framing and lathing, incased in solid plaster, and are perfectly fire-proof—a patent of the above company. All the staircases and external steps are fire-proof and executed in Stuart's granolithic concrete. The rooms in roof are fire-, heat-, cold-, and sound-proof, being specially finished with Anderson's silicate cotton. All communicating doors between rooms are removable, and are double and sound-proof. All sashes are removable, and can be cleaned inside rooms, and are fitted with N.A.P. patent fastenings. The warming and ventilation, cooking apparatus, complete installation of electric light and bells, and the whole of the engineering work (except lifts) has been executed by Messrs. J. Slater and Co. In the basement, the kitchen, larders, pantries, service-rooms, and offices are lined throughout with glazed bricks, also dado in corridors, and paved with wood-block flooring. The service, luggage, and passenger lifts have been erected by the Otis Elevator Co., with all the latest improvements. The visitors' hall, main staircase, balustrade, dining-room, chimneypiece, &c., have been executed in marble by Messrs. Burke and Co., from the designs of the architect. The marble mosaic floors are by Burke and Mainzer and Co. The Carton-pierre enrichments to large and small dining-rooms, ball-room (Renaissance), drawing-room (Louis XV.), billiard-room (Spanish Renaissance), were executed by Messrs. G. Jackson and Sons, from the architect's drawings. The stained glass and some decorative painting are by Messrs. Campbell, Smith, and Co. Two subject panels in lounge were modelled and painted by Messrs. Moria and Jenkins. The whole of the furnishing and equipment of the hotel has been specially designed and executed by Messrs. Smee and Cobay, and the decorations were carried out by them under the directions of the architect. The hotel contains over 250 bed and sitting-rooms, and on the ground floor, arrival entrance and hall, visitors' entrance hall and lounge, entrance to ball-room and suite. Two dining-rooms, reception-room, drawing, reading, smoking, and billiard-rooms, and the necessary service rooms. The hotel stands in its own grounds of about four acres, and is bounded by roads on all sides. Mr. W. Woodward and Mr. J. Davies have acted as clerks of works, and the building has cost about £150,000.

HITHER GREEN.—The Prince and Princess of Wales will open on Monday next the new Park Hospital erected by the Metropolitan Asylums Board for the treatment of scarlet fever, diphtheria, and enteric fever at Hither Green, near Lewisham. The hospital is said to be the largest for acute cases of fever in the United Kingdom. It stands on a site of twenty acres on the summit of a slight hill clothed with trees. The buildings forming the hospital are 42 in number. There are 18 pavilions containing 108 wards, varying in size from those for single beds to others 120ft. long for 20 beds, with separate residences for the officials and larger homes for the male servants, the female servants (with accommodation for 90 maids), and for the nurses. This last consists of three blocks, containing about 200 rooms in all. The servants, kitchens, stores, &c., are arranged in the centre, with a water and clock tower, and to the east, west, and south of this centre are grouped the various pavilions for the different diseases, all separated one from another, and the whole being connected to the central administration by arcaded covered ways open to the air. Beneath these are subways for steam heaters, water and steam pipes, electric cables, &c. The whole hospital is heated by steam and hot water, lighted by electricity, fitted with fire appliances and electric alarms, telephones, and other modern appliances. Wells are being sunk on the site to supply water from the chalk, the estimated maximum daily consumption being over 200 tons. An apparatus is provided for softening the water before it enters pipes and boilers. All the cooking is done by gas or steam, and the walls of the kitchen buildings are lined with glass. The architect of the hospital is Mr. Edwin T. Hall, F.R.I.B.A.

PETERBOROUGH.—The completion of the present restoration of the north-west gable of Peterborough Cathedral was marked by the formal placing in position, on Monday, of the cross which terminates the gable. The whole of the cross, with its original base, was lifted into position in one piece. The dean, Dr. Ingram, Canon Clayton, and Miss Alderson, daughter of Canon Alderson, assisted in laying the bed of Portland cement on which the cross was to rest. The work has been carried out by Mr. John Thompson, of Peterborough, and very few new stones have had to be introduced to take the place of those which were completely ruined by the weather. There are only two new stones in the outside order of the great arch, and with the exception of two small patches the large string course has been replaced intact. Every stone has been put back into its original position, having been carefully numbered before being taken down.

SHERINGHAM.—The new church of St. Peter's, Lower Sheringham, and the new burial-ground recently added to the churchyard of All Saints', Upper Sheringham, were consecrated on St. Peter's Day by the Bishop of Norwich. The building consists of a nave 87ft. long, with a lofty arcade on each side, north and south aisles 75ft. by 10ft., chancel 35ft. 6in. by 22ft. inside screens and 42ft. between walls, with an arcade and aisles on the north and south sides. Porches are built at the west end of the north and south aisles and to the vestry. The chancel will be eventually inclosed by screens, forming an ambulatory around the sides. Accommodation is provided for 600 people in the nave, chairs being used, to which are fixed kneeling-boards. The font is against the west wall of the nave. The organ-chamber will be in the north chancel aisle. A large bell-cote has been constructed at the west end of the nave, to hold three bells. The walls externally are faced with flint, with Doulting stone dressings for the windows, &c., and the roof is covered with slates. The architects are Messrs. St. Aubyn and Wadling, of London.

WALTON.—The Baptist Chapel at Walton, near Felixstowe, is being renovated and enlarged at a cost of £900. The memorial stone was laid last week. The north and west walls have been rebuilt substantially. A new floor and new benches, the latter all facing the east end, are to be laid. The pulpit and platform, formerly occupying a position along the north side, are to be rebuilt along the east wall, and designs for a new baptistery, to be placed near the same spot, have been prepared by Mr. Alfred Conder, F.R.I.B.A. Two narrow side galleries will be fixed, and a deeper end gallery, and the roof of the chapel will be raised internally some 4ft. The contractor is Mr. Robert Girling, of Ipswich.

WOLSINGHAM.—On Saturday, the Bishop of Durham reopened the parish church, after undergoing important renovations and improvements. An addition has been made to the west end of the church, where the baptistery is now located, together with some additional seats, the floor of the church has been entirely relaid with blocks of wood upon a concrete foundation, the church has been reseated, and a new pulpit added, all being of Hungarian oak. The altar is also new, and an improved heating apparatus of hot water has been fixed together with a new lighting arrangement, the gas brackets being suspended from the roof in place of the old fixtures on the pews. The total cost has been close upon £800. The alterations were carried out from designs by Mr. C. H. Fowler, F.S.A., Durham, by Mr. Westgarth, builder, Wolsingham; Mr. W. Hudson, joiner, Bishop Auckland; and Messrs. Dinning and Cooke, of Newcastle-on-Tyne.

The old Bell Hotel, Holborn, the last of the famous galleried coaching houses in London, was put up to auction on Monday at the Mart, Token-house-yard, as a building site of 7,200ft. The highest bidding for the 80 years' lease, with the licence, was £11,600, at which premium price it was sold to Mr. Fitch, surveyor, of Furnival's-inn. The rent will be a peppercorn for the first year, and £750 per annum for 79 years.

At a general meeting of the Institute of Painters in Oil Colours, held on Monday night, Sir E. J. Poynter, P.R.A., Sir E. Burne-Jones, Mr. G. F. Watts, R.A., Mr. Frank Dicksee, R.A., and Mr. Frederick Sandys were elected honorary members. Mr. W. Llewellyn, Mr. Julius Olsson, Mr. Niels M. Lund, Mr. W. B. Wollen, R.I., Mr. Alfred Withers, and Mr. Robert Noble, A.R.S.A., were elected members.

The Duke of Devonshire, as Lord President of the council, and official head of the Department of Science and Art, has appointed Mr. George Coffey, B.A., to the office of superintendent of Irish antiquities in the Dublin Museum.

A petition was filed in the Lincoln Court on Tuesday week against George Arthur Gill, of Bardney, plumber. The usual receiving order was made, and the debtor has, upon his own application, been adjudicated bankrupt.

Engineering Notes.

LEITH.—During the past six months good progress has been made with the erection of the new wet dock at Leith. Since the beginning of the year four or five steam navvies have been engaged in excavating the area for the new dock, and early the contractor, Mr. John Best, commenced the construction of the dock wall by putting in the concrete base on which it rests. One part of the masonry has now been raised to a height of 28ft. The whole of the foundation of the north wall has now been laid. The wall is about 20ft. thick at the base, and diminishes in thickness till it reaches the top, where it is 8ft. The coping of the wall is 40ft. above the bottom of the dock. Steam navvies are also at work excavating the new entrance lock from the east pier which is to be 70ft. wide, and is to be fitted with iron gates worked by hydraulic machinery. Another steam navvy is employed digging a passage between the new dock and the Albert Dock. The swing bridge across this lock has now been placed in position in order to give communication to the west side of the Albert Dock while the passage is being constructed. The bridge is 130ft. long, 27ft. wide, and weighs about 350 tons, and is to be fitted and worked by hydraulic machinery. On the bridge there are two lines of rails and a footpath on each side. The deepening of the entrance channel is also proceeding, a dredger being engaged in this work, one third of which has been completed.

WATER SUPPLY AND SANITARY MATTERS.

LONDON WATER SUPPLY.—The Water Committee of the London County Council have prepared a series of resolutions which they will ask the Council to pass at its next meeting. (*a*) That, in the opinion of the Council, the water supply of the Metropolis should not continue in the hands of private companies. (*b*) That, in the opinion of the Council, the undertakings of the Metropolitan water companies should forthwith be purchased at the fair and reasonable value of the same, regard being had to the rights, special circumstances, and obligations of the companies. (*c*) That the management of the water supply should be effected either (1) by the London County Council supplying its own area directly and outside authorities in bulk at a fixed price; or (2) by the London County Council supplying its own area only and the outside authorities supplying their areas; or (3) by a new body supplying directly the whole area both within and without the county. (*d*) That, in any case, as the County of London contains 87 per cent. of the ratable value and over 79 per cent. of the population of the whole area supplied by the Metropolitan water companies, and will thus be liable for more than four-fifths of the purchase money, it is desirable that the London County Council should, in the first instance, be the purchasing authority on behalf of the population of the whole area concerned. (*e*) That if the undertakings of the water companies are not acquired, it is essential that effective powers of control should be given to the County Council, and, further, that the position of the companies should be reconsidered and the law amended, particularly as regards their power to make and recover rates and charges and divide profits, and their obligation respecting the supply of water.

NEWPORT PAGNELL, BUCKS.—At a meeting of the Newport Pagnell Rural District Council, the scheme of main sewerage and sewage disposal for the town of Newport Pagnell was approved after being fully considered and approved by the Parochial Sanitary Committee, and it was decided to apply to the Local Government Board for sanction to a loan for carrying out the work. The scheme has been designed by Mr. D. Balfour, M.Inst.C.E., F.G.S., of Newcastle-on-Tyne and Edinburgh. The whole of the town is to be properly sewered with fireclay socketed pipes, and, where subsoil is wet, Hassall's watertight jointed pipes are to be used, especially adjoining the rivers Ouze and Ouzel. The sewage will discharge into an underground storage tank, from which it will be lifted by centrifugal pumps driven by gas-engines in duplicate, and forced through a rising main to the disposal works, where it will be specially treated by chemical or bacteriological tanks and land. Special means are to be taken also to prevent the flooding of the town during heavy rains by means of relief culverts.

In the House of Commons, on Monday night, Mr. Balfour announced that the Government had accepted the recommendation of the Committee on the Housing of the Wallace Bequests, and will purchase for the nation the mansion in which this splendid collection now rests.

PARLIAMENTARY NOTES.

WESTMINSTER HALL.—Colonel Welby (Taunton) asked the First Commissioner of Works last Friday whether it was intended to complete the architectural design of the north front of Westminster Hall by filling the niches with statues of personages connected with the history of our country. Mr. Akers Douglas (Kent, St. Augustine's): There is no prop sal, such as my hon. and gallant friend suggests, under the consideration of the Office of Works.

PLUMBERS' REGISTRATION BILL.—This measure, as amended, again came before the House of Commons sitting in committee on Wednesday night. Mr. Brigg moved to insert in Clause 3 after "established" the words, "in each county and borough council area in England, Wales, and Scotland." His object was to give to the local authorities, who knew the needs and wants of the localities, the power to carry out the Act.—Mr. Whittaker complained that amendments were being accepted which entirely altered the whole framework of the Bill. He did not consider the amendment of his hon. friend much of an improvement. If there were to be registration and examination, there ought to be uniformity and one registration body. On a division the numbers were:—For the amendment, 70; against, 166: majority, 96.—Mr. Warner moved an amendment to the effect that it should be left to the Local Government Board to make such arrangements as would be necessary for creating a council. The clause before the House and the schedules were far too complicated to admit of their being discussed with any adequacy in what remained of that sitting. The only practical course open to the supporters of the Bill was to agree to delegate some of the authority of that House to the Local Government Board, and to empower that department to frame rules for the constitution of the Plumbers' Council.—Mr. John Burns wished to hear the views of the secretary to the Local Government Board on this suggestion. Under the complicated scheme provided in the Bill, simplicity and uniformity of registration could not be hoped for. The Local Government Board was well qualified by its past experience to frame rules for the formation of the proposed general council, and the sanitary education of our plumbers was surely a matter in which the Board ought to take a special interest. The officials of the Board had damned this Bill with faint praise, and the secretary to the Board apparently did not know what attitude to take up.—Mr. T. W. Russell said that the same proposal that was now made was made in the Standing Committee, and was so unpopular that a division was not even taken. The hon. members who had spoken to-day proposed to lay a very serious duty upon the Local Government Board, a department which was overburdened with work already. The provision in the Bill in regard to the appointment of the general council had been carefully considered by the Local Government Board, and they were of opinion that the schedule was adequate for the purpose. Considering the work the Local Government Board had to do, he must decline, on behalf of the board, to undertake the proposed responsibility.—After remarks from Sir F. S. Powell and Mr. Tomlinson, Sir J. B. Maple said he could not understand a Government complaining that too much work was put upon one of its departments; but he considered that plumbers had no more right to be examined than bricklayers or any other class. It ought to be the duty of the Local Government Board to see that architects, surveyors, engineers, and foremen of building works were properly qualified as well as plumbers. The plumber, after all, carried out his work under the instructions of the architect and of the foreman of the works.—Sir J. Lubbock said he understood that the main ground why the Local Government Board refused this duty was in consequence of the character of the duty. Surely it was for the House to say what should be done, and then doubtless it would be carried out adequately by the officials of the Local Government Board.—Mr. Wolff thought it was of the greatest importance that the examinations should be of a uniform character.—General Laurie believed that whether the amendment was adopted or not, the Local Government Board would ultimately have, owing to the defective proposals of the Bill, to take over the work the amendment proposed to place on them. Sir H. Fowler said his experience of the Local Government Board was that it was very much undermanned and very much overworked. On that ground, therefore, he could not vote for the amendment. The House was anxious to throw everything on the Local Government Board, and then when the Board did their best they were attacked for what they were doing. Sir J. Brunner thought the Local Government Board was the best authority to control the examinations. The House divided, and there voted—For the amendment, 99; against, 199; majority against, 100.—Mr. Whittaker moved to leave out the whole of Clause 3 after the words "The general council shall consist of the following members," in order to insert words providing that the council should consist of the following:—One representative of each of the bodies enumerated in the Schedule B, and ten operative and ten master plumbers (in each case six being from England, two from Scotland, and two from Ireland) to be elected by the registered operative and master plumbers respectively. He said that the general arrangements in the Bill for the election of a general council were clumsy and unsatisfactory; and as the council was to discharge the most important and responsible duties, it was highly necessary that it should be a competent and impartial body. His amendment would obviate the necessity for huge meetings all over the country to elect representatives on the council.—Mr. Knowles opposed the amendment on behalf of the promoters of the Bill. It offered no adequate machinery, whereas the constitution of the general council under the Bill was most carefully considered by the Grand Committee, who made the general council as representative as possible of plumbers, sanitary persons, and other individuals who would be effective members of it. He could not see how in any particular the proposed new general council was any improvement upon the one in the Bill.—Sir J. B. Maple decidedly preferred the constitution of the general council set out in the amendment to that in the Bill. For instance, what did ironmongers know about the examination of plumbers?—General Laurie and Mr. Burns spoke in a similar sense. A division was challenged, but on the question being again put, the amendment was negatived and the debate stood adjourned.

CHIPS.

The aggregate for last week at the Auction Mart was only £46,243, and a comparison with those of the corresponding week of last year—£231,263—affords a striking proof of the present flatness of the market. Not only was there a shorter supply, but the demand was very feeble for all classes of property, and nothing like a proper average of the lots submitted found purchasers.

The Liverpool Corporation have decided to place at the disposal of the Parks Committee the sum of £7,690 for the purpose of laying out part of the site of Kirkdale Gaol as a recreation ground. This new place of recreation will contain about 6¾ acres of land.

A successful artesian bore has just been completed in Baston Fen, on the estate of the Right Hon. Lord Kesteven. The water rock was tapped at a depth of 170ft., when a very fine supply of water was obtained, rising 20ft. above the service, and yielding an overflow of 5,000 gallons per hour. Mr. Noble, of Thurlby, was the contractor for the work.

A reredos has been erected in Olney parish church. The work has been carried out by Messrs. Jones and Willis, of London and Birmingham. Caen stone has been used, relieved by pillars of Devonshire marble, coloured black, grey, and red. The centre panel contains a lamb, representing the Agnus Dei, and the side panels contain figures emblematic of the four evangelists, the tops of the panels being diapered and fitted with crocketed labels. The tracery is carved in the Gothic style, with conventional capitals, and figure-heads at the top of the marble pillars, four pinnacles surmounting the centre portion.

A five-light window, illustrative of scenes from the Old and New Testaments, has just been erected in Clifton Church, near Tamworth. The five lights show the Birth, Baptism, Crucifixion, Resurrection, and Ascension of Our Saviour, and in the tracery above are pictures of subjects from the Old Testament. The work was intrusted to Messrs. Jones and Willis, of Birmingham and London.

We omitted to mention last week, in our notice of the opening of the new Shoreditch dust destructor, that the roofs are glazed on the patent system of Messrs. W. E. Rendle and Co., of Westminster Chambers, 5, Victoria-street, S.W.

The Bishop of Norwich visited St. Margaret's Church, Starston, on Wednesday week, to dedicate the churchyard cross which the parishioners have erected to commemorate the Queen's record reign. The cross is of Portland stone, and follows generally the design of St. Martin's Cross, Iona; it is 14ft. high; the carving introduces V.R., 1837-1897, with the rose, shamrock, and thistle.

On Sunday week special services were held at St. Andrew, Old Chesterton, in celebration of the insertion of a stained-glass east window. The central figure of the window, which has five lights, is Our Lord in glory, crowned as Head and King of the Church, and wearing His priestly robes as the Great High Priest. The five lights also contain at the top the Four Evangelists, with their symbols. Beneath these, in the three centre lights, are the Annunciation, the Nativity, and the Presentation in the Temple. On the north side is the figure of St. Andrew, on the south St. Michael; these have underneath the arms of St. Andrew and of Hervey de Stanton.

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ILLUSTRATIONS.

FIRST AND SECOND PREMIATED DESIGNS FOR THE SUTHERLAND INSTITUTE, LONGTON.—MR. ALFRED BEIT'S MANSION IN PARK LANE.—THE SWANSEA METAL EXCHANGE.—WESLEYAN MISSION SCHOOLS, GROVES, HULL.—A HOUSE AT CASTLEMORTON.—DETAIL OF FRONT ELEVATION OF SELECTED DESIGN FOR THE NEW CITY HALL, BELFAST.

Our Illustrations.

SUTHERLAND INSTITUTE, LONGTON.

WE illustrate this building by the two designs placed first and second by Mr. W. Gilbee Scott in an open competition, and whose selection was afterwards endorsed by the Longton Town Council. This double event was won by Messrs. Wood and Hutchings, architects, of Burslem and Tunstall. The site was given by the Duke of Sutherland, and the foundation-stone was laid in January last, with Masonic honours, by the Prince of Wales. On the ground floor provision is made for a free library, and the remainder of the building will be devoted to technical purposes, having well-arranged rooms for science and art, cookery, and manual training. A caretaker's house is also provided, and the site is large enough to permit of easy enlargement in the future. The buildings will be constructed of brick, with stone dressings, and fireproof construction throughout, the estimated cost being £8,000, but the contract is not yet fixed.

MR. ALFRED BEIT'S MANSION IN PARK LANE.

THIS house, which is now (except in respect to some of the internal decorations) complete, has been erected on a leasehold site belonging to the Grosvenor Estate. It is bounded on the north by Mount-street, on the east by Park-street, on the south by South-street, and on the west by Park-lane. On the north and east the house is separated from the street only by wide areas. On the west and south, however, space has been left inside the fence wall for a garden. In studying the plans it will no doubt strike the observer that apparently little advantage has been taken of the southern aspect, so important in this climate. The reason forms a key to some peculiarities both in plan and design. Originally it had been intended to erect two houses on the site, and Mr. Alfred Beit, the owner of the house, took a lease of the northern portion only. In these circumstances no view could have been obtained from windows looking south, and but little sunshine would have shone on the southern wall. It was not until after the building had progressed too far to alter the plan that Mr. Beit took a lease of the remaining portion of the ground, and decided to erect upon it the winter garden and billiard-rooms shown on the plans. All architects will appreciate the difficulties which attend efforts to make such additions as this harmonise with a design already complete in itself. It will be noted that all the lines have been picked up, and that the treatment of semicircular arches carried on black granite columns, already adopted for the north porch and west bay, has been repeated in the addition. The plans speak for themselves. All the reception rooms are on the ground floor, and provision has been made for the easy circulation of guests at large entertainments. The centre hall and staircase are of English oak, elaborately carved. The suite of rooms on the first floor facing west, above the two drawing-rooms, are Mr. Beit's private apartments. There are on this floor, in addition, two bedrooms and dressing-rooms. Above this, again, are guests' rooms, all these enjoying a magnificent view over Hyde Park. The men-servants are accommodated in the basement, and the women servants on the east side of the second floor. It should be noted that the height of the building was limited by the terms of the lease. The walls are faced with brown Portland stone, and the columns are of Aberdeenshire black granite, half-polished. The floors of the balcony over the west bay and of the flat over the billiard-room are of marble. The contractors are Messrs. G. Trollope and Sons. The architects are Messrs. Balfour and Turner, of 10, Buckingham-street, Strand.

THE SWANSEA METAL EXCHANGE.

THE Swansea Exchange (Incorporated) have just opened their new headquarters, Fisher-street. For the past ten years the members of this important organisation have been meeting at the theatre of the Royal Institution of South Wales; but it was felt that a more suitable and commodious meeting-place should be erected for the Exchange business transactions. The committee accordingly secured a site at the rear of the "Cambrian" office in Fisher-street. Plans were prepared by Mr. H. W. Wills, architect, of Castle-square, and the building of the exchange was intrusted to Mr. Thomas Davies, St. Helen's-avenue, who has now carried out his contract. The new Swansea Exchange is built in an adaptation of what is known as the Queen Anne style, in red brickwork, with stone dressings. The main entrance is from Fisher-street. The principal entrance has columns on either side, whilst above there is some carving with a centre figure allegorical of Swansea. The corridor is tiled, and leads into the large exchange, the inside of which is 50ft. by 40ft., and 20ft. high, and has a curved elliptical roof. It is lighted by elliptical windows, containing upon them the arms of Swansea. The building also contains 21 other rooms, arranged in suites for offices. The roof is covered with tinplates instead of slate, though with what success it is as yet difficult to say. The building, which cost £4,000, is in a most central position, and should afford a convenient meeting-place for commercial men.

WESLEYAN MISSION SCHOOLS, GROVES, HULL.

THESE buildings, just completed, are situated upon a good corner site at the junction of Jenning-street and Cleveland-street, and comprise an assembly hall 53ft. 6in. long by 36ft. 6in. wide, with side balconies and end gallery (accommodating about 600 persons), approached by good entrances from Jenning-street, and surrounded by twelve class-rooms, library, kitchen, &c., on the ground floor—as will be seen by the plan given with the view. A large junior school and minister's vestry are planned at the rear, with an entrance from the side street. There are large class-rooms on first floor for young men and young women respectively, available for week-night meetings. The hall has a partly-open timbered roof, and is lighted from above by a continuous clerestory glazed with leaded lights. The walls are faced with Lincolnshire red pressed bricks; the bricks are from Ruabon. The weatherings are in Howley Park stone, and the tracery windows are executed in Ancaster stone. The inside joiner's work is framed in Californian red wood with panels of red deal, slightly stained and varnished. The front windows and inside door panels are glazed with leaded lights. The builder is Mr. Edward Good, Barmston-street, and the architects are Messrs. Gelder and Kitchen, of Lowgate, Hull.

HOUSE AT CASTLEMORTON.

THIS was built in 1890 for Mr. R. H. Cazalet, seven miles from Great Malvern, in brick rough-cast in cement with red tile roof. It has three sitting-rooms, one 31ft. by 14ft., and seven bedrooms, with bath-room and hot and cold water supply. The builder was Mr. Wm. Porter, of Malvern Wells. The architect is Mr. C. F. A. Voysey.

BELFAST TOWN HALL.

WE have already given plans, views, and elevations of both the first and a second design selected in this recent important competition. The first we printed on June 18 and the second on June 25 last. To-day is published a detail drawing of the chosen design, front elevation. The architects are Messrs. Thomas and Son, of Westminster, and for further particulars of the scheme our readers will do well to refer to our previous descriptions of the work.

CHIPS.

On Saturday afternoon Mrs. Thos. Ashton laid the foundation-stone of a new technical school and free library at Hyde. It is estimated to cost £12,000.

The Roman Catholic cathedral of the Immaculate Conception at Sligo was consecrated last week. The building is Late Byzantine in style, very plainly treated, and has cost, from first to last, £58,000.

The Pension Office building at Washington is asserted to be the largest brick building in the world. Its rectangular base is 400ft. by 200ft. The exterior measurement is 316ft. by 116ft. on the inner court. The height from floor to glass roof is 89ft. Each of the supporting columns is 25ft. in circumference at the base, and contains 100,000 bricks. The first story walls are 3ft. thick, and 2ft. 2in. above. The interior of the building is divided by brick partitions into 170 rooms.

At Tuesday's meeting of the London County Council, the Works Committee reported that a recent sale by auction of timber unused by the Works Department had resulted in a loss of £674. The cost of the timber was £2,781, including rent.

The Works Committee of the Edinburgh and District Water Trust opened, on Monday, eight tenders in connection with Contract No. 6 of the new water-supply scheme. The work involved consists of ten miles of tunnelling and covered aqueducts, beginning at Broughton Station, and joining Mr. Best's contract at Broomlee Station. The offers varied in amount from about £130,000 to about £100,000. The five lowest were remitted to the engineer for examination and report.

The Hartlepool Board of Guardians having to vacate their present premises for the extension of the municipal buildings, have decided to purchase a site of 1,200 square yards in Hart-road as a site for their new offices, and will expend about £3,000 in building.

On Sunday week the R.C. Bishop of Down and Connor laid the foundation-stone of the new church of St. Vincent de Paul Ligoniel, Belfast. The church will seat about 1,300 persons. The nave walls are now about ready for roofing. It consists of nave and aisles, the general dimensions being 100ft. by 50ft. and 50ft. from floor to ridge. There are five bays on each side of the nave, and a projecting semi-octagonal apse, with which is connected a sacristy, and a meeting-room on the first floor above the latter. The style is Gothic, and the building is faced with ashlar.

At a meeting of the Morley Town Council, on Monday, it was decided to make an application to the Local Government Board for sanction to borrow £8,000 for the erection and furnishing of public baths, according to plans and specifications submitted by Mr. Fox, of Dewsbury.

The formal opening of Port Royal Harbour, Peterhead, took place on Monday. The area of Port Royal as now extended and deepened is nearly six acres, and the work has cost £32,000, including £12,000 for forming a quay wall in the South Bay. The quantity of rock excavated has been 160,000 tons, and the whole work has been carried out within a year.

A pulpit has been erected in Holy Trinity Church, Dorchester, as a memorial to the late rector (Rev. H. Everett). The work was intrusted to Mr. Harry Hems, of Exeter.

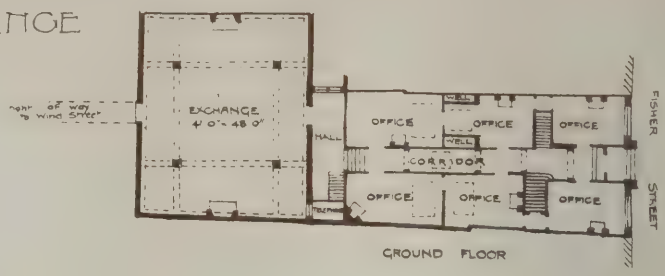
At the Town Hall, Wolverhampton, on Monday, Mr. Rienzi Walton, C.E., held an inquiry on behalf of the Local Government Board with regard to applications by the town council for sanction to borrow £23,847 for paving work, £7,600 for the public baths, £2,500 for the purchase of the Exchange Hall, and £2,050 for the purchase of the site for the new free library.

The new church of St. Peter, Bocking End, near Braintree, was consecrated last week. The section completed consisted of nave with clerestory, chancel vestries, and base of tower. The walls are of stock bricks, with red brick quoins, and the roofs are covered with red tiles. Mr. J. T. Micklethwaite, F.S.A., of Westminster, was the architect, and Mr. W. Parmenter, of Braintree, was the builder.

The old tower of the parish church of Cadoxton-juxta-Neath is about being restored, under the superintendence of Mr. C. B. Fowler, F.R.I.B.A., of Cardiff. The cost is estimated at £300, and it is proposed to add three bells, making a peal of six, at an additional cost of £200. The tower is one of much interest, and is in Early 14th Century style. It is proposed to restore only the portions which are perished and dangerous, preserving all the sound parts.

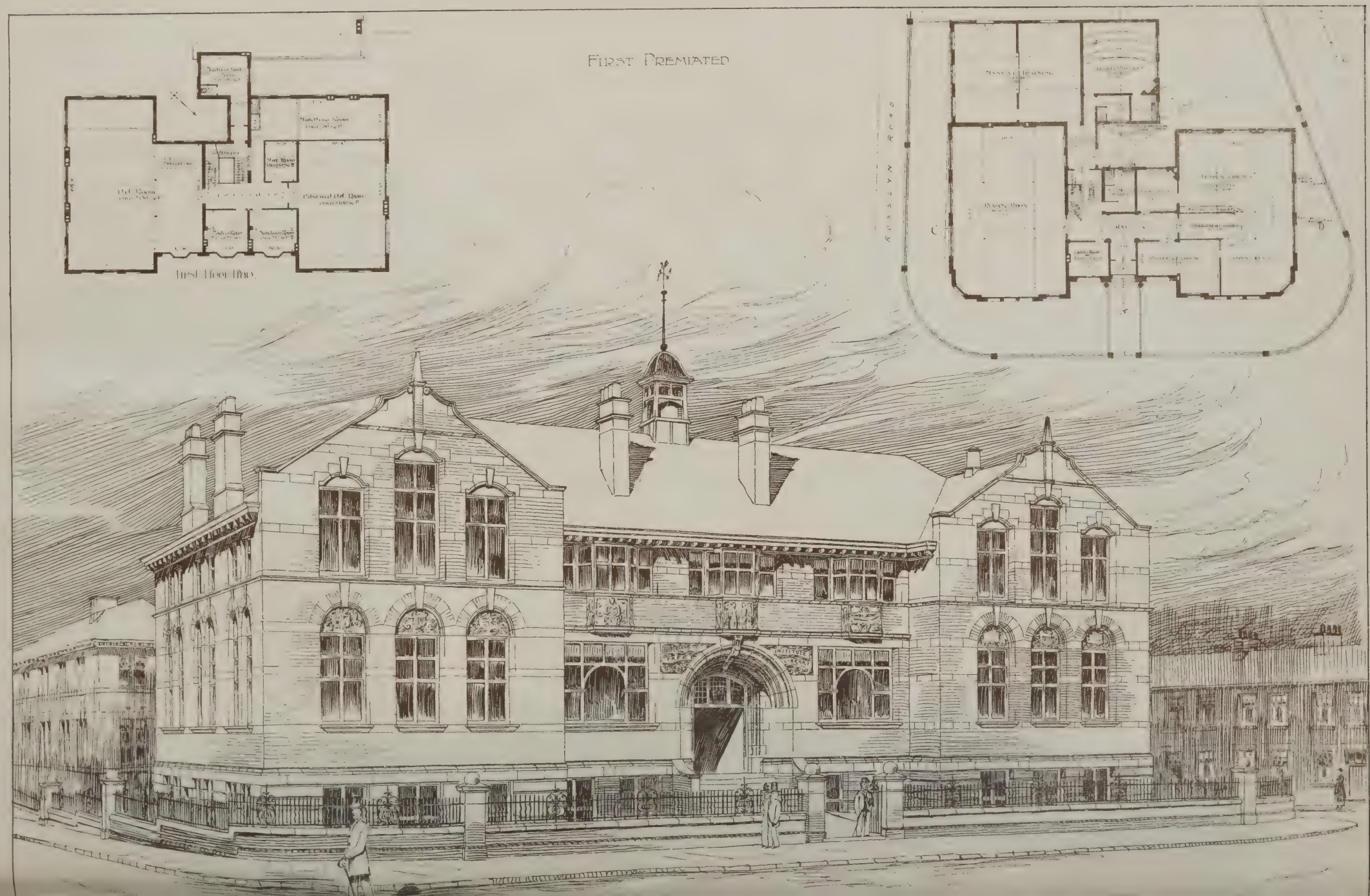
THE SWANSEA METAL-EXCHANGE

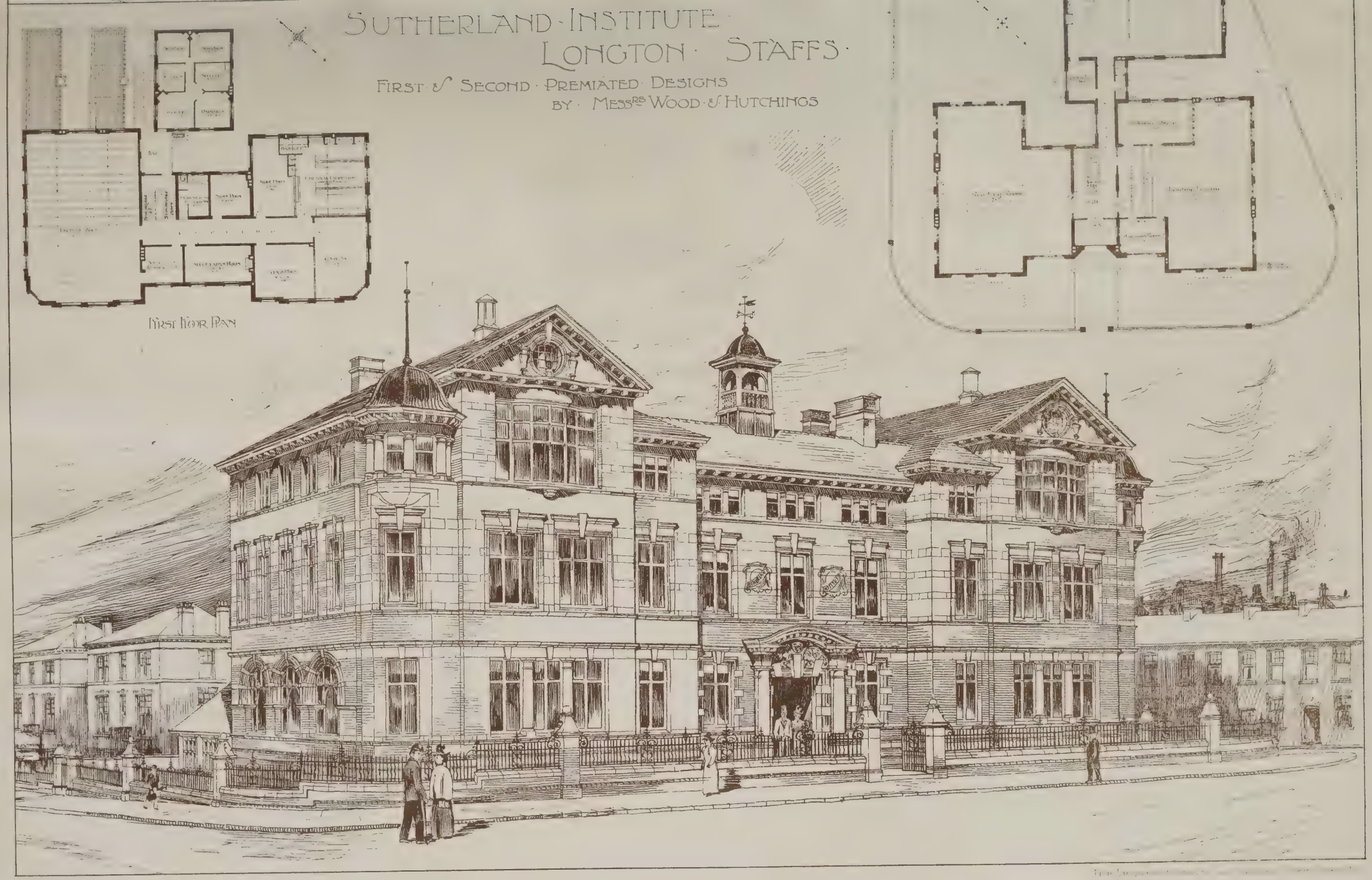
HERBERT W. WILLS ARIBA ARCHT



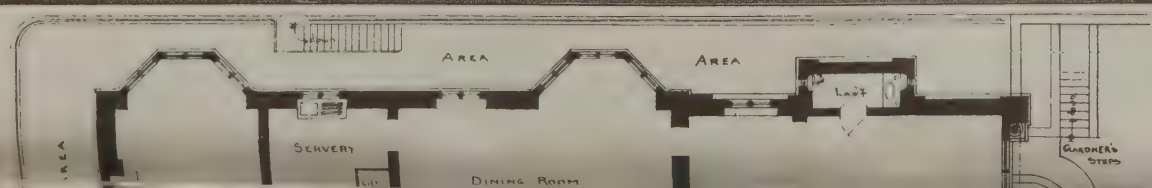
"PHOTO-TINT," by James Akerman 6, Queen Square London, W.C.

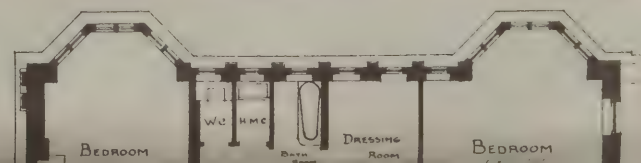
HOUSE AT CASTLEMORTON WORCESTERSHIRE. C.F.A. VOYSEY ARCHT.

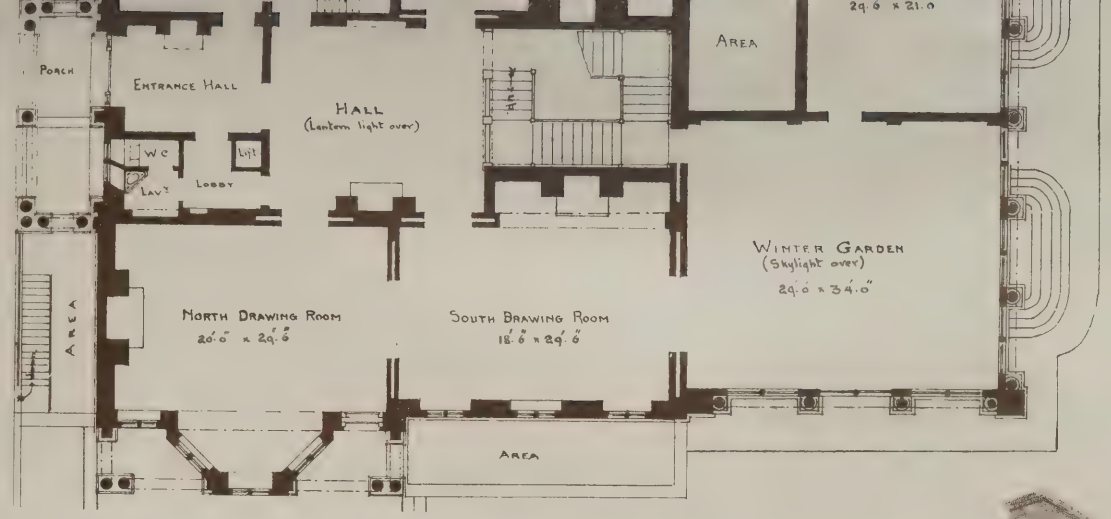

FIRST PREMIATED
FIRST FLOOR PLAN.
RUSSLYN ROAD
INSTITUTE
LIBRARY



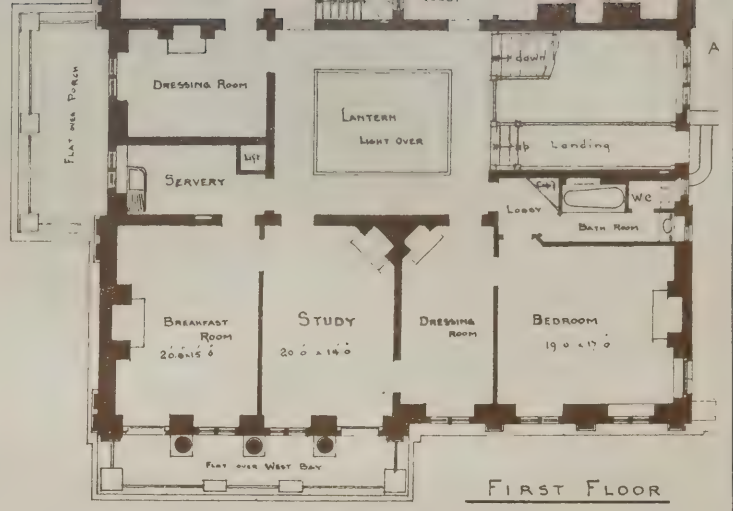
SECOND · PREMIATED


AREA
AREA
LIFT
SERVERY
DINING ROOM
GARDNER'S STEPS


BEDROOM
W.C.
H.M.C.
BATH
DRESSING ROOM
BEDROOM

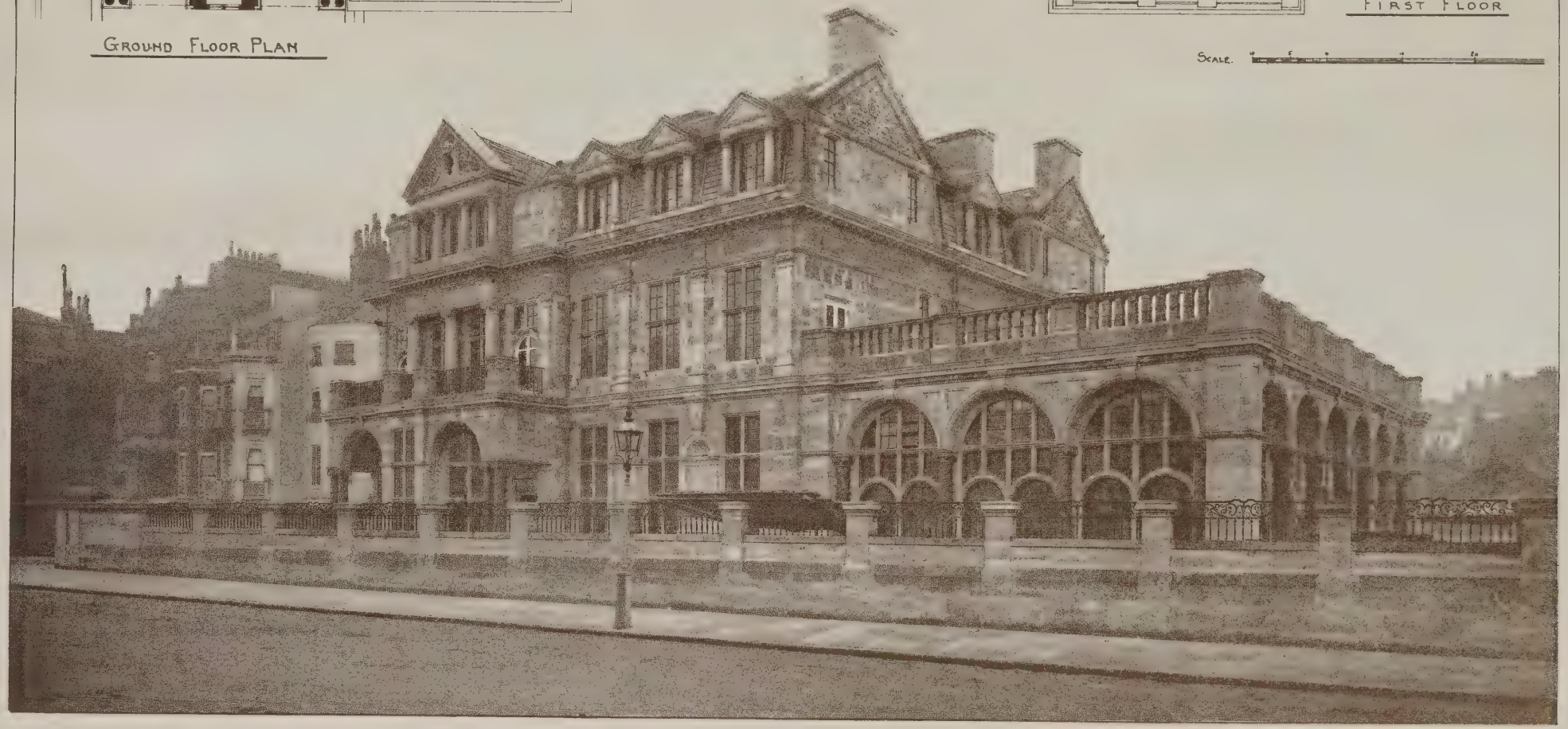


Ground Floor Plan



First Floor

Scale.



"Photo-Tint" by James Akerman

New Mansion in Park Lane W. for Mr Alfred Beit. Messrs Balfour & Turner Archts

WESLEYAN · MISSION · SCHOOLS GROVES HULL · MESSRS GELDER & KITCHEN ARCHTS

"PHOTO-TINT" by James Akerman, Queen Square London W.C.

BELFAST TOWN HALL. SELECTED DESIGN.

MESSRS. EDWARD THOMAS & SON, ARCHITECTS.

DETAIL OF FRONT ELEVATION

Photo Lithographed & Printed by James Akerman & Queen

Intercommunication.

QUESTIONS.

[11701.]—**Floor Construction.**—I have a building to erect, about 100ft. square, with first and second floors supported on columns. The floors will have to bear heavy weights, probably approaching 5cwt. per square foot. What would be the most substantial and economical construction for floors that must be laid with stone or concrete slabs? Hints as to the proportions of the concrete arching, thickness, resistance of lateral thrust, structural ironwork, &c., would oblige.—DEVONIAN.

REPLIES.

[11691.]—**Ornamental Plaster.**—There is a very interesting and practical book, entitled "Plastering: Plain and Decorative," by W. Millar, published by Mr. B. T. Batsford, 94, High Holborn.—CONTRACTOR.

[11694.]—**Sound.**—Prevention of the transmission of sound through walls can only be attained, I believe, by means of a judicious application of Fred. Jones and Co.'s patent combined silicate cotton and plaster slabs. "W. T. T." should obtain samples, &c., from manufacturers.—J. C.

LEGAL INTELLIGENCE.

A BIRMINGHAM ARBITRATION.—In the Birmingham Racecourse Company's arbitration, two arbitrators, with Sir Douglas Galton as umpire, sat in Birmingham for fourteen days, extending over Christmas and the commencement of this year, to deal with a reference to them of the claims of the Earl of Bradford and of Lord Newport, who alleged, in connection with the making of the new racecourse on their lordships' lands near Castle Bromwich, that considerable works provided for by the lease had been left undone, and that other works had been imperfectly and improperly carried out, and heavy damages were claimed in default of the execution of such works. The Racecourse Company claimed that, if their lordships' claims were just, it rested with the Nottingham Contract Corporation, Limited, who undertook all liability for them, to make good whatever was ordered as against them. The award of Sir Douglas Galton, the umpire, has now been made. It is in favour of the Earl of Bradford and Lord Newport, and against the Nottingham Contract Corporation, who are ordered to recoup the Racecourse Company in respect of nearly all the works and payments ordered, and the Nottingham Contract Corporation are also ordered to pay the whole of the costs attendant on the arbitration.

A BUILDER'S ACCIDENT POLICY.—Before Mr. Justice Henn Collins and a special jury last week the case of "Gibbs against the Norwich Accident Insurance Association" was decided. This was a claim by Anne Gibbs, executrix of Edwin Gibbs, of Cardiff, builder, against the defendants to recover a sum of £1,000, the amount of an insurance effected with them on the life of the deceased. The deceased on August 19, 1895, signed a proposal form for an insurance for £1,000 on his life, the premium for which was £5, and effected a fire policy at the same time. On September 3 Mrs. Gibbs wrote for her husband to inquire whether the insurance had been accepted, and on September 4 received an answer in the affirmative, and in fact the policy was signed by two of the directors and the secretary and sent to their Cardiff agents on August 26. On October 1 Gibbs met with an accident by falling off a ladder on some buildings he was erecting, and received injuries which resulted in his death on October 5. A message was brought to deceased's daughter on the day of the accident, but the injuries were reported to be slight. On her way to the infirmary to see her father she called at the office of the company and paid the premium, her mother having told her two days before to do so, a fact which had escaped her memory. The reason she gave for paying it when she did was that she was afraid if it was not paid her father would lose the advantage of the sick pay which he was entitled to under the policy. At the time she paid the premium she did not inform the agent of the accident, and this fact was strongly relied upon by the defendants as a suppression of a material fact. They also sought immunity from liability under a proviso in the policy that it was issued upon the express condition that the policy was to have no effect in any year unless and until the premium for that year should have been duly paid. It was further contended by them that they were protected by an arbitration clause in the policy. The jury found in favour of the plaintiff on all the issues, and judgment for £1,000 was entered for her. A stay of execution was granted on the money being brought into Court within a week and notice of appeal given within 14 days.

THE RIGHT TO CONSTRUCT PIERS IN LAKES.—At Appleby, before Mr. Justice Bruce, the case of "The Attorney-General and the Bowness-on-Windermere Urban District Council v. The Furness Railway Company" terminated last week. The plaintiffs sought to obtain an injunction to restrain the defendants from erecting within a part of Bowness Bay on Lake Windermere a new pier, or extending the already existing pier, and they also claimed damages for trespass. The defendants, who had owned the existing pier since they commenced running their steamers on the lake in 1870, were anxious to extend the pier to accommodate larger boats. The greater part of the existing pier is within that part of the bay of which the council are tenants. The defendants accordingly gave notice to the council of their intention to enlarge the present pier by adding about 90ft. The council objected to the proposed extension on the grounds that it would be a serious obstruction to navigation on the lake, and that it would greatly interfere with the public right of way and navigation over the lake. Damages for trespass were claimed, because defendants had placed their plant and machinery upon the land of the council, thereby causing an obstruction. The plaintiffs were willing for the defendant company to erect a pier on an adjoining site. The defendants urged that they only proposed to extend the pier on that part of the bed of the lake beyond that of which the council were tenants, also that the public had no right of way over the lake, and that Lord Lonsdale was entitled to the soil and bed of Lake Windermere, and that they had, as his tenants, received his written consent to the proposed extension of the pier. The defendants submitted that the plaintiffs had for some years past been filling up the foreshore and the bay at the shore end of the pier, thereby depriving them of the use of a considerable part of their pier. Numerous witnesses were called by the plaintiffs to prove the public rights on the lake. The following cases were quoted during the hearing:—"Bourke v. Davies," "Harrison v. Duke of Rutland," "Regina v. Russell," "Rex. v Ward," "Attorney-General v. Terry," "Marshall v. Allowater Steam Navigation Company." A large body of evidence was also called by the defendants. The learned Judge, in summing up the case, left several questions to the jury. Ultimately the jury found that the public had from time immemorial exercised the general right of navigating the lake in all directions and over the part of the waterway in which the defendants proposed to erect the new pier without hindrance; also that various landing-places on the lake had been used by the public as of right from time immemorial, and that the right of passing in vessels and boats from the landing-lace at Bowness over the part of the waterway in which the defendants proposed to erect the new pier to other public landing-places on the lake had been similarly exercised. They found that the proposed pier would be an obstruction, but they could not agree whether the benefit to the public outweighed the inconvenience caused. The learned judge gave judgment for the plaintiffs, and granted an injunction.

STAINED GLASS.

WESTHOUGHTON CHURCH, BOLTON.—Five new stained-glass windows have just been placed in the south aisle of this church, the subjects being respectively: "The Nativity of Our Lord," "Samuel and Eli," and the Works of Dorcas. The windows are from the studio of Messrs. Powell Brothers, of Park-square, Leeds.

DEWSBURY.—A three-light stained-glass window has just been placed in the south aisle of St. Mark's Church, Dewsbury, in memory of Arthur and Stanton, sons of Mr. Samuel Mayman, of Dewsbury. The subjects illustrated are: "Samuel Ministering before the Altar with Eli," "Our Lord Disputing with the Doctors," and the "Incredulity of St. Thomas." Each picture is in rich and harmonious colours, and surrounded by delicate canopy work. The window has been designed and executed by Messrs. Powell Bros., of 30, Park-square, Leeds.

The Corporation of Hull have signalised the bestowal of the dignity of a city on the ancient borough and county of Kingston-upon-Hull by adopting, by a large majority, a scheme for paving all their main roads and certain other streets with wood instead of granite.

The new promenade at Colwyn Bay is approaching completion. It will cost about £13,000, and is being constructed by Mr. Jacob Biggs, contractor, Farm-street, Birmingham. The esplanade and roadway (20ft. wide) extends from the railway station eastward about a mile, forming an inward curve below the embankment of the London and North-Western Railway. The surface of the promenade varies in width from 40ft. to 90ft., and is being asphalted by the Val de Travers Company. It is provided with cart crossings, kiosks, lavatories, &c. The outer wall is being constructed flush with the surface, so that at high tides the waves will reach the promenade proper. The approach to the new work is obtained by means of a subway constructed beneath the railway line at the east end. Eventually the promenade will be extended another half mile, so as to reach Old Colwyn. The undertaking is being carried out under the supervision of Mr. William Jones, A.M.I.C.E.

Our Office Table.

PROBABLY there are few, even amongst archæologists, who are aware that there are within seven miles of the Bank of England the well-defined remains of a Roman camp. This camp is situated on Uphall Farm, on the eastern bank of the river Roding, between Ilford and Barking, and is of the usual four-square shape on a slight elevation above what was formerly marshy ground. The vallum, though much reduced by centuries of agricultural operations, is still recognisable on all four sides, whilst on the river side there is a higher elevation, evidently for look-out purposes. Now this relic of the past is threatened with extinction by the irrepressible builder, the farm being advertised for sale (to-day) as building land. Cannot the destruction of this antiquity of some 15 centuries be prevented? If the area could be dedicated to public purposes and the inclosure turned into a garden or even cricket field, it would be of lasting benefit to the fast-growing population of this district. Once destroyed, it can never be replaced.

THE annual exhibition of drawings, needlework, designing in paper and colour, modelling in clay and cardboard, woodwork, cookery, laundry-work, and kindergarten, executed in the various schools of the School Board for London, will be held at the Hugh Myddelton School, St. James's-walk, Clerkenwell Green, E.C., from Friday, the 16th July, to Wednesday, the 21st July (Sunday excluded), from 12 o'clock noon to 8.30 p.m. The exhibition will be opened by the Marquess of Londonderry, K.G. (Chairman of the Board.) Practical demonstration lessons in cookery, laundrywork, and needlework will be given each day. Admission to the exhibition and demonstration lessons will be entirely free, and it is hoped that the public will largely avail themselves of this opportunity of seeing specimens of the work being done in their schools.

IN order to make way for the memorial to Lord Leighton in St. Paul's Cathedral, the Dean and Chapter propose to remove to the crypt the monument erected by the nation to the memory of Captain Burgess, who was killed in the action off Camperdown, 1797. The relatives of the gallant captain protest most vigorously against it. There is grave doubt, however, whether they can make their opposition effective. If it were a parish church the monument could not be moved without a faculty, and the Diocesan Chancellor would require the family to be cited. But in the case of a cathedral the Dean and Chapter are supreme. The Burgess monument was erected by special command of George III. in response to a unanimous request from the House of Commons.

THE London County Council will shortly receive a proposal from the Highways Committee for providing the electric light on the Victoria Embankment and Westminster and Waterloo Bridges. It is recommended that the Council shall establish its own building and plant for producing the light, and that lamp standards shall be placed at the sides, and not in the centre of the carriage-ways. It is proposed that there should be provided in all 90 arc-lamps of the Jandus pattern, and that of these 54 should be placed on the Victoria Embankment, 27 on each side, 10 on Waterloo Bridge, 11 on Westminster Bridge and its approaches, and the remainder at Northumber-avenue approach and other points, eight being placed on the piers adjacent to the Embankment. The proposed site for the generating station is a piece of ground adjacent to the Charing Cross Station of the District Railway, power having been obtained in a recent Act to use the ground for that purpose. It is not intended under the present scheme that the lamps on the river wall shall be lighted by electricity, but should this be decided on later, the generating plant provided will be sufficient to supply the additional energy required. The committee do not think it advisable that the ornamental gardens on the Embankment should be lighted by electricity. The first cost of the installation is estimated at £22,000, and the cost of maintenance will be about £1,900 a year. The present annual average charge for lighting the Embankment and bridges is about £1,300.

ONE of the most destructive fires that have occurred in Ayr since the disastrous burning of the woollen mills, exactly twenty-one years ago, took place yesterday week, when the Town-hall and organ were destroyed in the course of less

than an hour, and other surrounding buildings were seriously injured by either fire or water. The hall, built from plans prepared by Messrs. Campbell Douglas and Sellars, had sitting accommodation for 1,400. It contained a handsome organ, which cost about £2,000—a sum which was raised largely through the efforts of the late Dean of Guild Hunter. Adjoining the hall were the offices of the town clerk, chamberlain, and surveyor; in front, aligning the street, were shops; while behind, at the south-west of the hall, were the houses of the keeper and other employees of the burgh. The whole buildings cost about £40,000. This was exclusive of the spire which rose from the centre of the block.

THE Departmental Committee on Dangerous Trades have issued an interim report upon the dangers connected with electrical generating works. The peculiar danger is the liability to shock, which is often fatal if, by accident, anyone comes into contact with the conductors when charged to a high pressure. The contact need neither be very perfect nor direct; provided two parts of the body are made to touch conducting materials which themselves differ in pressure by 1,000 volts or more, or even by much less if the contact with the flesh is very good, a dangerous—and possibly fatal—shock will result. High-pressure overhead wires, even if insulated over their entire length, can never be considered as entirely free from risk. As illustrating the dangers incidental to the use of electricity, it has been stated that, in addition to minor accidents, of which we hear little or nothing, fourteen deaths have been reported since 1892. The committee make a series of recommendations for the furtherance of safety in these works, and suggest that all persons engaged in them shall be instructed in methods of artificial respiration to be applied in case of accidents. They further recommend that a specially-qualified person be appointed to advise the Secretary of State or the chief factory inspector on matters requiring technical knowledge of electricity.

THE proposed new builders' by-laws for Scarborough, which will in a fortnight become law, will, Mr. A. W. Sinclair, builder, of Commercial-street, in that town, writes, "very detrimentally affect the growth of the town, greatly increase the cost of houses, without a proportionate increase in size or convenience, and consequently will touch the pocket of each resident by increase of rent." As he says: "One cannot have 18ft. asphalted back streets, concrete under the whole area of buildings, inspection chambers built of glazed bricks in every yard, greatly increased yard area, thicker walls and timbers, drains laid in concrete, and other requirements, without paying for them."

THE question of constructing subways under the streets of London for the reception of the tubes and wires of the gas, water, electric, and other companies, which was mooted rather more than a year ago, but which fell through owing to the magnitude of the scheme and the large expense it would involve, has again been under consideration; and it is now proposed to introduce a Bill into Parliament to constuct such subways. The rents to be paid by the various companies using them are to be determined by agreement, or failing agreement by arbitration of the Board of Trade. The expenses of construction and maintenance will be shared by the local authorities and the London County Council.

AN instructive illustration of the advantages of the municipalisation of tramways appears in the third annual report of the working of the Glasgow City Tramways. The number of passengers who travelled on the cars was, in round numbers, ninety-nine millions, and the money they paid in fares amounted to £365,761. Had, however, the fares been in force which were exacted when the tramways were under private management, £180,000 more would have had to be paid by the passengers than they actually did pay. The gross profits for the year were no less than £84,596, which is about the same as for the preceding twelve months, notwithstanding the increased competition there now is owing to the new District Subway, the Glasgow Central Railway, and other suburban lines opened during the year. Since the Glasgow tramways have been taken over by the corporation, halfpenny fares, which have proved very popular and very profitable, have been instituted, and arrangements are now in progress for the introduction of electric haulage, which has been recommended by a committee of the city council that has lately made personal examination of the most approved methods of electric traction for street cars, both on the Continent and in America.

THE 46th annual report of the Birkbeck Building Society states that during the financial year just closed the total receipts have reached the large sum of £18,967,010, exceeding by more than one-and-a-half million pounds the total receipts of all the other incorporated and unincorporated building societies in the United Kingdom—numbering 2,625—as shown by the Chief Registrar's return, presented to Parliament on the 23rd April last. The receipts from subscriptions have amounted to £240,082, and from deposits to £14,678,767. The withdrawals have been £13,880,483, showing a balance over the preceding year of £1,038,366, or a total increase since 1892 (a period of five years) of £3,438,741, after allowing for the large amounts withdrawn during the panic in that year. The total liabilities on subscriptions and deposits now exceeds nine millions (£9,113,454). The balance of assets in excess of liabilities amounts to upwards of four hundred thousand pounds—£400,186 16s. 4d. The total assets are £9,513,641. The 15th triennial bonus has been apportioned this year in accordance with the rules. The sum, with the bonus previously set aside, but not yet payable, will absorb £61,179 10s. This amount is provisionally credited to all members holding investing shares, but the bonus is only payable provided the instalments have been regularly made, and then not until the shares have been ten years in existence. A further sum of £25,000 has been added to the permanent guarantee fund, which now stands at £200,000, the whole amount being invested in consols. During the past year 2,538 members have joined the society, whilst 2,212 current accounts and 7,173 deposit accounts have been opened, making a total of 11,923 new accounts. The shareholders now on the register number 12,760, current accounts 17,818, and deposit accounts 48,919, making a total of 79,497 accounts now open. The number of shares in existence at the close of the year is 65,985. Since its establishment the society has returned to the shareholders and depositors more than one hundred and eighty millions (£180,130,323), the whole amount having been repaid upon demand. The amount advanced to borrowers has been £3,225,315, and the amount of interest and bonus paid to investors and depositors is upwards of three millions sterling, the exact figures being £3,057,331.

CHIPS.

The annual meeting of the National Trust for Places of Historic Interest will be held this (Friday) afternoon at 4.30 p.m. at the Society of Antiquaries' rooms, Burlington House. The Duke of Westminster will take the chair as president, and among the promised speakers are the Marquis of Dufferin, Sir W. B. Richmond, R.A., Sir Henry Howarth, and Mrs. Octavia Hill.

The foundation-stone of a new chancel was laid at Stockingford, Nuneaton, on Saturday, the 19th ult., by Lady Wickman. A silver trowel was presented to Lady Wickman by the architects, Messrs. J. R. Veall and Son, Wolverhampton. The cost of the chancel, &c., is about £800. The builder is Mr. T. Smith, of Chilvers Coton, Nuneaton.

Lady Esther Smith, who was accompanied by the Hon. W. F. D. Smith, M.P., performed on Monday the ceremony of laying the memorial-stone of the new parish house of St. Clement Danes and Clare Market. The building is being erected on a site in old Clare Market at the corner of Vere-street and Sheffield-street.

Princess Christian's prizes will again be offered for competition at the Artists' Guild (Exhibition-road) Ninth Amateur Art Exhibition in November next. The exhibition is open to all amateurs.

It is expected, says the *Western Mercury*, that the conference of the National Association of Master Builders, to be held in Bristol on the 20th inst., will be attended by about 150 delegates from all parts of the kingdom. The last conference of the Association in Bristol was twelve years ago, under the presidency of the late Mr. W. H. Cowlin. The president of the Association this year is Mr. T. F. Rider, F.R.G.S., of London. The arrangements for the forthcoming conference have been carried out by the local committee, consisting of Mr. A. Krauss (president of the Bristol Association), Mr. W. Church (vice-president), Messrs. C. A. Hayes, Geo. Wilkins, Geo. Humphries, E. Walters, F. N. Cowlin, and H. J. Spear (secretary). The questions to be discussed include the apprenticeship indenture, the Workman's Compensation Bill, and the Plumbers' Registration Bill.

LATEST PRICES.

IRON, &c.

	Per ton.		Per ton.
Rolled-Iron Joists, Belgian	£5 15 0	to	£6 0 0
Rolled-Steel Joists, English	6 0 0	,,	6 10 0
Wrought-Iron Girder Plates	5 15 0	,,	6 10 0
Bar Iron, good Staffs	7 0 0	,,	8 0 0
Do., Lowmoor, Flat, Round, or Square	17 0 0	,,	17 0 0
Do., Welsh	5 15 0	,,	5 17 6
Boiler Plates, Iron—			
South Staffs	7 17 6	,	8 5 0
Best Snedshill	10 0 0	,,	10 10 0

Angles 10s., Tees 20s. per ton extra.

Builders' Hoop Iron, for bonding, &c., £6 15s. 0d. per ton.

Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.

Galvanised Corrugated Sheet Iron—

	No. 18 to 20. Per ton.		No. 22 to 24. Per ton.
6ft. to 8ft. long, inclusive gauge	£10 15 0	...	£11 0 0
Best ditto	11 5 6	...	11 10 0

	Per ton.		Per ton.
Cast-Iron Columns	£6 0 0	to	£8 10 0
Cast-Iron Stanchions	6 0 0	,,	8 10 0
Cast-Iron Sash Weights	—	,,	4 2 6
Cast-Iron Socket Pipes—			
3in. diameter	5 10 0	,,	5 15 0
4in. to 6in.	5 5 0	,,	5 10 0
7in. to 24in. (all sizes)	4 15 0	,,	5 0 0

[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]

Pig Iron—	Per ton.	
Cold Blast, Lilleshall	105s. to 110s.	
Hot Blast, ditto	57s. 6d. to 62s. 6d.	
Wrought-Iron Tubes—Discount off Standard Lists f.o.b.		
Gas-Tubes	75p.c.	Fittings 77½p.c.
Water-Tubes	70	,, 72½
Steam-Tubes	62½	,, 65
Galvanised Gas-Tubes	60	,, 62½
Galvanised Water-Tubes	55	,, 57½
Galvanised Steam-Tubes	45	,, 47½

	10cwt. casks. Per ton.		5cwt. casks. Per ton.
Sheet Zinc, for roofing and working up	£22 10 0	to	£23 10 0
Sheet Lead, 3lb. per sq. ft. super.	14 0 0	,,	15 0 0
Pig Lead, in 1cwt. pigs	13 10 0	,,	14 10 0
Lead Shot, in 28lb. bags	16 10 0	,,	17 10 0
Copper Sheets, sheathing and rods	60 0 0	,,	61 0 0
Copper, British Cake and Ingot	51 15 0	,,	52 15 0
Tin, Straits	63 10 0	,,	64 10 0
Do., English Ingots	66 15 0	,,	67 15 0
Spelter, Silesian	17 10 0	,,	19 10 0
	Per ton.		Per ton.
Cut Clasp Nails, 3in. to 6in.	£8 15 0	,,	£9 15 0
Cut Floor Brads	8 10 0	,,	9 10 0

Wire Nails (Points de Paris)—

0 to 7	8	9	10	11	12	13	14	15	B.W.G.
8/6	9/0	9/6	10/3	11/0	12/0	13/0	14/9	16/9	per cwt.

TIMBER.

Teak, Burmah	per load	£14 5 0	to	£16 10 0
,, Bangkok	,, ...	11 10 0	,,	15 10 0
Quebec pine, pitch	,, ...	—	,,	—
,, yellow	,, ...	1 15 0	,,	3 15 0
,, Oak	,, ...	5 5 0	,,	6 5 0
,, Birch	,, ...	3 15 0	,,	5 10 0
,, Elm	,, ...	4 0 0	,,	5 5 0
,, Ash	,, ...	3 5 0	,,	4 10 0
Dantsic and Memel Oak	,, ...	2 10 0	,,	3 10 0
Fir	,, ...	2 15 0	,,	4 15 0
Wainscot, Riga p. log	,, ...	2 0 0	,,	4 5 0
Lath, Dantsic, p.f.	,, ...	4 10 0	,,	5 10 0
St. Petersburg	,, ...	5 0 0	,,	6 10 0
Greenheart	,, ...	8 0 0	,,	9 0 0
Box	,, ...	4 0 0	,,	15 0 0
Sequoia, U.S.A.	per cube foot	0 1 9	,,	0 1 10
Mahogany, Cuba, per super foot 1in. thick		0 0 4½	,,	0 0 6
,, Honduras	,, ...	0 0 5	,,	0 0 6½
,, Mexican	,, ...	0 0 4	,,	0 0 5
Cedar, Cuba	,, ...	0 0 4½	,,	0 0 5
,, Honduras	,, ...	0 0 4	,,	0 0 5
Satinwood	,, ...	0 0 7	,,	0 1 0
Walnut, Italian	,, ...	0 0 3½	,,	0 0 7

Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 11in.:—

Quebec, Pine, 1st		£19 10 0	to	£25 10 0
,, 2nd		14 0 0	,,	16 10 0
,, 3rd		6 10 0	,,	10 0 0
Canada Spruce, 1st		10 10 0	,,	12 0 0
,, 2nd and 3rd		8 0 0	,,	9 5 0
New Brunswick		7 15 0	,,	8 5 0
Riga		7 10 0	,,	8 10 0
St. Petersburg		9 10 0	,,	13 10 0
Swedish		9 10 0	,,	16 10 0
Finland		9 0 0	,,	9 10 0
White Sea		10 10 0	,,	17 0 0
Battens, all sorts		5 0 0	,,	20 0 0
Flooring Boards, per square of 1in.:—				
1st prepared		0 8 6	,,	0 15 6
2nd ditto		0 7 0	,,	0 12 0
Other qualities		0 5 3	,,	0 6 3
Staves, per standard M:—				
Quebec pipe		—		—
U.S. ditto		35 0 0	,,	42 10 0
Memel, cr. pipe		230 0 0	,,	240 0 0
Memel, brack		200 0 0	,,	210 0 0

OILS.

Linseed	per ton	£14 5 0	to	£14 10 0
Rapeseed, English pale	,, ...	26 10 0	,,	27 5 0
Do., brown	,, ...	23 10 0	,,	25 10 0
Cottonseed, refined	,, ...	14 10 0	,,	15 0 0
Olive, Spanish	,, ...	27 0 0	,,	28 0 0
Seal, pale	,, ...	23 0 0	,,	24 0 0
Cocoanut, Cochin	,, ...	26 0 0	,,	27 0 0
Do., Ceylon	,, ...	23 5 0	,,	23 10 0
Palm, Lagos	,, ...	20 15 0	,,	22 10 0
Oleine	,, ...	19 0 0	,,	20 0 0
Lubricating U.S.	per gal.	0 6 3	,,	0 7 6
Petroleum, refined	,, ...	0 0 4¾	,,	0 0 4½
Tar, Stockholm	per barrel	1 2 0	,,	1 5 0
Archangel	,, ...	0 12 6	,,	0 15 0
Turpentine, American	per ton	21 0 0	,,	21 10 0

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MODERNISM IN ART.

A GREAT deal is implied under the term "modernism." It includes not only what is modern in construction and method, new inventions in building, but that modern spirit and feeling which have entered into and permeated our art generally, and it is in this sense chiefly that we now speak. The spirit of modernism, the very opposite of that which we call antiquarianism, is characterised by certain qualities and attributes which may generally be grouped under mechanical labour, repetition, and cheapness. We find it in building operations owing to the methods and modern apparatus employed, as well as in all those processes of manufacture which are employed in decoration, the manufacture and design of fabrics of all kinds. It meets us everywhere, from the building of the factory and warehouse to the design and finish of the suburban villa, or the fashionable and so-called "artistic" riverside residence or bungalow. Wherever we turn, there is a stamp of modernity on every new erection, on every piece of furniture and wall-paper; and what is it? It is an indefinable something which cannot be mistaken for an instant for anything genuinely old or antiquated, even though the architect or manufacturer has striven hard to give his work an antique look or character. In spite of appearing in an old dress or style, we cannot mistake the modern spirit and handiwork. Attempts are made sometimes to disguise our materials—to produce an appearance of roughness or irregularity in the work. In building, the architect endeavours to impart an ancient effect to his roofs and gables by using hand-made bricks and tiles of uneven colour; by giving a roughness of texture to his walls and plaster and timber-work by various devices in pointing, moulded and ornamental brick and plaster-work. For this purpose stains, antique glass and metal-work are employed. The furniture dealer who tries to mimic the antique resorts to all manner of devices to give his copies of old cabinets, tables, and chairs all the marks of worm-eaten surfaces, rude framing, and chisel-marks, diversity of colour, in which disguises he is cleverly helped by the metal-worker, the makers of stained glass and textile fabrics. These attempts are not often dictated in an honest spirit, and in proportion as they are dishonest they invariably fail to give satisfaction. But, it may be asked, Why copy the antique? If our construction and methods are superior, why not honestly express them? The answer suggests a psychological reason. Is there not something lacking in our modern work? The mind and eye appear to look in vain for real pleasure in modern buildings and work—a want of some quality to appeal to the artistic sense and feeling. The mechanical turned-out brick and tile and the machine-cut moulding have something cold and unsympathetic about them, like a piece of mechanical music. We can build more scientifically; our sanitary arrangements and fittings are much better than the old; but for some reason we naturally find more pleasure in an old house: there is an element in it we cannot obtain in the newly-built house, and that is sentiment. There is no feeling of association in the new-built dwelling, and even the copy we get of Tudor or Queen Anne or Georgian has a poor, half-starved, meagre appearance compared with the original. When we copy the style—and we can do so perfectly on paper—we cannot put in the real workmanship of the age which produced it; the very conditions and causes which created the style are absent from our new work, and we feel almost instinctively it is an imitation. Do we not find this to be so in nearly all our modern restorations of churches and domestic buildings? The tool-marks, the mode of laying the stones, besides the want of mere age in toning down the stonework, are different. If we copy the accidents of age and the weather, we are apt to do so wrongly. Take a "spic-and-span" villa built in a cottage *orné* style, or a half-timbered residence on the banks of the Thames, like we see dozens of from Richmond to Henley. No one can mistake any of these for the genuine work of the age they represent. There is all the thinness, mechanical finish and flimsiness that distinguish a cardboard model from the real building. One thing that strikes us in these imitations is the mechanical look of regularity about them: the timbers are spaced with unerring accuracy, both sides are precisely alike; added to all, there is a smoothness and a slightness in the work which shows its origin. The old timbered houses, as we see them in Cheshire, Surrey, and Sussex, are very different: the studs are often irregular and not over-straight or evenly wrought, and they are much bolder and more massive. They are real sawn square timbers, not mere boards. Can anyone believe, when he looks on the careful restoration of the old houses in Middle-row, Holborn, that they really represent the half-timbering of the original? When we compare the old timbered roof with the modern imitation, we perceive the same difference: the regular spacing, the smooth timbers, the trim neatness of the modern, the rough-hewn rafters, uneven spacing, and warped timbers of the old. The rigid straightness of the machine-cut timber is absent. But there is the attempt now, even, to correct this tendency. Hand-made goods are sometimes substituted—better, of course, much; but the spirit of modernism is manifest in them also. There is something we can distinguish between the "hand-made" of the fifteenth century and the "hand-made" of the nineteenth. The "modern antique" is visible in it, because it assumes the air of quaintness; it takes particular shapes and details without the corresponding motive which gave them rise. These are a few of the general characteristics of modernism in art.

Let us examine a little more closely a few of those branches of architecture where the modern spirit prevails, and, first, brickwork. We can distinguish an old from a modern brick. It is always well-burnt, hard, of a good colour, and somewhat thin; whereas a new brick of the facing kind is often porous, by no means well-burned, but of true shape. The edges, though sharp, can easily be chipped. The Fareham first quality red is, perhaps, the nearest we have to the old brick. The modern taste is to get "uniform tint to be approved"; but the old brickwork we see in manor-houses and garden-walls wore a variety of tints, mottled brown, and red, and blue, just as they came from the kiln. The joints were generally struck as the work proceeded; whereas the modern method is to point at completion, to rub and stain the brickwork and tuck-point. The old jointing was also honest: the mortar was of good quality, and the joints were kept at a fair thickness; but the modern joint is often wide and irregular to fill in cracks and imperfections in the bricks, and upon these joints the brick-pointing is planted. The intensely modern brick front is generally faced with bricks of even tint, or rubbed down, and stained, and tuck-pointed. If there is any diaper work, it is executed with black header bricks of even tint. The arches are in gauged work in orange-red rubbers, set with lime-putty in narrow joints; there is an air of intense neatness. We see such fronts to perfection in the neighbourhoods of Sloane-street, Hans-place, and other Western suburbs, some of them modernised half-timber Gothic. "Queen Anne" woodwork is even more brought under the bane of modernism. Every piece of wrought timber is machine turned out. The modern open-timber roof has its trusses sawn and planed down to the finest scantling; the modern barge-board looks as if it was cut or perforated by the yard, with a mechanical precision that contrasts strongly with the old hand-wrought kind; the mouldings are intensely hard and straight, and we have none of that artistic sense of adaptation and sympathetic tooling which we see in hand-made joinery. What can be more intensely modern than plaster-work? The modern plasterer is no longer the artist he was a century ago. We find him adopting all kinds of modernisms. His panelled and moulded ceilings are executed with a mechanical precision in line and surface which robs them of all the life and spirit of the old examples. Those very little irregularities of line of mouldings and roughness in the surfaces of the old plaster ceilings gave them a character which we only imperfectly copy in our newer methods of "running" and "floating." Our embossed fibrous plaster and other modern fabrics breathe a different spirit, though they are all based on old designs. The spirit is absent, and we can only account for its loss in the use of the tools we employ, in mechanical modes of reproduction — in other words, the elimination of hand labour. What of our ironwork? The spirit of the ancient hammered work has fled. Look at the modern railway station, as we see it in some of our main lines. There is that miserable overhanging roof over the platform, sloping sometimes one way, sometimes another. It is supported by rolled iron rafters, braced, filled in with some elaborate cast-iron ornament; or below the constructional ironwork a cast-iron spandrel of an ordinary commonplace pattern is placed, one end bolted to an iron column or supported on a corbel in the brick wall of the station. There is no connection between the cast and wrought ironwork, both of which are in the worst of taste, and join very unhappily with the brick structure behind. What with the "pressed" bricks of the station, the blue-moulded brick labels round the windows, and the obtrusive ornament, the building is a good example of all that mechanical processes can do. A recent writer has supposed the only "genuinely modern feature of architecture is the plate-glass window, and the most abhorred by all artistic architects," but we think modern ironwork is more so. A large plate-glass window is very modern, but it is not so fussy and obtrusive as cheap ironwork.

A word, too, on decoration. We have been studying "art" in many things, and our decoration of to-day is certainly far less modern in design than it used to be in the sixties; but, if we may say so, we have rather been producing the "modern antique" with a vengeance. Our efforts to produce antiquated effects, patterns, and colour, have rather overshot the mark, and we have really been unconsciously defeating our very intention by endeavouring to reproduce, by modern mechanical means, old wall-hangings, papers, and fabrics. The consequence is that much of what we prize as "art decoration" and furnishing is really more modern in feeling than the ordinary productions they try to supersede. The real spirit and essence of modernism is cheap imitation—the desire, but failure, to produce by modern processes what is really old.

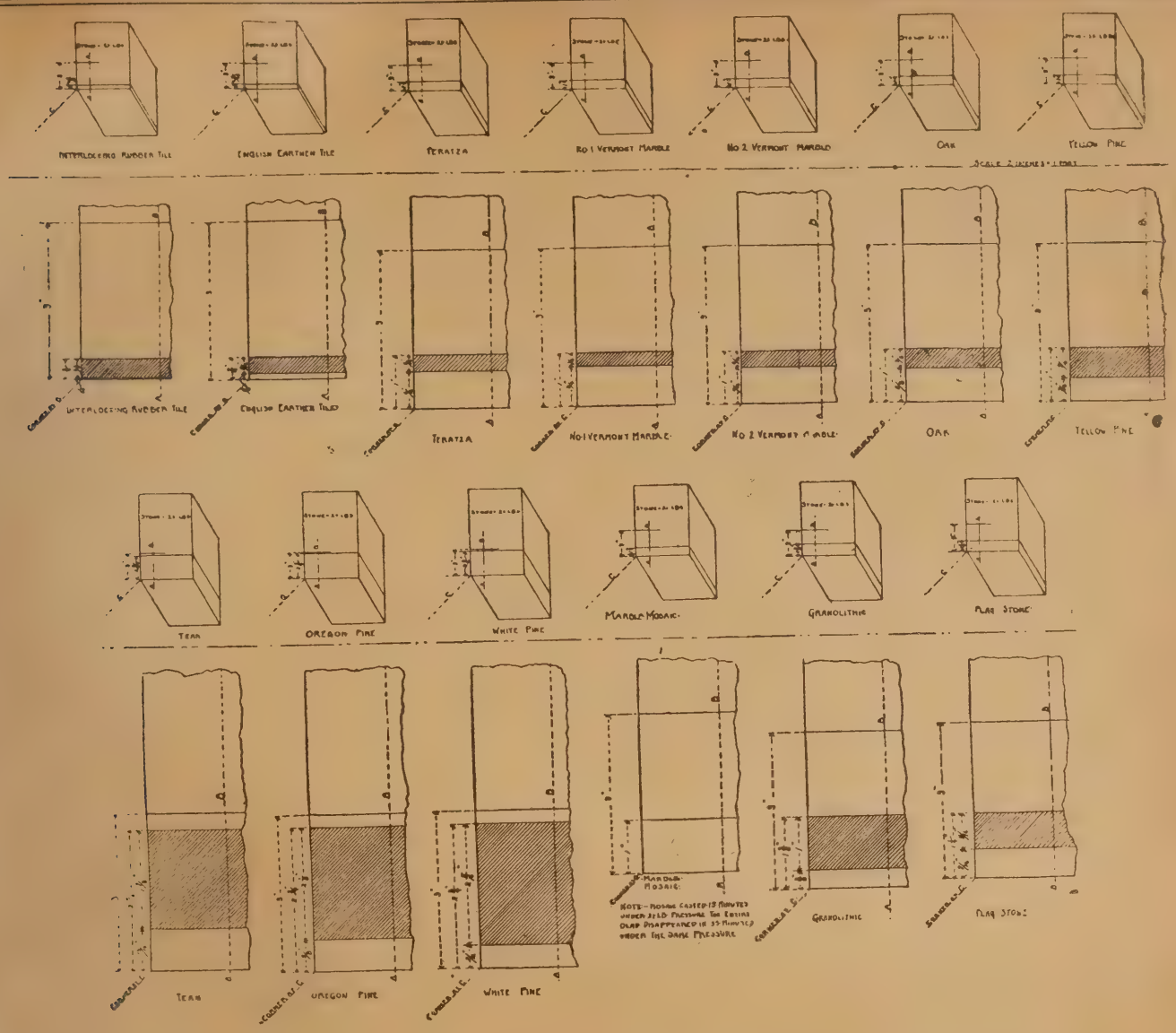
COMPETITION CONDITIONS.

ALTHOUGH there have been many suggestions for the conduct of architectural competitions, they remain practically a dead-letter. Those who compete comprise many men who are willing to regard competition as a mere speculation, and to risk their labour and skill on the barest chance. With their eyes open, they are quite ready to embark under any conditions that may be proposed, however unreasonable they may be. The leading architects of New York have drawn up a set of conditions that appear to meet the requirements of competing members, to which we may draw the attention of our readers. The first of these is that in any case "the undersigned shall be paid at least a sufficient sum to reimburse them for their cash outlay in preparing competition drawings." A most desirable condition. What architect of any repute will undertake to devote weeks or months to the preparation of a design without any remuneration whatever? Is it fair that any professional man should be called upon to give his time and labour for the bare chance of winning? Why should even the youthful tiro be expected to spend money out of pocket on such a venture? These are questions that will appeal to everyone who competes, for if a contest of skill is necessary to insure the highest standard, it is surely right that every competitor who gives away his brains should have returned to him any sum he has spent in producing his design. Another condition is that "in case of limited competition the number of competitors shall be definitely named, and that the number shall not be increased without the consent of all competitors." This also appears fair. A competitor in such a trial likes to know the real number of rivals he has to contend against, and the kind of steel he has to encounter. Then there is a stipulation that the ordinary fees published by the American Institute shall be paid as compensation to the successful competitor; that a professional advisor, or advisors, be appointed to act with the promoters in preparing a proper programme, which shall define the drawings required, and the rules of the competition. That, in the opinion of the signatories, the adviser, or advisers, be practising architects, and it is suggested that the best result can be gained by first appointing the architects to compete, and then to arrange with the promoters as to the terms of competition, and to nominate the professional adviser. Such a plan might save much heartburning and trouble. The independent mode of appointing the assessor by the promoters before the conditions of competition are prepared without consulting the competitors can never work satisfactorily. There is always a feeling among the latter that the committee are studying their own interests in nominating an assessor, and the adviser is looked upon rather askance by the competing candidates, who suppose, not unnaturally, that the assessor is appointed to assist the committee in framing stringent conditions, and that he will be biassed in his judgment. The competitors are certainly the right party to have a hand in the election of their own judge, and a mutual arrangement like that proposed by which both promoters and competitors should have a voice in his appointment seems to be the fairest course. And what more reasonable that than the competitors should help to decide upon the terms which they agree to abide by?

How much trouble and disagreement between promoters and competitors would be avoided if this plan were always followed. There would be no complaints made about unjust conditions which are now so frequent. Of course, the professional adviser will examine all drawings, and place out of competition any who has not fulfilled the terms of competition as to date of reception, drawings and details not required, or those which do not conform exactly to the requirements, and the authors of such plans are not to receive any further consideration. Such a condition looks a little stringent; but if a competitor purposely exceeds the requirements, or does not comply with any of them, it is only fair to the remainder that he be ruled out of the contest. Too often the transgressor has been tolerated—aye! even rewarded. The man who has sent in a coloured perspective against the rule, or has submitted large drawings or models, finds many favourites, and sometimes wins, because he has been so bold and unscrupulous as to ignore the conditions others have honestly conformed to. An important condition is the last but one. It reads as follows:—"Inasmuch as the object of a competition is to adopt the general *motif* of a design to be further elaborated, and to select an architect for the work, rather than secure plans perfectly studied in all their details, the undersigned will enter upon no competition unless it shall be agreed that an award shall be made, and that an architect shall be appointed on the consideration of the relative merits of the several schemes as shown by the drawings, and that no demand shall be made for additional drawings, or for a new competition." If such a condition as this had been in force, much bitter disappointment and injustice might have been saved. The object is first to prevent unnecessary detail and labour in the design, to secure a good idea or scheme, and to select an architect. In many competitions, the idea has been to select an elaborated set of drawings, and afterwards to allow its author to alter his plans to bring them into agreement with the conditions which others have more carefully obeyed. Sometimes—and we all know instances—a highly coloured and clever perspective wins, although the plans are not equal in merit to others. The author is selected; but, as future consideration shows it impracticable to carry out the author's design as drawn, he is asked to make alterations, or the committee, having found out their mistake, rather than acknowledge their error, boldly invite a new competition, to the scandal of the local authority and the gross injustice of the competitors. We are doubtful whether the last condition is desirable—namely, that all designs should be signed by their authors, which we think in many instances would be prejudicial to the merits of the designs thus identified.

LIBRARY PLANS AT THE GUILDHALL.

DURING the present week an interesting exhibition of library plans and designs has been held in this great City of London hall, in connection with the second International Library Conference, of which Sir John Lubbock, M.P., is the president. The gathering also included a collection of library furniture, fittings, and appliances showing the latest developments and improvements which have been made in these matters. As institutions of this class increase in scale and importance, so in proportion the necessities of ready and reliable indexes or classifications make enlarged demands upon librarians and their subordinates. To meet the requirements thus created, the manufacturers of so-called "library requisites" are evidently directing their endeavours towards compactness of form and simplicity of construction, so as to save space and clerical labour as far as possible in the working of a public library. American ideas, in not a few instances, have unmistakably been adopted, and every sort of adjustable alphabetical accessory for changing, cataloguing, checking, indicating, and fixing up papers, magazines, and books as well as their readers in comfort and convenience, finds a scope for increasing enterprise. All who are interested in the planning and arrangement of library buildings would do well to visit the exhibition to which we have drawn attention. Unfortunately, the catalogue was all behindhand; but the exhibition was open to the public without charge. The architectural drawings shown, though by no means exhaustive, may be described as fairly representative of the latest examples of buildings erected for the purpose, as the following notes will show, while photographs of such libraries as those at the Guildhall and Gray's Inn were included in the collection The largest photograph in the hall is a remarkably fine one, representing Earl Rosebery and the Libraries Commissioners grouped in front of the Passmore Edwards Public Library at Hammersmith on the occasion of its public opening by the ex-Premier last summer. The portraits of Lord Rosebery, Mr. J. Passmore Edwards, General Galsworthy, M.P., Mr. Bull, M.P., and other notable persons more or less locally distinguished, are very clearly rendered. The building, too, appears well in detail. Its plans, by Mr. Maurice B. Adams, the architect, find a central place on another screen, by the side of the Chelsea Central Library, built some few years since from the designs of Mr. J. M. Brydon. Mr. E. B. I'Anson's Library at Clapham has a very different plan to the last named, and Mr. J. Johnson's Library at Bermondsey, with its lighting on all sides, compares with neither. The Edinburgh Library, planned on a cruciform arrangement, is a substantial and handsomely-fitted building from the designs of Mr. G. Washington Browne. Hanging close by is the new Library for St. George's-in-the-East, about to be erected by Mr. J. Passmore Edwards from Mr. Maurice B. Adams's plans, for the district of Shadwell. Messrs. Karslake and Mortimer's Clerkenwell Library — another institution worked on the open-and-ticket system—ingeniously utilises a corner site. The West Ham Institute, by Messrs. Gibson and Russell, is shown on the other side of the hall. The Central Library, Peckham-road, presided over by Mr. Edward Foskett, the well-known librarian, is one of the most extensive in South London. The architect was Mr. R. P. Whellock, whose small water-colour here exhibited should be mentioned. The Cardiff Free Library, shown by plans and elevations sent by Messrs. Seward and Thomas, is in a Classical style, with bold cornices. The Aston Manor Library and Institute, built at Birmingham, is more freely handled, and externally aims at picturesqueness. The Charles Lamb Memorial public library, which is now being built at Edmonton at the cost of Mr. J. Passmore Edwards, is represented here by the pen-and-ink perspective, published in our pages a few weeks ago, by Mr. Maurice B. Adams, its architect. The Lewisham Central Library is in evidence in a line view drawn by Mr. A. L. Guy, architect; and the Gamble Institute and Library, likewise illustrated in the BUILDING NEWS, from St. Helen's, was planned by Messrs. Briggs and Wolstenholme. St. Mary's Library, Battersea, is contributed by Mr. H. Branch; while Messrs. Potts, Son, and Hennings are to the fore with the Passmore Edwards Library at Whitechapel. Cheltenham Library, on the same screen, is a work of some pretensions by Messrs. Knight and Chatters. A large sheet of plans is shown by the Central Libraries Association of all the public libraries in Manchester; and a plan of the Queen's reading-room, Victoria, illustrates a method of classification elaborately simple. The Passmore Edwards Library, Kingsland-road, Shoreditch, by Mr. Maurice B. Adams, is an adaptation and enlargement of a building originally erected for another purpose. The Lord Leighton Memorial



Institute now approaching completion as part of the South London Art Galleries for the Camberwell Library Committee, at the expense of Mr. Passmore Edwards, is also exhibited. Mr. Maurice B. Adams, F.R.I.B.A., is the architect.

TESTS OF THE WEARING QUALITIES OF FLOORING MATERIALS.

AT the suggestion of Mr. Frank Furness, architect, of Philadelphia, a series of tests has been carried out to determine the relative durability of various flooring materials. The experiments were carried out on May 15, by Messrs. William Gray and Sons, who are the largest contractors for stonework in Philadelphia, and they were made under the careful supervision of Mr. William J. Gray, who has given his affidavit as to the accuracy of the results as herewith published. The accompanying diagram, in which the results are drawn to scale, was furnished to the *Scientific American* by Mr. Furness.

In carrying out the tests the specimens were cemented to identical blocks of sandstone, each of which weighed 21lb. The samples presented a surface 6in. square, and the thickness of each sample was the same as that commonly used in the various floorings. In the diagram the upper figures represent the specimens attached to the blocks before being tested, the thickness of the specimen being shown to scale. Thus the interlocking rubber tile specimen was $\frac{3}{8}$in. thick, the No. 1 Vermont marble was 1in. thick, the Oregon pine $2\frac{3}{4}$in. thick, and so on.

The samples were all placed face downward upon a horizontal iron rubbing-wheel 10ft. in diameter, which was run for a space of one hour at a speed of 75 revolutions per minute. A suitable frame held the blocks loosely in place and prevented them from rotating with the wheel, care being taken to let the full weight of the blocks bear upon the wheel. The face of the wheel was freely supplied during the test with the best sharp rubbing-sand and water.

The wear of the various flooring materials is shown in the lower line of diagrams, which represents the lower left-hand corner of each specimen drawn on a half-size scale. The diagonal shading shows the portion of the materials which remained intact, and the clear space beneath shows the amount that was worn away by the wheel.

By far the best showing was that made by the interlocking rubber tile, which only lost $\frac{1}{64}$in. as the result of an hour's grinding. On the other hand, the marble mosaic collapsed altogether, the 1in. strip being rubbed entirely away within 15 minutes under a pressure of a little over $\frac{1}{2}$lb. to the square inch. The whole slab disappeared in 35 minutes under the same pressure.

Next to the rubber the English earthen tile showed by far the best results, losing only $\frac{1}{8}$in. in thickness; and of the stones, the granolithic made the best showing, losing $\frac{3}{8}$in., flagstone coming next with $\frac{9}{16}$in. wear. The marbles wore away very fast, No. 1 Vermont marble losing $\frac{3}{4}$in. Their average resistance, indeed, was not as high as that of the woods.

One of the most curious results is shown in the action of the woods, where teak lost nearly double as much as the softer white pine, the wear being respectively $1\frac{3}{8}$in. and $\frac{7}{16}$in. Yellow pine showed the same wear as white pine, and the oak specimen lost the same amount as its great rival, Oregon pine, which was reduced by $\frac{5}{8}$in.

ROYAL ARCHITECTURAL MUSEUM.

THE Duke of Westminster, K.G., President of the Royal Architectural Museum, occupied the chair at the annual meeting, held on Friday last, in the central gallery of that institution. The following report was adopted, after being read and presented to the meeting by Mr. Maurice B. Adams, hon. sec. Dr. William Garnett, of the London County Council, proposed the election of the council and re-election of the Duke as President, a motion which was carried unanimously. The President, in thanking the meeting, expressed his warm appreciation of the work which was being done by the schools at the museum, and he remarked that the unostentatious labours of the council in conducting the affairs of the institution relieved the President of much responsibility. Among the speakers were Messrs. J. Hungerford Pollen, J. P. Seddon, W. R. Lethaby, Sidney Lee, W. Pain, and Maurice B. Adams. Mr. Pain is the architect for the extensions to the building facing Tufton-street, as described in the annual report. The results of the recent examinations in connection with the Science and Art Department have proved, so far as the returns have been made known, are most satisfactory to the students at the Royal Architectural Museum, as, for example, out of 53 candidates presented in drawing from the antique, 36 passed, while of the 61 students who competed for work from the life, no less than 59 passed, two only failing—an unprecedented percentage of successes. In anatomy 18 candidates entered and 13 succeeded. The report is as follows:—"The council of the Royal Architectural Museum and Westminster School of Art, in presenting their report for the year 1896, are pleased to state that, although the exceptionally favourable result of the previous year's operations has not been reached, there is a balance of income over expenditure amounting to £582 0s. 7d. As before, this result is due to the continued success of the School of Art, the fees from which amounted to £1,090 0s. 6d., whilst the grants from the Technical Education Board of the London County Council (£500) and from the Science and Art Department (£201 6s.) on the

students' works, examination, and attendance, were larger than in 1895, so that the total receipts on account of the school were £1,821 6s. 6d., against £1,843 10s. 6d. in the previous year. There is very little fluctuation in the subscriptions to the museum, amounting in 1896 to £86 16s., and derived chiefly from subscribers who have from its earliest years been staunch supporters of the institution. It was stated in last year's report that it was in contemplation to acquire premises adjacent to the museum for the purpose of building additional classrooms, and the council, after much consideration, decided to carry out this proposal, seeing that the opportunity for enlargement was not likely to recur. Plans were accordingly prepared by Messrs. Lee and Pain, and a contract has been entered into for the erection of the new building at a cost of £2,322. The full expenditure, including the provision of lighting and warming apparatus, will probably amount to about £2,630, exclusive of architects' charges. The work is now proceeding, and is to be completed by Christmas next. It is hoped that the additional accommodation thus provided will not only relieve the museum from some encroachments necessitated by the growth of the School of Art, but that it will conduce greatly to the extended success of the school itself, which, from small beginnings, has been gradually developed until it has become known far and wide, attracting students from all parts of the United Kingdom, and even from Canada and the United States. Towards this large outlay subscriptions have been received or promised amounting to £310 3s., including the sum of £100 contributed, with his customary munificence, by his Grace the Duke of Westminster; £100 has been transferred to the enlargement fund from the current account, and there is also a reserve fund of £300 Consols; and the Technical Education Board of the London County Council have undertaken to advance £500, to be repaid by deductions from their annual grants in four instalments. There is also a considerable balance at the bank, from which perhaps £1,000 may be provided in the course of the current year. Nevertheless, a substantial amount remains to be found, and additional subscriptions from friends of the museum and school will be gratefully accepted. It was but fitting that an institution enjoying the patronage of her Majesty the Queen should participate in the congratulations offered to her Majesty, on the attainment of her Diamond Jubilee, by her loyal and devoted subjects in all quarters of the globe; and an address of congratulation, engrossed on vellum, and signed, on behalf of the council, by his grace the president and by the hon. secretary, has accordingly been forwarded to the Home Secretary for presentation." In replying to a vote of thanks proposed by Mr. J. P. Seddon, the Duke said that there could be no doubt of the immense advantage which it would be to the school to have the additional premises now being added to the institution. He called attention to the fact that a substantial amount of the funds necessary to carry out these alterations remained to be found, and that, as on most occasions of this sort, they had to appeal to a generous public to supplement with their contributions the efforts of the society.

PUZZOLANA AND ITS PRACTICAL USE.*

PUZZOLANA is one of the oldest materials used for making mortar, especially hydraulic mortars. It entered largely into the construction of all the important works built by the Romans from the earliest period of their existence as a nation, and is fully and quaintly described by Vitruvius in the fourth chapter of the second book of his work. The remarkable hardness which the Roman mortars attained with age was largely due to the employment of puzzolana mixed with fat, lime, and sand. Formerly, puzzolana was found principally in the neighbourhood of Naples, and especially at Puzzoli—hence the name. At the present time similar material is known sometimes under different local nomenclature, like that from the River Rhine (Germany), where the hard, stone-like variety is called "tuffstone," the powdered, "trass"; from the Azores Islands, where the name of puzzolana has been adopted, but a red variety is called "tetin"; from Schemnitz (Hungary); from Auvergne (France); from Teneriffa, where it is called "tosca," &c. The "Santorin-earth," from the Greek Island Santorin, is also to be ranged with the puzzolanas. Puzzolana is of volcanic origin, and in its natural state appears as a deposit of powdered and coarse ashes, and often contains pieces of pumice-stone. Where such ashes were mixed or deposited in water, the mud thus produced hardened to a certain degree while drying. The tuffstone of the River Rhine is a good example of this. In case the yet moist puzzolana were covered by a hot lava stream which allowed evaporation of the water after an energetic action of oxidation on the hydrous oxide of iron, which, at the same time, lost part of its water, the colour of the puzzolana changed to red, and often the part in contact with the hot lava became as hard as a brick. An example of this is the "tetin" of the Azores. The latest Tertiary period produced the best puzzolana now used in mortar. H. Von Dechen* and L. Dresselt† accord that the trachytic-leucitic and pumice-stone tuffs of the Laacher See (River Rhine) originated at the end of the Tertiary period and the beginning of the Loess deposits. It may be observed that only trachytic and pumice-stone tuff is fit for mortar purposes, while the leucitic tuff yielded almost no useful result. However, leucittuff yields an excellent building-stone, especially for ornamental work, and has been used extensively in churches and other monumental buildings in Germany. The origin of the leucitic tuff is somewhat different from that of the trachytic and pumice-stone tuff, as it is considered not to be ejected, but to flow out from the volcano in a mud steam — Moja. The Italian puzzolana is mostly obtained by digging it from open pits of slight depth; however, very large deposits are also found. That of Trentaremi, furnishing a brown-yellowish puzzolana, is more than 600ft. deep, of great extent and situated immediately on the sea. The average production in 1885 amounted to 100 tons per day. The deposits of the dark gray puzzolana of Santa Maria della Bruna, near Torre Anunciata, on the slope of Mount Vesuvius, is estimated at 2,000,000 tons, and can furnish 150 to 300 tons per day. Comparatively little care is exercised in the selection of the localities from which puzzolana is taken, a matter of great importance, although it is evident that a natural material of this character, the product of successive volcanic eruptions, must vary greatly in its chemical and physical constituents. Besides neglecting the necessary preliminary tests and explorations, the Italian manufacturers have been very careless in the grinding and screening of the puzzolana after it has been excavated, and, as a necessary consequence, the manufactured article varies greatly in quality. The Italian puzzolana, besides being poorly manufactured, is inferior to other puzzolanas, such as are found on the Rhine (Germany) and in the Azores, in the character of the material itself. This want of uniformity in the Italian puzzolana has made the French engineers employ less of it in their marine constructions than they did formerly. Therefore, it is not surprising that Italian puzzolana from Castelamare, imported into the United States by a Boston firm in 1886, proved an entire failure. The Dutch engineers, on the contrary, whose very existence depend on the stability of their hydraulic works, employed "trass" (which is closely allied to the Italian puzzolana, but is selected and manufactured with much greater care), in all their important places, on account of its cheapness and strength. Puzzolana of the Azores is a yellowish to brownish, sometimes greyish, earth-like powder, which is often fine enough to use as a mortar without grinding or screening. "Trass," on the contrary, is a pulverised stone called tuffstone, which is about as hard as brick, varies in colour from bluish-grey to yellow, and is found as a porous mass, interspersed with pumice-stone. The harder the tuffstone the better its quality. The tuffstone, especially in the valley of Brohl, on the river Rhine, is generally—sometimes up to 100ft.—covered by powdered puzzolana containing much pumice-stone, which is called "mountain trass," and is by far inferior to tuffstone for mortar purposes. Both puzzolana and trass are the products of the eruptions of former volcanoes, and, although quite different in their physical appearance, they give nearly the same chemical analysis. They also give the best results for hydraulic mortars when the materials have been found at the original place of deposit, near the volcano from which they were first ejected. General Q. A. Gillmore, in his standard treatise on limes, hydraulic cements, and mortars, makes the following reference to trass and puzzolana: "Trass, or teras.—In the valley of the Rhine, between Mayence and Cologne, and in various localities in Holland, a substance of volcanic origin is found called trass or teras, which has been extensively employed throughout that region, particularly by the Dutch engineers, for the production of hydraulic mortar. It is derived from immense pits or quarries occupying the sites of extinct volcanoes, and enjoys in every particular the distinguishing properties of Italian puzzolana, closely resembling it in its composition and in the details of its manipulation, requiring to be pulverised and combined with rich lime in order to render it fit for use, and to develop any of its hydraulic properties." The above description of the trass and puzzolana is substantially correct, except that General Gillmore should have said "between Coblentz and Cologne," instead of Mayence and Cologne, and should have omitted the words "in various localities in Holland," as no trass is found in Holland unless it is imported from the above-named locality in Germany. The following analysis shows how much trass and puzzolana resemble each other, and also that the chief ingredients are silica, alumina, and iron oxide. The proper amount of lime that is necessary to use with puzzolana and trass mortars varies with the character of the work and the quality of the puzzolana and lime. Mortar composed by volume of one part each of puzzolana, powdered lime, and sand probably gives better results than any other combination of these materials, although larger proportions of lime and sand may be used where great strength is not required. At the great harbour improvements at Kiel (Holstein) the following mixture was adopted:—

3 Volumes of trass.
2 Volumes of fat lime paste.
7 Volumes of sand.

In Holland the following composition is the standard for the hydraulic works:—

	Trass.	Shell Lime Paste.	Sand.	Stones.
	Vols.	Vols.	Vols.	Vols.
Strong Trass Mortar	1	1	—	—
Second Quality	2	4	1	—
Third Quality	2	6	$3\frac{1}{2}$	—
Concrete	1	1	—	$1\frac{3}{4}$ to $1\frac{4}{5}$

In the United States the ordinary market limes make, when mixed with puzzolana, very strong mortars; some of the best results having been obtained with common Rockland lime. The lime should be slaked with about 40 per cent., by weight, of water, two or three days before mixing with the puzzolana, to give the unslaked particles a chance to be air-slaked. General Gillmore, in his work on limes above referred to, says; "Experiments seem to prove that fat lime slaked to powder will give better mortars with trass and sand, or with trass alone, if left exposed to the air for a month or more after slaking, than if made into mortar when perfectly fresh." After the lime has been slaked it should be screened through a sieve of 400 meshes per square inch. Of course, other kinds of lime may be used just as well in puzzolana mortar. The right proportions of the mixture should be ascertained by previous experiments. Unlike cement mortars, which have to be used soon after mixing, the puzzolana and trass, after the lime, sand, and water are added to them in the proper proportions, can be left at least 24 hours undisturbed, and be worked over just before using, without injuring the quality of the resulting mortars. This is of great advantage in building operations, inasmuch as the quantity of the mortar for each day's work does not have to be so accurately determined. As trass and puzzolana commence to harden only after the addition of the lime, they can be stored even in damp places for any length of time without deteriorating in the slightest degree. Trass that had been kept exposed to the atmosphere for three years, and which was then mixed with one volume each of powdered lime and sand, gave a tensile strength at the end of five months of 204lb. per square inch. This quality makes it possible to export trass and puzzolana without risk, whereas with Portland cement great trouble is experienced in the ocean voyage, either from dampness or overheating, and the cargo rarely

* A paper by Mr. JOSEF ZERVAS, and published in the American *School of Mines Quarterly*.

* *Geognostischer Führer zum Laacher See und seinen vulkanischen Umgebungen. Bonn*, 1864.

† *Geognostisch-geologische Skizze der Laacher Vulkangegend. Münster*, 1871.

	Analysis of Trass from Germany.						Puzzolana.					
Origin	Plaidt. Tuffstone.	Kruft. Tuffstone.	Brohl. Tuffstone.	Brohl. Mountain Trass.	Weibern. Leucittuff.	Seven Mountains. Trachytuff.	Azores. St. Miguel.	Azores. Terceira.	Azores. St. Miguel "Teinn."	Italy. Naples.	Italy. Civitia Vecchia.	Santorin.
Analyst	Zervas.	V. Menger-schausen.	Berthier.	Kyll.	Kyll.	Kyll.	Chateau.	Zervas,	Zervas.	Stengel.	Berthier.	Feich-tinger.
Silica, SiO_2	53·58	55·28	57·00	61·10	67·60	59·40	54·70	57·73	60·90	60·91	44·50	66·37
Alumina, Al_2O_3	19·11	17·34	16·00	12·70	11·30	22·70	20·50	13·81	11·14	21·28	15·00	13·72
Iron Oxide, Fe_2O_3	9·24	3·90	5·00	10·20	5·20	2·50	6·30	12·02	12·78	4·76	12·00	4·31
Lime, CaO	3·21	3·17	2·60	8·10	8·20	3·10	2·20	3·74	2·57	1·90	8·80	2·98
Magnesia, MgO	0·30	0·87	1·00	1·90	2·80	0·80	1·70	1·73	1·45	0·00	4·70	1·29
Potash, K_2O	4·84	4·70	7·00	2·10	0·60	3·50 }	2·20	3·21	2·64	4·37	1·40	2·83
Natron, Na_2O	1·87	3·80	1·00	2·10	0·50	2·80 }		2·76	2·74	6·23	4·10	4·22
Water, H_2O	7·50	10·63	9·60	1·40	3·10	4·80 }	12·40	4·67 }	5·78 }	0·55	9·20	4·06
Loss	0·35	0·31	0·80	0·40	0·70	0·40 }		0·33 }			0·30	0·22

In the above analysis, all that is lacking to make a good material for hydraulic mortar is the lime, and this is therefore added to with sand.

arrives in as good condition as it was when shipped. The ability to keep puzzolana and trass also enables the engineer to carry on large works more advantageously, as he is not obliged to estimate so closely the quantity of cement required for each piece, and he can make better arrangements in regard to its purchase and storage. To get a Portland cement mortar of equivalent strength to the puzzolana, and near the price of it, large quantities of sand must be added. This brings up the question of the weakening effect of certain sands upon cement mortar, and, from some very carefully-made German experiments, we find that the same cement mixed with fine and impure sands can lose two-thirds of its strength. The bad effect of the inferior sand upon a puzzolana mortar would be less in proportion to the smaller amount of sand used. Puzzolana and trass mortars form very little "laitance" as compared with cement mortars, a very desirable quality when laying concrete in mass, under water, where cement mortars tend to separate in layers, according to the specific gravities of the component parts. This is not the case when puzzolana or trass is used. The change of volume, either contraction or expansion, so common with cement mortars, is not observable with puzzolana or trass when the lime is perfectly slaked. The following table, in which the quantities have been determined by very careful measurements, will enable anyone to calculate for himself the relative economy of using puzzolana and trass mortars in preference to either Portland or Rosendale cement. The weights of the three cements and of the lime and sand were obtained by filling a litre with each material, and shaking the measure as they were poured in, until the litre would hold no more, thus insuring absolute compactness.

TABLE A.

—	Weight: Kilograms.	Amount of Water absorbed: Litres.	Amount of Space occupied by Solid Material in one Litre.	Space occupied by each Material in a Cubic Metre of Mortar: Litres.
Portland Cement	1·63	0·480	0·520	520
Rosendale Cement	1·40	0·500	0·500	500
Puzzolana or Trass	1·25	0·370	0·630	630
Sand	1·70	0·350	0·650	650
Powdrd or Slaked Fat Lime	0·72	0·600	0·400	400

TABLE B.

AVERAGE PRICES OF MORTAR MATERIALS IN NEW YORK.

Weighs.	Cost. Dols.	One Cubic metre contains Kilo.	Cost. Dols.
Portland Cement 1 bbl. net, 170 Kilo.	2·15	1630	20·61
Rosendale " 1 " " 136·2 "	1·00	1400	10·27
Puzzolana or Trass	—	1250	10·00
Fat Lime 1 " " 136·2 "	0·70	—	—
Slaked to Powder = 2·25 vol.	—	720	1·65
Sand 1 c.yd. 1315·0 "	0·65	1700	·87

Tables A and B may be changed by substituting for the weights of the materials when compacted, the weights of the same when poured loosely into the measuring vessel—as, for example, the standard weights per struck bushel when measured by falling from a hopper placed at a uniform height. But this change will not affect the results shown in Table C relatively for the three cements. The tensile strength for Portland and Rosendale mortars, given in the last column of Table C, is taken from Mr. Eliot C. Clarke's paper printed in the *Transactions* of the American Society of Civil Engineers, published in April, 1885. It was compiled from about 25,000 breakings of 20 different brands, and fairly represents the average strength of ordinary good cements of

TABLE C.

One Cubic Metre of	Powdered Fat Lime. Cubic Metres.	Sand. Cubic Metres.	Water 25 per cent. by Vol. Cubic Metres.	Amount of Mortar. Cubic Metres.	Total Cost in dols.	Cost per Cubic Metre in dols.	Cost per Cubic Yard in dols.	Tensile Strength. Lbs. per sq. in. 28 Days Old.
Portland Cement	—	1	0·500	1·67	21·44	12·84	9·80	225
	—	2	0·750	2·57	22·28	8·67	6·62	163
	—	3	1·000	3·47	23·12	6·67	5·09	140
Rosendale Cement	—	1	0·500	1·65	11·10	6·73	5·13	116
	—	2	0·750	2·55	11·94	4·69	3·59	60
Puzzolana or Trass	1	1	0·750	2·43	12·49	5·14	3·92	200
	1	1·5	0·875	2·88	12·91	4·48	3·33	187
	1	2	1·000	3·33	13·33	4·00	3·05	128

the two kinds. The amount of water used was just sufficient to make a plastic mortar, somewhat stiffer than is commonly used by masons, about 25 per cent. for neat Portland and 33 per cent. for neat Rosendale. The amount of water used by Mr. Clarke in his experiments being about the same as was used with the puzzolana mortars, enables us to make a fair comparison. If less water had been used, all the above figures would be more. Mixed with 20 per cent. water, puzzolana mortars composed of one volume each of puzzolana, lime, and sand, 28 days old, break at more than 200lb. per square inch. The following tables give a summary of results in regard to the proportion of the compressive strength compared with the tensile strength, the latter being admitted at 100. The mixtures are made by volume.

Puzzolana or Trass.	Fat Lime.	Sand.	Compressive Strength.
1	$\frac{3}{4}$	1	683
1	$\frac{3}{4}$	2	732
1	1	3	826
1	$1\frac{1}{8}$	4	810

With slow-setting cement treated in the same standard manner, the results were:

Cement.	Lime.	Sand.	Compressive Strength.
1	—	1	825
1	—	2	822
1	—	3	789
1	$\frac{1}{2}$	4	808
1	1	6	770

The above figures prove clearly that puzzolana or trass mortar shows better proportions of compressive strength to tensile strength when a larger amount of sand is added, so as, by diminishing its plasticity, to render it more similar to cement mortar, and consequently be struck into the testing mould like cement mortar. While the air cannot escape as easily from the fat puzzolana or trass mortar as from the cement mortar, the density of the test cube, and consequently the strength, is diminished in a proportion which averages 98 : 100. Therefore, in practical work, where no ramming of the mortar takes place, the result will, in proportion, be more advantageous with puzzolana or trass mortar than with cement mortar. To test the density or impermeability to water, circular conical discs of 20 square centimètres surface at the smallest face, and 15 millimètres thick are made of standard mortar, and immersed in water to harden, the same as for tensile-strength test. By means of a rubber ring the hardened disc is tightly fitted into a cylinder in such a manner as to produce by an air-pump a vacuum in the lower part of the cylinder underneath the mortar disc, while water is filled in the upper part of the cylinder, on top of the mortar disc. The water thus effects a pressure of one atmosphere upon the mortar disc. After 24 hours the percolated water is carefully collected and weighed. Results:—1. The mixture being made by volume, the fat lime slaked to paste, and the mortar discs hardened for six weeks under water:—

Trass or Puzzolana.	Fat Lime.	Sand.	Water.	Water-pressed Trough. Grammes.
2	1	0	0·180	0·00
1	$\frac{1}{2}$	1	0·150	0·03
1	$\frac{3}{4}$	1	0·075	0·10
1	1	1	0·000	0·14
1	$\frac{3}{4}$	2	0·150	0·14
1	1	2	0·050	0·06
$1\frac{1}{2}$	1	2	0·200	0·01
1	$1\frac{1}{8}$	3	0·075	0·59
$1\frac{1}{4}$	1	3	0·200	0·29
$1\frac{1}{2}$	1	3	0·300	0·10
1	$1\frac{1}{4}$	4	0·050	0·66

2. The fat lime being slaked to powder and the mortar disc hardened for four weeks under water.

Trass or Puzzolana	Fat Lime.	Sand.	Water.	Water-pressed Trough. Grammes.
2	1	0	0·800	0·10
1	1	1	0·450	1·15
1	1	1	0·500	0·25
1	1	1	0·550	0·15
1	1	1	0·600	0·07

To surpass the quantity of water of the last mixture would be injurious, as the quantity of water and lime is of essential influence to the density of the mortar. Cement-sand mortars thinned as in practical use are less dense, because the cement does not fill up as perfectly the spaces between the particles of the sand as is the case with puzzolana or trass and lime in puzzolana or trass mortars. Slow-setting cement of standard tensile strength and standard mixture, after four weeks' hardening under water, transmitted 1·25 grammes of water, and mixtures of—

Cement.	Lime.	Sands.
1	..	4
1	$\frac{1}{2}$	4
1	1	6

treated in the same manner transmitted all of the water. To Dutch and German engineers these well-known facts have been of decisive importance in many of their large works, especially in the construction of sluices and basins. The adhesive strength of mortar to stone is of great importance, especially in concrete. In the following table the figures of adhesion have been established in connection with the compressive

Mortar Mixture by Volume.			Water.	Proportion of the Adhesive Strength of the Concrete.
Puzzolana or Trass.	Fat Lime Paste.	Sand.		
2	1	0	0·180	108
1	$\frac{1}{2}$	1	0·150	101
1	$\frac{3}{4}$	1	0·075	121
1	1	1	0·000	115
1	$\frac{3}{4}$	2	0·150	109
1	1	2	0·050	126
1	1	3	0·100	90
1	$1\frac{1}{4}$	3	0·075	109
$1\frac{1}{4}$	1	3	0·050	95
1	$1\frac{1}{2}$	4	0·100	73
1	$1\frac{1}{4}$	4	0·050	78

strength, which is taken at 100. The test specimens are prepared in the same manner as for compression tests. As bricks show too great a difference between themselves, congenerous basalt

pieces have been used for the concrete. To one volume of ready mortar, two volumes of basalt pieces have been added, after they had been immersed in water for some time. The specimens were left to harden under water for six weeks. The mortars with more lime show mostly higher proportional figures in concrete than those with less lime. Therefore, a larger addition of lime should be made to mortar used in concrete than to that used without stones. While up to the admixture of two volumes of sand the concretes show higher strength than the mortars without stones, the adhesive strength decreases with larger additions of sand in such a manner that it does not even reach the strength of the mortar without stones. By this it is easily understood that cement mortars with much sand (as generally used, 1 volume of cement and at least 3 volumes of sand) attain by far inferior strength in concrete than the same cement mortars would show without stones. These differences in strength ought to be greater with cement mortars than with puzzolana or trass mortars, because, in consequence of their greater density, the puzzolana and trass mortars have more points of contact with the admixed stones than the more porous cement mortars. Adhesion tests with cement mortars made into concrete and treated in the same manner as with puzzolana and trass mortars gave the following results :—

Cement.	Lime.	Sand.	Proportion of the Adhesive Strength of the Concrete.
1	..	3	76 : 100
1	..	4	62 : 100
1	½	4	72 : 100
1	1	6	95 : 100

For the valuation of the mortar materials it surely merits consideration that in most of the mortar mixtures used in concrete works puzzolana and trass mortars yield a higher strength by the addition of the stones, while the more porous cement mortars show a much more inferior strength, as is found by the usual test of the mortar without stones. As no large structure can be executed without interruption, the joining of the separate layers of mortar is of special importance. The more or less perfect junction of already hardened to freshly-applied mortar is not dependent upon the final hardening of the mortar, but rather upon its adhesive capacity. Experiments in that line have been made as follows :—Specimens made as for tensile-strength tests were at once immersed in water. After 24, 36, &c., hours some of them were taken out of the water and divided into halves, while the other specimens remained under water to ascertain later their tensile strength. Each of the halves were put again into a mould, and the remaining empty half of the mould fill up again with fresh mortar, carefully pressed to the old half specimen and reimmersed at once. The cement used for this test, according to standard test, left one day in the air, showed 16·85 kilos tensile strength. The less strength stated in the following table is caused by the necessary immediate immersion of the specimens.

TABLE I.

Mixture.	Medium Temp. of Water.	Tensile Strength after 28 days. Kilos per Square Centimetre.	
		Regular Specimens.	Specimens joined after 24 hours.
1 Trass, 1½ Fat Lime Paste, 3 Sand, without water	19¼° C.	15·00	12·00
Cement, Standard Mixture	19½° C.	11·25	6·25
This answers the proportion of :—			
Trass-Puzzolana Mortar		100 : 80	
Cement Mortar		100 : 55	

TABLE II.

Mixture.	Temp.	Regular Specimens.	Joined after 36 hours.
Trass, the same as in Table I.	15¼° C.	13·25	9·25
1 Trass, 1 Fat Lime Paste, 1 Sand, and 5 per cent. Water	15° C.	14·50	11·00
Cement, Standard Mixture	15° C.	9·50	4·00
This answers the proportion of :—			
Trass Mortar	1.1½.3	100 : 70	
Trass Mortar	1 1.1.	100 : 77	
Cement Mortar	—	100 : 42	

That trass or puzzolana mortar, even after so long an interruption of the work, makes as perfect a junction as shown by the table, is certainly very important, and the only guarantee for impermeable masonry. It is more important yet with concrete work under water. Usual cement mortars often form very much "laitance," which has to be removed before a new concrete may be put on. As the formation of "laitance" is but a consequence of decomposition of the mortar, it ought to diminish the hydraulic properties of the mortar. With the plastic trass or puzzolana mortars, such decomposition and formation of "laitance" is almost unknown. Hardening under sea-water is by no means injurious to puzzolana or trass mortar. Even much higher strength is obtained than when hardening in soft water. This has been stated in many maritime works by the Governments of Germany, Holland, Portugal, &c. Taking the tensile strength of the mortar hardened in soft water at 100, the same mortar hardened in sea-water showed the following results :—

Trass.	Fat Lime Paste.	Sand.	After 28 days hardening.
2 parts	1 part	— by weight	111
1 part	1 part	1 part by weight	168
1 part	1 part	2 parts volume	132

At the Polytechnicum in Delft, Holland, tests were made by Professor van der Kloes, at the pretty low temperature of 7·9° C., yielding an average tensile strength after one month's hardening, with 2 parts trass and 1 part of fat lime :—

In soft water.	In sea-water.
7·84 kilos.	10·56 kilos. per square centimètre
That means a proportion of	100 : 135

Trass has been used in the construction of most bridges over the Rhine, Weser, and Elbe, at the maritime works of the German Government, and especially in Holland and Belgium, the docks at Antwerp having required 60,000 tons. Trass was also used in building the large aqueduct that supplies the city of Verviers, including the enormous masonry dam, "*le barrage de la Gileppe,*" in Belgium, about twenty-five years ago. To show how trass and puzzolana can hold their own as competitors with Portland cements may be mentioned the fact that when, about fifteen years ago, it was found necessary to build some hydraulic works, sluices, &c., for the improvement of the River Main, in close proximity to the celebrated Portland cement works of Dykerhoff and Schifferdecker, trass was selected as the material to be used on account of its strength and cheapness, although it had to be brought about three hundred miles. Large contracts have been made for supplying the Chinese Government with trass manufactured by D. Zervas' Sons, Cologne, Germany, owners of extensive tuffstone quarries and trass mills near Andernach, Kruft, and Brohl. According to the official reports of the Board of Trade in Lisbon, puzzolana was imported from San Miguel, Azores Islands, to Portugal, in 1801, and was there used with great success in the erection of important buildings. Of late years this puzzolana has been used with great satisfaction in the following railroad constructions :—East Railroad, South Railroad, and Central Railroad; in the harbours, docks, and bridges in Porto, Lisbon, Ponta Delgada, &c.; also in the hospital, aqueduct, and reservoir, together with many other structures in Lisbon and other cities in Portugal. In the harbour and dock works of Figueira, which required over five years to finish, the mortar was: one volume puzzolana, one volume Alcantara lime, and one volume sand. This mortar got so hard that fire was produced when it was struck with a hammer. Trass and puzzolana have as yet rarely been used within the United States, probably because they have not been advertised enough. A few small works made with puzzolana of the Azores produced excellent results, even under very unfavourable circumstances. It may be proper at this point to mention one report in regard to this. Mr. Henry S. Kearney, Chief Engineer of the Board of Electrical Control in New York, says in his letter of September 2, 1887, "I can state that I put the concrete made of puzzolana in last fall in Green Point for foundation of a large engine, which has been running very satisfactorily since last spring. As I have not had any occasion to inspect it, there being no complaint, I can say that it is satisfactory. I consider the time (November and December) when concrete was placed, being very unfavourable, and my not being troubled since the engine has been running, a very satisfactory test and very much in favour of the cement and its future use." The writer of this article inspected the work mentioned. The block containing over fifty cubic yards was as solid as a monolith. The place where the block had to be put in was swampy, subjected to the effect of ebb and flood, and the foundation secured by but a small pile work. The weather was so cold that every morning a solid ice cover had to be removed from the work-pit to put the concrete in, and the concrete—consisting of 1 volume of Puzzolana from the Azores, 1 volume of Rockland lime slaked to powder, 1¾ volume of concrete stones—had to be used at once after mixing to prevent its freezing. All other cement-work at the place had to be stopped on account of the great cold. Some smaller puzzolana concrete works at the same place showed all the same perfection. Up to the present time real puzzolana has not yet been discovered within the United States, where the geological conditions offer little expectation in that regard.

HYDRAULIC LIMES.

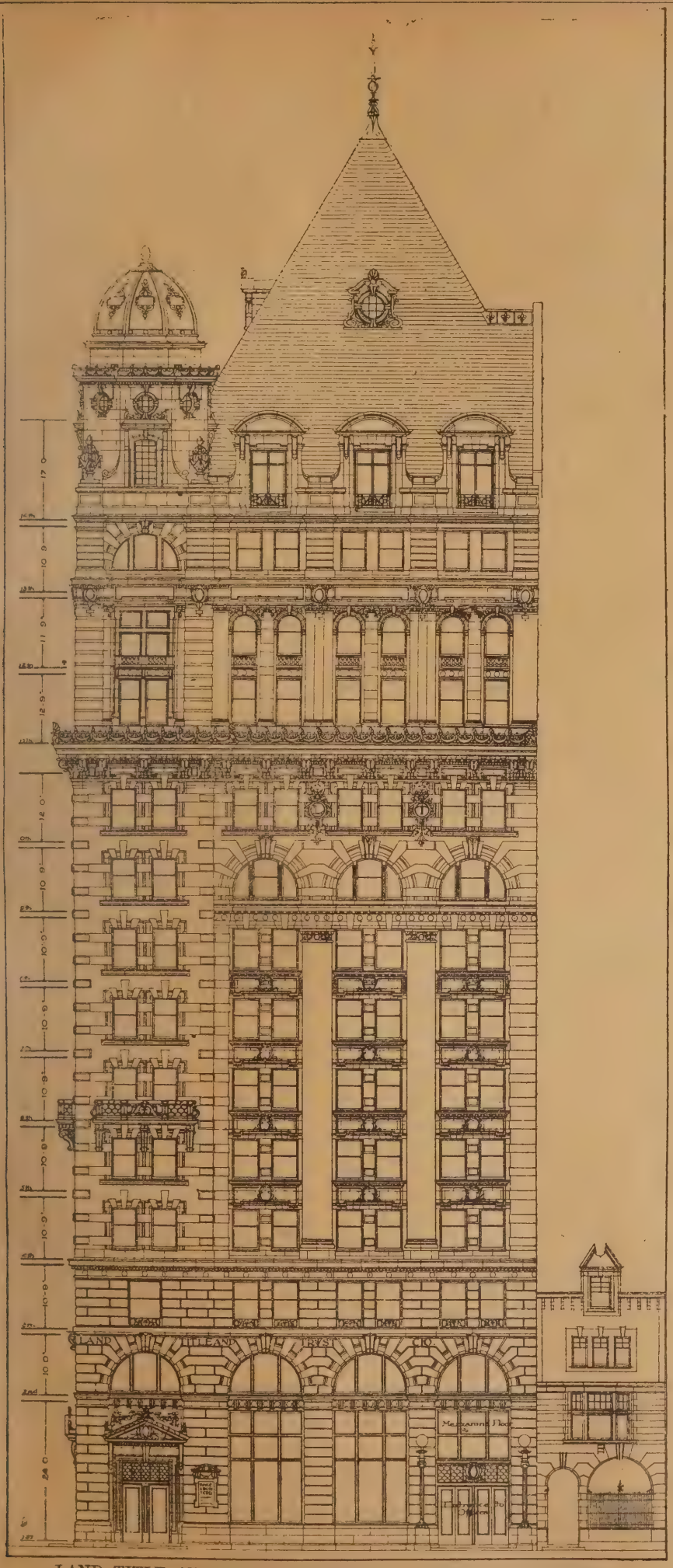
As the hydraulicity of lime depends chiefly on the presence of silicate of alumina or clay—the more clay, within a certain degree, the more hydraulic the mortar becomes. Thus, up to 10 per cent. of clay the limes are feebly hydraulic; up to 20 per cent. they are ordinarily so, and up to 30 per cent. eminently hydraulic, so that the lime will set under water. Amongst the best limes for setting under water are those called grey stone limes, which come from Dorking, Merstham, and Guildford. Thus the admixture of clay will often be found to improve the water-setting properties. Ordinary hydraulic limes harden under water in from six to eight days, while those of the latter class, which contain most clay, harden in from one to four days. One important point is the slaking of these limes. The more hydraulic they are, the more sluggish the slaking is. Hence, hydraulic works often burst from the slaking of the lime which has not been properly prepared for its use. It should be all hydrated before placing, and this requires more time than ordinary lime. The "fat" limes, on the other hand, slake fiercely, as they contain nearly pure carbonate of lime; they develop also great heat and steam. They fall into a bulky powder, and possess little setting power, being slowly soluble in water. For waterworks, in which rapid setting is necessary, Frenssalt found this concrete mixture excellent: 30 parts of hydraulic lime, measured in bulk, and before being slaked; 30 parts of Terras of Andernach, 30 parts of sand, 20 parts gravel, and 40 parts of broken stone, a hard limestone.

EBURITE FAIENCE.

At the new General Hospital, Birmingham, the opening of which we recorded last week, a noticeable feature is the decoration of the out-patients' waiting-hall, which is carried out in "Eburite Faïence," a unique treatment introduced by Mr. Alfred Whitehead, of 35 and 36, Prudential Buildings, Park-row, Leeds, who was many years chief designer and architect to the Burmantofts Works.

The treatment of the hall referred to consists of dadoes carried round the room and round the columns in rich brown glazed majolica ware, the whole of the upper part of the rooms, columns, and arches being treated with Eburite Faïence in various shades of ivory and light brown, relieved with a few bright majolica bands. This Eburite Faïence is a speciality prepared for Mr. Whitehead by Mr. John Campbell, the Campbell Tile Co., Stoke-on-Trent, and this is the first instance in which Mr. Whitehead has used it. The effect seems to give extreme satisfaction to all who have seen it. It is a dull or egg-shell glazed material, and the general impression in cream colours gives the effect of old ivory, which is a very pleasing departure from the glitter of the majolica ware generally in use. The room is 46ft. wide by 95ft. long, with aisles on either side and a nave arcade consisting of six bays spanned by flat segmental arches filled in with ornamental spandrels and cornice over, above which are clerestory lights. From this hall branch off the doctors' and patients' entrances into the quadrangle of the main building, each 10ft. wide. The whole of the work has been prepared and carried out under Mr. Whitehead's contract and direction, and is well worth inspection by all interested.

A new organ for Mill Hill School, the gift of Sir W. H. Wills, Bart., M.P., is being built by Messrs. Vowles and Co., of Bristol.



LAND TITLE AND TRUST COMPANY'S OFFICE, PHILADELPHIA.

PROPOSED OFFICE BUILDING FOR THE LAND TITLE AND TRUST COMPANY, PHILADELPHIA.

WE are indebted to the *American Architect* for this illustration of a competitive design, prepared by Messrs. Kennedy, Hays, and Kelsey, architects, of Philadelphia, Pa., U.S.A., for the new offices of the Land Title and Trust Company, to be erected in that city.

THE PARK HOSPITAL, HITHER GREEN.

THE formal opening of the Park Hospital, Hither Green, near Lewisham, by the Prince and Princess of Wales on Monday afternoon last, brings into public notice a building, or rather group of buildings, of exceptional importance, and one of the largest infectious hospitals in the kingdom. It is the ninth hospital erected by the managers of the Metropolitan Asylums District for the reception of patients of the parishes and unions of the Metropolis. The Park Hospital is situated on elevated ground near Hither Green Station on the South-Eastern Railway, and about a mile from Lewisham. Its average level is about 95ft. above high-water mark, but the land slopes about 30ft. from east to west, and nearly as much from north to south, an inclination which has been taken advantage of in the planning of the pavilions, of which there are 18. We gave a general view of these and a description in the BUILDING NEWS of November 20, 1896, from which our readers will see the general distribution of the buildings on the site. There are eight two-storied pavilions for scarlet fever, four for enteric or diphtheria patients, and six isolation pavilions for other cases. These cover an area of 20 acres, or about two and a half times the area of St. Thomas's Hospital. Externally the buildings are of stock brick relieved by red brick and red terracotta. The scarlet-fever cases are provided for in 48 wards for 368 patients, diphtheria and enteric fever in 24 wards for 120 patients, and 36 isolation in wards for 60 patients, making a total of 548 beds for patients. The scarlet-fever pavilions are on the right or west side, the diphtheria and enteric fever wards on the east, and the isolation blocks in the south or rear. In the centre are the one-story kitchen block and administration buildings; these are connected to the pavilions by covered ways. The steward's stores, water tower, dispensary, and telephone exchange, and the servant's residences are in the centre. The latter face the road. The laundry, boiler, and engine-houses, workshops, and disinfecting house are at the south-east corner, and the med superintendent's house is at the right-han of main entrance on the north side. The is also between the two entrance-roads, a the discharging-room and mortuary, &c., are on the left-hand side of entrance. The steward's house also commands the entrance to the stores and kitchen yard. The number of staff accommodated is 316, including the medical superintendent, assistant medical officers, of which there are 5, matron and housekeeper, nurses (191), domestic servants (90), and other servants.

The pavilions are axially arranged nearly north and south, and all of two stories, and have fire- and sound-proof floors; there is no internal communication between the two floors, the upper floor being reached by an external staircase opening from the covered ways. Lifts are provided at each staircase for coals, food-trolleys, &c. From the plan it will be seen the nurses' home is in the rear on the south-west, the highest point. The covered ways are arched and open, and connect all the buildings, and are constructed of brick and concrete, the floors and steps of red granolithic concrete; under them are subways for water and steam mains and heaters, electric light, telephone, &c., and all these are accessible. We notice also that below the ground-floor ward of every pavilion there is a low-arched space for ventilation. Each scarlet-fever pavilion has on each floor three wards, one for twenty beds (120ft. long), one for two beds, and a single-bedded ward, a ward scullery with hot-plate kitcheners, sink, &c., and other offices, a bath-room, two w.c.'s for patients and one for staff; sink-room, two bed-pan slop-sinks, lavatories, and movable baths. A few details deserve notice. Hot-water radiators are employed in cases designed to admit fresh air, which enters warmed into the ward at a slow velocity, calculated to change the air in each ward three times

per hour. Inlets for fresh air are provided, and admit of adjustment. Each ward has two central open fireplaces, and stacks of flues designed by the architect, every flue of which can be swept from the external basement. These flues are surrounded by aspirating flues, which produce an up-current, and draw off the vitiated air of ward. Externally, the stacks are made of blue-green faïence, and make pleasing breaks in the wards. There are eight air-flues and four smoke-flues in each stack, which is 3ft. 6in. square on plan. All pipes are accessible. The windows are sliding sash below, and open lights falling inwards above. Some of the buildings have a specially-designed window by the architect. There are no hollow linings; the frame is solid, but the sashes slide, and are made to open inwards to throw the air upwards. They can be regulated to any angle, and can be opened to admit air through the full area of the frame—*i.e.*, double the area of an ordinary sash-window; the weights and sash-lines can be removed without taking the sashes out, and the linings are made to open for sweeping. These windows can be cleaned, painted, and reglazed from the inside—very desirable points. The laundry is in two parts for patients and staff; the soiled linen enters at one end, and passes through several cleansing processes to the distributing room at the other end. The disinfector is at the entrance to laundry-yard, and is fitted with Lyon's apparatus. The water supply is from wells in the chalk, and the water-tower in the centre, with a four-dial clock, forms a feature seen in our view. We may note that the kitchen block is internally faced with glass, making a clean and bright surface. Internally the wards present a light and cheerful appearance; the floors are close boarded with teak, the walls are cemented and painted of two colours, a dada of dark chocolate, having a glazed and washable surface, and all the angles between floor and walls are rounded off in cement. We can only briefly refer to the other buildings. The female servants' block has a separate cubicle for each maid, large mess and sitting rooms, and a separate flat of rooms for the matron. The nurses home, on the south-west, is divided into three houses, connected with iron and glass corridors on each floor; each nurse has her own bedroom, and separate dining and sitting-rooms are provided for charge and assistant nurses. The w.c.'s and lavatories are in detached towers as in the pavilions. Mr. Edwin T. Hall, F.R.I.B.A. and F.S.I., is the architect, and his plan was selected in public competition in 1894. Mr. Hall has personally supervised every detail of this extensive range of buildings. He has been ably assisted by Mr. Turner, the chief clerk of works, and Mr. Mansell, assistant clerk of works. Messrs. Leslie and Co., Ltd., of Kensington, are the contractors, and the contract amount is £210,000. The work has been well carried out under the personal supervision of Mr. Shingleton, assisted by his manager Mr. Kitchener, and the ground foreman of the works, Mr. Easter.

THE SEPTIC TANK SYSTEM OF SEWAGE TREATMENT.

THE particulars we gave last week of this system have elicited several inquiries which will be probably found answered in the following paper, which was lately read before the Devon and Exeter Architectural Society by the originator of the system, Mr. Donald Cameron, the city surveyor of Exeter:—After enumerating the various methods of dealing with sewage and pointing out their drawbacks and failures, the lecturer proceeded to say that "such considerations as these forced me to the conclusion that no system of treating sewage can be satisfactory which does not follow as closely as possible the lines laid down by nature. I therefore set myself to devise a system in which the work of natural agents should be forwarded to the fullest extent. For many years past, in such leisure as I could snatch from the duties of a very exacting position, I have devoted myself to researches and experiments with a view to ascertain what conditions would best further the desired object. Of this work the septic tank is the outcome. In this system no chemicals are employed, and there is no "treatment" of the sewage in the ordinary sense of the term, its purification being accomplished entirely by natural agencies. The septic tank itself is merely a receptacle designed to favour the multiplication of micro-organisms, and bring the whole of the sewage under their influence. To this end the tank is of ample size, though not larger than would be necessary with chemical precipitation, and covered so as to exclude light, and, as far as possible, air. The incoming sewage is delivered below the water level; and the outlet also is submerged, with the two-fold object of trapping out air and avoiding disturbance of the upper part of the contents of the tank. On entering the still water of the tank the solids suspended in the sewage are to a great extent disengaged, going either to the bottom or to the surface, according to their specific gravity. In the absence of light and air the organisms originally present in the sewage increase enormously, and rapidly attack all the organic matter. By their action the more complex organic substances are converted into simpler compounds; and these in turn are reduced to still simpler forms, the ultimate products of the decomposition in the tank being water, ammonia, and carbonic acid and other gases. Other nitrogenous compounds may also be present, but they will all be soluble in a slightly alkaline solution—a condition which obtains with every normal sewage. No sludge is found. Examination of the bottom of a tank which has been in use for six months reveals only a thin layer of black earthy matter—the burnt-out ash of the solids of the sewage—together with the mud and grit brought down by storm water. So far as accumulation at the bottom is concerned, it would seem that a tank may be used for an indefinite time without requiring to be cleared. The larger part of the solids in the tank are found at the top, where a somewhat tenacious scum soon forms, consisting of the lighter solids in process of decomposition. After a tank has been a short time at work, the scum increases in thickness very slowly. In one case after thirteen months' work, the scum was only a few inches thick. The effluent from the tank is comparatively clear and inoffensive, and not liable to any after fermentation, the work of decomposition being already done. In this state there can be no reasonable objection to its discharge into tidal water. It is eminently fitted for utilisation on land, containing as it does all the constituents of the sewage having any manurial value in a form immediately available as food for plants; while its freedom from suspended matter removes the difficulty met with in irrigation with crude sewage. It is also in a fit state for filtration. The filtration of sewage or sewage effluent is not a mere straining action; if it were so, the filters would soon clog and become useless. Moreover, the effluent from the septic tank, being free from solids, is not susceptible of improvement by straining. The work to be done consists in the oxidation of the ammonia formed in the tank; this is thus converted into nitric acid, which at once combines with the bases present to form nitrates. This oxidation, like the previous decomposition, is the work of micro-organisms, but of a kind totally different from those which operate in the tank. The latter are largely of the species classed as anaërobic, living in the absence of air and light, and exercising in many cases a reducing or deoxidising action. The organisms which work in the filter, on the other hand, are aërobic, the presence of oxygen being absolutely necessary for their life and work. Consequently the conditions prevailing in the tank must be reversed in the filter, to which oxygen must be freely supplied. To this end the filters are best constructed of some porous material, such as coke breeze or crushed furnace clinker, affording abundant intersticial space. Furthermore, as has been shown by experiments made, filtration must not be continuous, or the oxygen contained in the filter will soon be consumed, when the nitrifying organisms will die off, rendering the filter useless until new colonies shall be formed. Filtration, therefore, must be intermittent, a change of air being supplied to the filter after every dose of effluent. It is found that a filter worked in this way retains its purifying power for an indefinite period. In my system attendance is altogether dispensed with, an arrangement being adopted whereby the filters are filled and discharged automatically. In a small plant, the filtering area may be divided into two parts, each of which would be filled in turn while the other is emptying and at rest. The action of the alternating gear is as follows:—The supply of effluent to each filter and the discharge of the clear water after filtration are controlled by valves, all connected to one rocking-shaft. The clear water from each filter passes into a bed of gravel underlying it, from which it is led by drains into a collecting well. As the effluent fills the filter, the clear water rises in the collecting well, and the filter becomes full, a small quantity of clear water overflows from the collecting well into a bucket carried by the shaft. The water thus thrown into the bucket bears it down, rocking the shaft, and thereby actuates all the valves. The flow of effluent to the filter already full is stopped and its discharge-valve opened, the effluent being turned on to the empty filter, whose discharge-valve is at the same time shut down. The water rushing out from the filter last in use draws down after it through the filtering material the charge of air required for dealing with the next dose of effluent. When the bucket which rocks the shaft sinks into its lower position, its contents are discharged through a counterbalance chamber, in which a part of the water remains to hold the valves in place until the other filter shall be full. The overflow from this second filter passes into another bucket, which was raised into position by the sinking of the first, and by means of which the valves are brought back into their original position. The first working installation consisted of a small tank only, which dealt with the sewage of over thirty houses, as well as that of a large reformatory. It also received a considerable amount of storm water. This tank was in use for thirteen months, during which it gave a uniformly clear effluent. At no time was any solid matter taken out of it, nor did it require cleaning at the end of the period. The fitness of this tank for its work having thus been demonstrated, a second plant was laid down to deal with the sewage of over 300 persons, ranging from 7,500 to 10,000 gallons daily. In addition to the tank, two coke breeze filters were provided, having a united area of about one-hundreth of an acre, and furnished with the alternating gear before described. The gratifying experience gained with the first tank has been confirmed by the second, while the uniformly good results given by the filters show how completely the tank does its work of preparing the sewage for filtration. The filtered effluent is quite free from smell, and in the bulk of a large tumbler shows the merest trace of colour. It is often absolutely colourless. Analyses show that it comes up to the exacting standard of purity laid down by the Rivers Pollution Commission. These results were somewhat unexpected, seeing that a two-filter plant does not admit of the period of rest after filling and before discharging which has been regarded as necessary. In view of the results thus obtained, the Exeter City Council, guided by the reports of chemical and bacteriological experts, have adopted the septic tank system for the disposal of the sewage of the whole city, subject to the sanction of the Local Government Board; and plans of the proposed works are now in hand. For the more complete demonstration of the capabilities of the system the council have constructed a larger plant to deal with the whole flow of one of their outfall sewers, amounting to 90,000gal. per day. This installation consists of a tank 64ft. by 18ft., ranging in depth from 7ft. to 10ft., with five filters 5ft. deep, filled with coke breeze and furnace clinker, and having a total area of 400 square yards. One filter will always be held in reserve, the four others being worked in one cycle, in the same way as the two-filter plant already described. By having four filters in a set instead of two, it becomes possible to give each filter a period of rest after filling before it is emptied, and a period for more complete aëration after each discharge. Instead of straining off the floating solids and intercepting the road-grit outside the tank, it was decided to turn into it all the solids brought down by the sewer, so as to place it under exceptionally severe conditions. The only outlet is the effluent discharge pipe 6ft. above the bottom, there being no other avenue by which either solids or liquids can escape from the tank. The foregoing description deals only with the main features of the system, passing over those minor details which do not affect its fundamental principles, though they are none the less necessary for insuring constant and reliable working. The tank is protected by patent, and a patent for the alternating gear has been applied for. In the matter of cost, the advantage of the septic tank system is not less marked than in that of efficiency. The capacity of tanks and filters required is not greater than with chemical processes, and the whole cost of machinery for preparing chemicals, agitating and

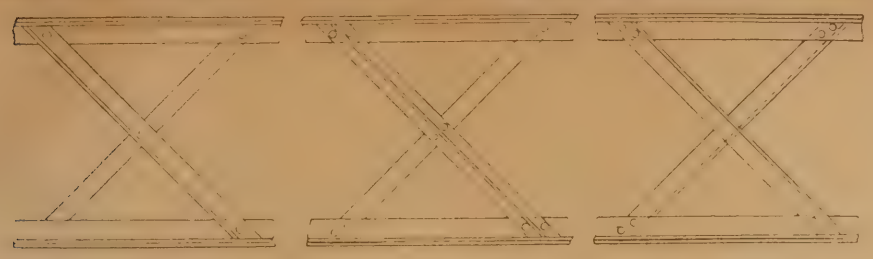


FIG. 135 FIG. 136 FIG. 137

dealing with the sludge, and buildings for its accommodation and for storage of sludge, is saved. The only additional item of cost with the septic tank system is the alternating gear, the valves themselves being common to both systems. The annual cost of working is practically nil. Not the least advantage of the system is its power of dealing temporarily with volumes of sewage far in excess of the normal capacity of the plant, a feature which renders it possible to abandon the risky expedient of discharging slightly-diluted sewage without treatment whenever the volume of dry-weather flow is slightly exceeded. With this system the difficulty often experienced in finding a suitable site for works of sewage disposal is reduced to a minimum, for a septic tank plant can be placed in situations where a plant on any other system would be impracticable."

WROUGHT-IRON AND STEEL IN CONSTRUCTIONAL WORK.—XXIV.

THE struts and ties, simple in the smaller girders, become more elaborate and complex in the larger. The elements in the simplest braced girder are single tee-shaped flanges and flat-bar bracings. It needs but little consideration to see that such a form is ill-suited to stand severe stresses, apart from the addition of other bracings and of stiffeners, and that a limit is soon reached, at which it becomes more economical to adopt other designs. Flat bars occur as ties in many of the largest girders, but they are only used as struts in small ones. They lack the stiffness necessary to enable them to resist crippling tendencies; they are often increased in number and riveted at their crossings; but the best practice is to use other sections, such as angles and ties for struts. With increase in length, which involves increase in depth, flat bars are reserved for members in tension only, or are not used at all. Flat bars are not suited for withstanding compressive stresses because they are too weak sideways, or, in other words, the moments of inertia and of resistance in that direction are of low value; the problem is not merely one of compressive strength per area of cross-section, but one of length relatively to area. Stiffness, equally with strength, is a primary consideration in a strut, strength only in a tie. A tie may be flexible, a strut never; this element of stiffness prevents the initial bending which would cause a weak strut to fail by bending as a beam. It is the element of stiffness which is so difficult to estimate, and for which a practical experience is a safer guide than theoretical deductions. Though additional security is gained in many cases by riveting ties and struts where they cross; this is only permissible in cross bracing, and cannot be done in a single Warren triangulation. Neither is the method suitable for deep girders, because the struts, if overstrained, are liable to pull and distort the ties along with themselves. In cases in which a girder is well stiffened vertically by tees, angles, or channels, it will often be the case that flat bars may be used for compression members; but, even then, it is probably better practice not to depend much on the action of the verticals, but to design the compression members for their own proper duty.

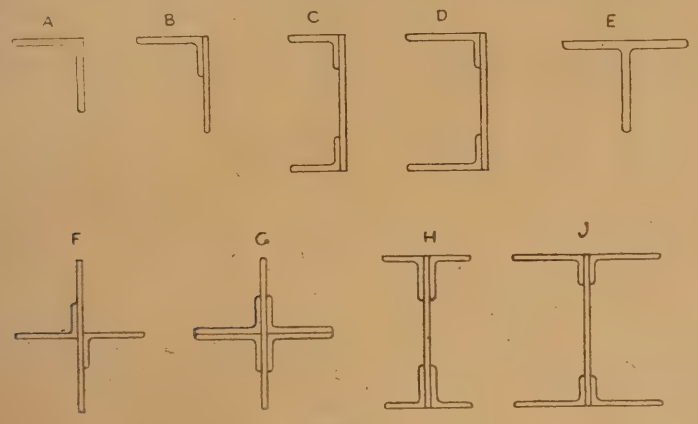


FIG. 138.

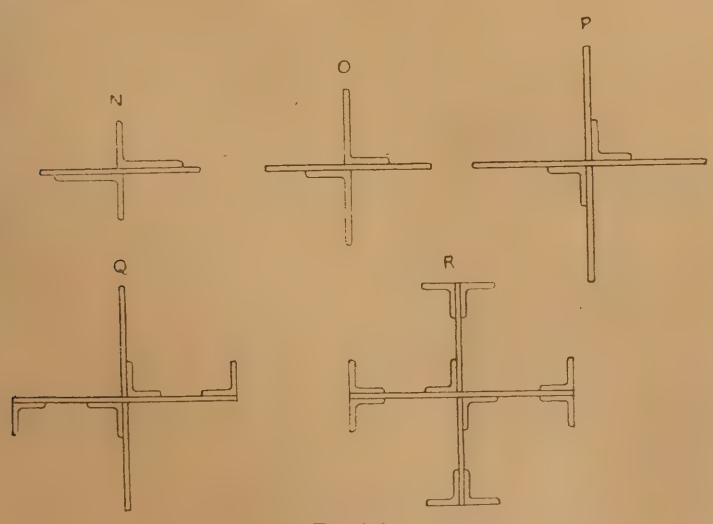


FIG. 140.

The question, therefore, of proportioning compressive members is one which has to be regarded apart from that of tension members, and many are the considerations and devices which arise in connection with this subject. In a simple triangulation it is desirable to have strut sections which are able to resist deflection equally in all directions: that is not quite possible of attainment, but a very near approximation to this condition can often be secured. In crossing-braces this condition is of less importance, because of the riveting together at the crossing sections; but due consideration has nevertheless to be given to the rigidity of all struts however cross-braced. These matters have to be borne in mind if we are to understand the reasons of the various forms given to braces and booms.

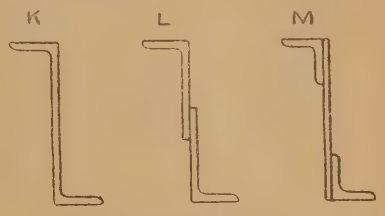


FIG. 139.

The remarks made in a previous article in reference to the moment of inertia of various sections used as columns applies with equal force to the bracing struts of girders. Clearly the circular form, in which I is equal in each direction, is the best possible; but it is not used in this application, because of the practical inconveniences of fitting and riveting circular sections. The flat bar is evidently the worst form possible, because I for this is measured by thickness, or thickness plus some assistance affording by riveting; the sections used, therefore, for heavy bracing are angles, tees, and built-up cruciform and box sections. Neither form possesses a moment of inertia quite alike in all directions; but it is practicable so to proportion sections by accumulating material towards the extremities as to obtain very good results. The differences in width and thickness of angles and tees obtainable permit a very wide range of choice in this respect. An excess of rigidity must always be imparted in such cases; but the limits must be reasonable, or dead weight will be unduly increased. In multiple lattice girders the practice of riveting the ties to the struts where they cross, by shortening the latter as pillars, increases their resisting power, while it also increases the rigidity of both sideways. In very deep trusses the struts are often stiffened by increasing the section about the centre by the riveting-on of extra plates there, or by building up struts having parabolic outlines; the principle is the same as that of increasing the sections of girders towards the centre. In some cases the truss is made of larger cross-section at the centre than at top and bottom by curving the bracing outwards from the flange towards the centre.

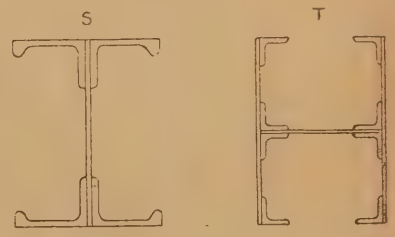


FIG. 141.

The commonest type of compressive member for girders of moderate dimension is the angle; better still is the tie. Either is used alone, or riveted to flat bars; also, it is frequent and good

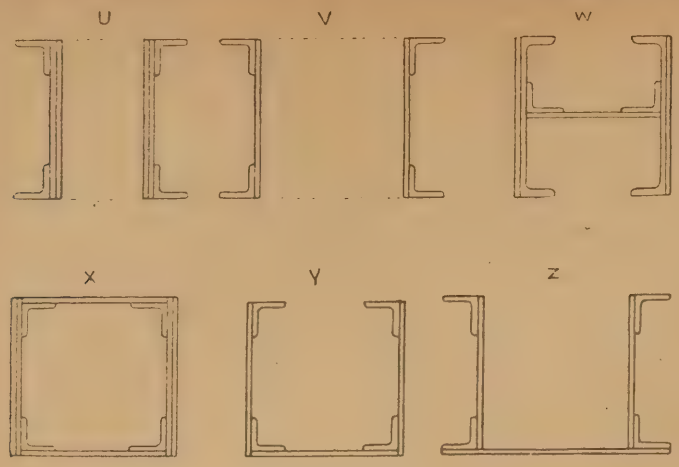


FIG. 142.

practice to use similar sections for the tension members, so making them stronger than necessary for tensile strength, but making them stiffer and better qualifed to reinforce the compression members. We get, therefore, such combinations as tension bars and compression angles, Fig. 135, or tension bars and compression tees, Fig. 136, or tension and compression angles, Fig. 137, or tension and compression tees, or angles riveted to flat bars, or tees riveted to flat bars for compression; these, however, are very simple forms suited only for light girders. In fastening such members together at the point of crossing flat faces should, whenever practicable, be riveted together; no flanged parts then have to be cut. It often happens that it becomes necessary to cut away the portion of a flange at the point of crossing of vertical stiffeners; then the riveting must be sufficient to fix the crossing bars firmly, making that in effect the termination of two short

FIG. 143.

struts in place of a single one of full length. Conditions of fixing have to be borne in mind when deciding on the forms of struts and ties. Simples bars, angles, and tees afford good facilities for this, but when built up into various sections the latter sometimes offer difficulties, and increase cost in fixing.

Bearing in mind previous remarks in reference to the best forms for struts—those, namely, in which the cross-section is as nearly as possible symmetrical about the neutral axis, and in which the largest quantity of metal is massed about the exterior parts—circles and hollow rectangular forms would naturally occur to the mind. Circular sections are not practicable; but the cross and the rectangle, in more or less perfect designs, are as common in the larger girders as bars, angles, and tees are in the smaller. The calculations for these are generally the same as those for long columns, bearing in mind that the least moment of resistance is to be taken.

In Figs. 138—142 various strut sections are shown, beginning with the common angle, and advancing to elaborate sections used on the heaviest girders; continuations of angles with plates make up most of these. The zed-bar, Fig. 139 K, or angles L, or angles and plate M, are frequently used, the outer flanges affording facility for direct attachment to the booms. The forms S and T, Fig. 141, are good. In S bulb angles are riveted to a web-plate, the bulbs affording stiffness where it is most wanted; T is an extension of the same principle, though rather more expensive. The best struts for heavy girders are those in Fig. 142, U to Z. The fault of nearly all the sections in these figures, except the last two, Figs. 141, 142, is that there is unnecessary metal in the centre, which might be massed at the outer portions of the sections with advantage; the best sections are those in the group, Fig. 142, where the metal is massed at the outer portion, where it is best calculated to resist deflection, precisely as in a column or a beam. These are built on the lines of the wide-flanged channel, and joist, and the rectangle; these not only give good moments of resistance, but they have the great advantage of affording broad faces

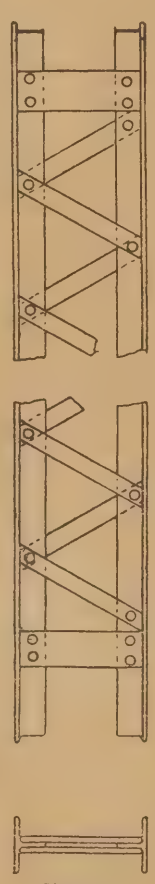


FIG. 144.

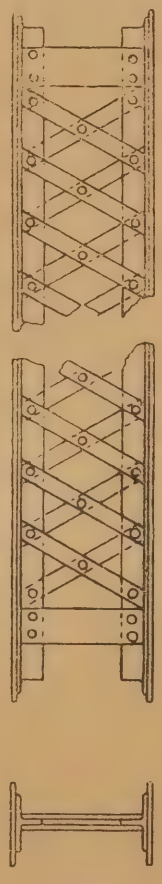


FIG. 145.

for attachment to the booms, and also for secondary bracing, ties, &c

Most of the foregoing forms of struts are all shown as solid webbed; but many of them are made with lattice web bracing when dimensions are large and reduction of dead weight is a consideration of importance; C, D, H, J, V, X, Y, Z are thus braced. Fig. 143 shows a braced strut in section, single angles only uniting single bracing only and flanges; and Figs. 144, 145 show two types of double bracing united to T-shaped flanges. The first is similar to a Warren girder, the second is of the lattice type; such forms are among the most frequent.

J. H.

STENCILLED DECORATION.

DECORATIVE fabrics are well known to most architects; but those who wish to see a decidedly artistic departure, in which the process of stencilling is made to conduce to decorative effects, cannot do better than pay a visit to the new show-rooms of Messrs. Aldam Heaton and Co., Ltd., designers and decorators, at 89, Mount-street, Grosvenor-square. In these spacious and well-lighted show-rooms one can discern the truly artistic in many handicrafts. The very idea of a stencilled design was at one time to conjure up in the mind everything that was crude in colour, mechanical and monotonous in pattern; but Messrs. Aldam Heaton and Co. have, by a novel proces of their own, given life and beauty to the method. For some years they have been applying the stencil to wall-papers, and other fabrics, with remarkable results. The first experiment made was to wall-papers, and by the use of tertiary and graduated colours, applied to a plain tinted paper or underprint, a very pleasing effect was obtained in shaded tones of colour, and very beautiful gradations, as varied as those of Nature herself. Several of these papers may be seen in Messrs. Aldam Heaton's showrooms, one in very delicate shades of rich colour of a bold Italian design, adapted for a drawing-room; others are of tertiary tones, on greyish or cream-like underprints stencilled over, through which the print of the ground appears, giving a very rich and delicate effect. Of this application of stencilling to wall-papers many beautiful designs were shown us. We can see many advantages in this treatment of wall surfaces; the pattern can be designed with a particular regard to the shape and extent of surface. For instance, a very nice pilaster design is treated as an arabesque in grey tones; panels and filling and dadoes can have special stencil designs made, at a price which would little exceed the higher class of wall-papering. By this means cutting the pattern, which spoils so many wall-papers, is avoided. The ceiling of the showroom shows the extension of the process to ceiling decoration—in this case a refined Italian design on printed ground, with centre oval, garlands, and figure-subjects introduced as medallions, having all the appearance of hand-painted work, and washable. Stencilling is also applied to curtain materials, seat covers, &c., made of mohair and silk, worsted leno, and other soft woollen fabrics on plain cream or coloured grounds, or over a light underpattern. We saw wall panels, curtains, portières, upholstery, and draperies treated in this manner with high artistic effect. These stencilled fabrics will stand washing, and the wall-papers can also be cleaned with sponge, soap, and water. The stencilled patterns on some of the specimens we examined impart a great richness to the material, the blending and shading of colour from light to dark, blues, reds and greys, being extremely decorative. We also notice a painted flock in dark warm bronze colour, some very handsome deep-red curtains with appliqué work, some embossed leather lacquered adapted for dadoes; also a twill-cloth material made of jute, having a bold stencilled pattern, admirable for exposed wall surfaces, and a Japanese canvas paper, lacquered over with bronze and stencilled, of very rich modelled effect. Architects will do wisely to adopt the wall and ceiling decorations in stencilled work, which are so effective. The stencils run from 1s. 6d. per yard and upwards, and for dadoes and friezes the effect cannot be surpassed. Hand-painted friezes on canvas, in oil colours, gilded or lacquered, or modelled in plaster, as in the "Mermaid" frieze, choice specimens of cabinets and marquetry may be seen at these showrooms, and show developments in decoration and furnishing which were unknown a few years ago. In the lower showroom, Messrs. Aldam Heaton and Co. have many very beautiful decorations and woodwork for the last new Atlantic liner.

At the London Consistory Court, last week, the Chancellor granted a faculty to erect a reredos in the church of St. Gabriel, Pimlico, and to transfer the present reredos to the apse of the south chapel, and to place in the south chapel a Holy Table. He also granted a faculty for adding a choir vestry to St. James's Church, Piccadilly.

In our description last week of the Hotel Métropole, Folkestone, we omitted to mention that Claridge's Patent Asphalte is laid upon all the flat roofs, balconies, and billiard-rooms, and is also used for lining the rainwater tanks, and in the broad gutters and areas, and wherever a smooth and water-tight surface was required. The architect has had great experience of the company's material, and has most judiciously used it in the present instance.

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ILLUSTRATIONS.

NEW HOUSES OF PARLIAMENT, SYDNEY, N.S.W.—THE "PUNCH" HOTEL, HULL.—DESIGN FOR DECORATION OF AN OVERMANTEL.—STAIRCASE IN VILLA DELIUS, AIX-LA-CHAPELLE.—PASSMORE EDWARDS CONVALESCENT HOME, PEGWELL BAY.—ST. GEORGE'S FREE LIBRARY, BRISTOL.

Our Illustrations.

PROPOSED NEW HOUSES OF PARLIAMENT, SYDNEY.

An original design, with dome, estimated to cost £465,636, is the one of which the plan, but not the exterior, was approved by the Cabinet. The original alternative design with tower, estimated at £522,916, speaks for itself. The modified design, with dome, has been proposed so as to work it in with the plans of the first design, and at the same time to reduce the cost. This has been effected. A special and interesting feature has been introduced in the modification—viz., the substitution of a sloping garden to the basement on the front and lateral façades of the building instead of the open excavated area shown in the original design. Our illustrations are from photographs and sun-prints taken by the photographer to the Public Works Department for New South Wales, from the plans and water-colour perspectives prepared in the Government architect's office. The architect is Mr. W. L. Vernon, F.R.I.B.A.

THE "PUNCH" HOTEL, HULL.

This building, for the Hull Brewery Company, Limited, now completed, is built of thin red bricks with terracotta dressings and has a light red granite base, and Staffordshire tiles are used for the roof. The architects have endeavoured to make a bright and pleasing front, while departing from the usual stereotyped public-house style. The front of the site is a continual curve, as will be seen from the plans given with the geometrical elevation. The contractor for the building is Mr. Drury, of Hull. Messrs. Jones and Willis supplied the wrought-iron work. Messrs. Smith, Brodrick, and Lowther, of Hull, are the architects.

NATIONAL SILVER MEDAL DESIGN FOR THE DECORATION OF AN OVERMANTEL.

Mr. Joseph Ogden, the author of this prize design, has undoubtedly displayed considerable skill and refined taste in the enrichments of his scheme, employing very simple framing for the overmantel itself, and thereby insuring his effect almost entirely by the judicious use of well-balanced ornament, which was specially mentioned in the Science and Art Department official report of the examiners—Messrs. W. de Morgan, Maurice B. Adams, and Lewis F. Day, as "an extremely able design." The drawing, which we have to-day reproduced, was effectively rendered in black and white lines on brown paper so that our illustration herewith is a facsimile, only to a smaller scale than the original.

STAIRCASE: VILLA DELIUS, AIX-LA-CHAPELLE.

This mansion, of which Mr. Georg Frentzen is the architect, is distinctly representative of modern Continental work of the more monumental kind, and this typical character is emphasised by the arrangement of its grand staircase, of which we give a photographic illustration. The archway at the foot of the first flight leads into the lower entrance hall, above which occurs the lantern-lighted gallery seen over the balustrade in our view. To the well-opening of this gallery a wrought-iron balcony front adds much richness, while marble columns and pilasters divide the walls of the hall into arched compartments. The execution of the masonry leaves nothing to be desired in finish and precision, for it has been thoroughly well built. Other views are given in Mr. Ernst Wasmuth's very comprehensive "Architektur der Gegenwart," the latest part of which, just issued, has now reached us. The plates, numbering over 100, are exquisitely produced by the Lichtdruck process to folio size from specially-taken photographs of every kind of building in Belgium and Germany, both old and new. There are several plans too, adding to the value of the publication, which is edited by Mr. Hugo Licht. We have made our choice to-day as an example of the remainder.

NEW WING AND TOWER BELVEDERE, PASSMORE EDWARDS CONVALESCENT HOME, PEGWELL BAY.

On Saturday last Mrs. J. Passmore Edwards laid the foundation-stone of the new wing of this building, which belongs to the Working Men's Club and Institute Union, Clerkenwell-road, E.C., and has been in use as a home for working men from three to four years. Having proved so useful and beneficial an institution, it is now being considerably enlarged, and a tower is erecting surmounted by a belvedere commanding a splendid view over the bay from Ramsgate to Deal. The premises, originally used as an hotel, were purchased by Mr. J. Passmore Edwards and given by him to the Club Union, who furnished the building after it had been renovated and adapted at the cost of Mr. Passmore Edwards, under the direction of Mr. Maurice B. Adams, F.R.I.B.A. This year the present enlargements have been put in hand by the Working Men's Club Union, at a cost of between £4,000 and £5,000, Mr. Passmore Edwards having supplemented his previous gift by handing over the adjacent freehold land to the institution, thus enabling a further public improvement also to be made by the Borough of Ramsgate by widening the public highway between Minster and Ramsgate just where the Pegwell Bay road was exceedingly dangerous and narrow. The recreation rooms, as well as the dining-hall, are located on the other side of the road with a subway approach, and here also, immediately on the shore, are the tennis-courts and summer-houses. The new buildings include accommodation for 32 additional beds, a laundry and series of lavatories and water-closets, bath-rooms, &c. The walls are lined with Messrs. Cliff and Sons' glazed bricks. Messrs. Mark Fawcett and Co.'s fireproof flooring is employed. The design has necessarily been made to assimilate with the original block; but an endeavour to give a more decided architectural character to the grouping has been made by the architect in designing the tower, which is capped by a lead-covered dome. The builders are Messrs. Jarman and Sons, of Ramsgate, and the architect is Mr. Maurice B. Adams, F.R.I.B.A.

ST. GEORGE'S FREE LIBRARY, BRISTOL.

On Saturday last the foundation-stone of this branch library was laid. It is a munificent gift to the town by Sir W. H. Wills, M.P. The architect is Mr. Frank Wills, and the builders are Messrs. William Cowlin and Son. Mr. E. Norris Mathews is the city librarian. The site is nearly opposite the parochial offices, on the edge of St. George's Public Park. The materials used are red Cattybrook bricks, with Ham Hill stone dressings. The library building will have a frontage of about 78ft., and a depth nearly as great. On each side of the central entrance will be large bays carried to the roof and terminating in an ornamented gable, while the entrance in the form of a smaller bay will be continued to a similar height and terminated by a turret. The roof will be tiled. Internally, nearly the whole of the building will be in one, and it will be open to the pitch of the roof, the supporting beams of which will be visible. The inside walls are to be sand-stuccoed. To the right of the entrance the floor space is to be allocated to a reference department, the bay on that side forming part of this section, while the left bay and a considerable part of the hall on that side will be devoted to newspaper readers. Across the rear end of the hall will be an arcade (the columns and seven semicircular arches being of Ham Hill stone) and behind it is to be the lending library, librarian's rooms, and boys' department. The counter separating the assistants in the lending department from the public extends under three arches, and behind it will be ample book-shelves for a large library. The building will be heated by hot-water apparatus, and is to be completed by Christmas. The cost is expected to be not far short of £6,000.

CHIPS.

In our notice of the alterations at Wolsingham Church, on page 10, we should have mentioned that the wood-block flooring was laid by Mr. Roger Lowe, of Farnworth.

At the Mersey Docks and Harbour Board Offices, Liverpool, on Monday, an album was presented to Mr. George F. Lyster by the staff of the engineering department of the Trust. In 1861, when he was 40 years of age, Mr. Lyster was appointed engineer-in-chief of the Liverpool and Birkenhead Dock Estate, and passed from active to consultative work in 1889. In thanking his former colleagues, Mr. Lyster referred to the great advances made in the dock system of Liverpool, and said that during the period he had been connected with the board a sum of 18 millions sterling had been expended.

Lady Stephenson laid the corner-stone on Friday of a church at Brocco Bank, Sheffield, which is to cost £7,700, apart from furnishing. It is Early English in style, and will accommodate 650 worshippers. Mr. J. D. Webster, of Sheffield, is the architect, and Mr. James Fidler, of Eckington, the contractor.

A select committee of the House of Lords on Monday gave their sanction to the Brompton and Piccadilly-circus Railway Bill, under which it is proposed to construct an underground electric railway, two miles in length, running from Piccadilly-circus to Brompton, and having communication at South Kensington with the District Railway Company. There will be seven stations on the line including the terminals, and it is intended to introduce a three-minutes' service. The Bill has already passed the House of Commons.

A new street at Edinburgh, half a mile in length, and 80ft. in width, which the Heriot Trust has made between Leith-walk and Broughton-road, was formally opened on Friday by Lord Provost M'Donald.

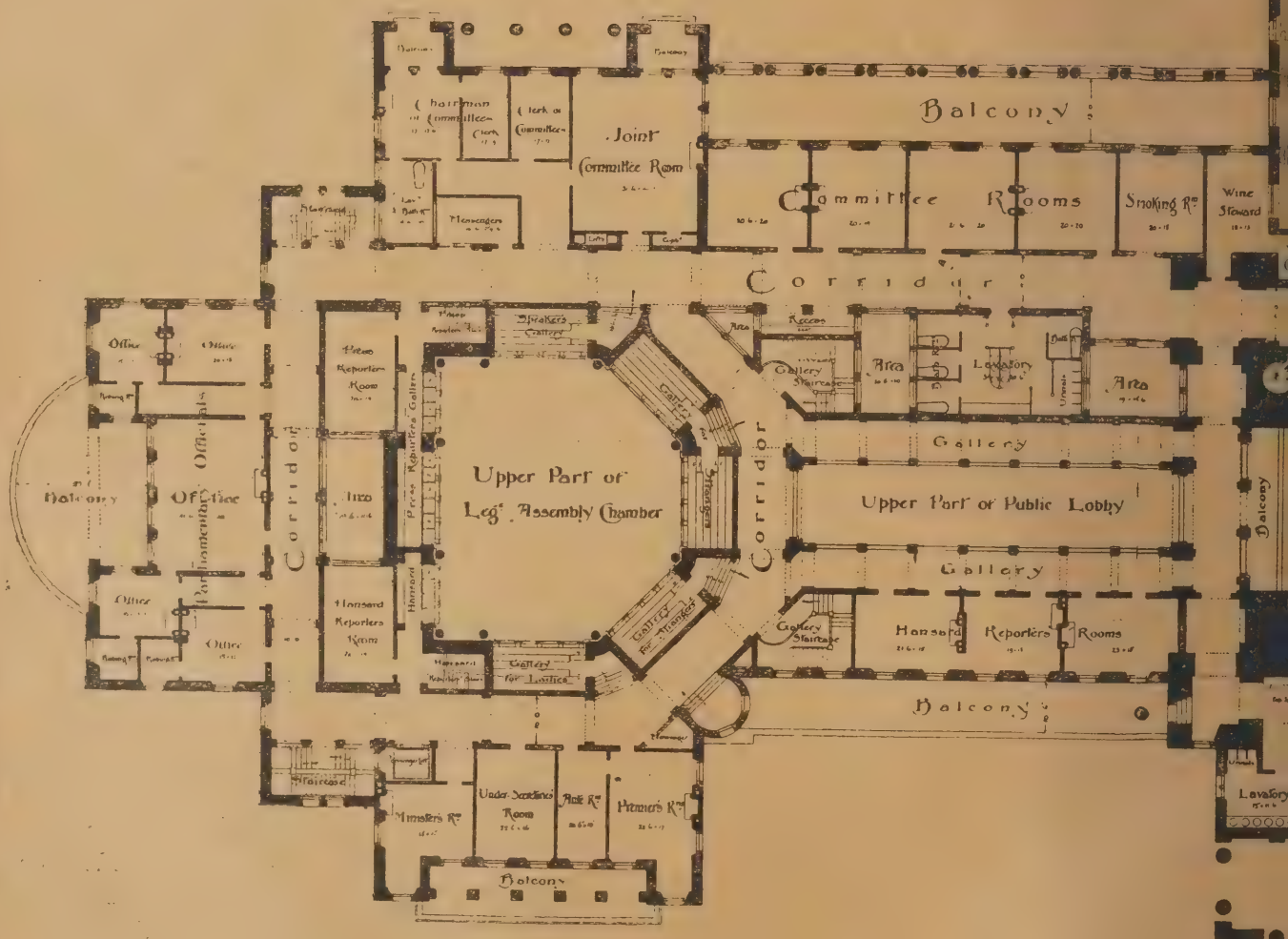
The foundation-stone of the free library which Sir William Henry Wills, M.P., has undertaken to provide for the parish of St. George, Bristol, was laid on Saturday afternoon by Mr. Augustine Birrell, Q.C., M.P. The site is on the main road, near the District Council offices, and the building, which is to afford accommodation for 300 readers at a time, with shelving for about 11,000 volumes, will be in the style of Late Tudor Renaissance. It will be a single-storied building, with Cattybrook brick facings, and Ham Hill stone dressings. The contractors are Messrs. W. Cowlin and Sons, the architect being Mr. Frank Wills, also of Bristol. The cost will be £6,000.

A fire broke out at Roe's timber-yard, Derby, on Wednesday week, and, spreading to adjoining premises, assumed great dimensions. The damage is estimated at £70,000, and a considerable number of people have lost employment and furniture.

Before Mr. Justice Lawrence at the Bristol Assizes on Friday, Francis Ball, civil engineer, employed as assistant surveyor by the Bristol Corporation, pleaded guilty of stealing £2,494, the property of the corporation. Isaac Jenkins Pearce, a youth, pleaded guilty of conspiring with him, but not of stealing £157. Full restitution of the money had been made. The Judge said it was a very grave case, and as a warning to others he sentenced Ball to seven years' penal servitude. Pearce was sentenced to twelve months' hard labour.

In the course of excavations made by workmen employed in demolishing old buildings in Northgate-street, Chester, the base of a Roman column has been uncovered. The relic is the largest specimen of its kind yet found in Chester. It is composed of a square base of red sandstone, the sides being 4ft. 6in. in length, and the height 1ft. 4in. Surmounting this is a moulded circular column 2ft. 10in. in diameter, with a height of 1ft. 8in., this, of course, being the proper proportion. The spot where the discovery was made is just under the foundations of what was known as the Old Lightcake shop, a curious little establishment, which was some four or five feet below the level of the street.

New Parliamentary Buildings
Sydney



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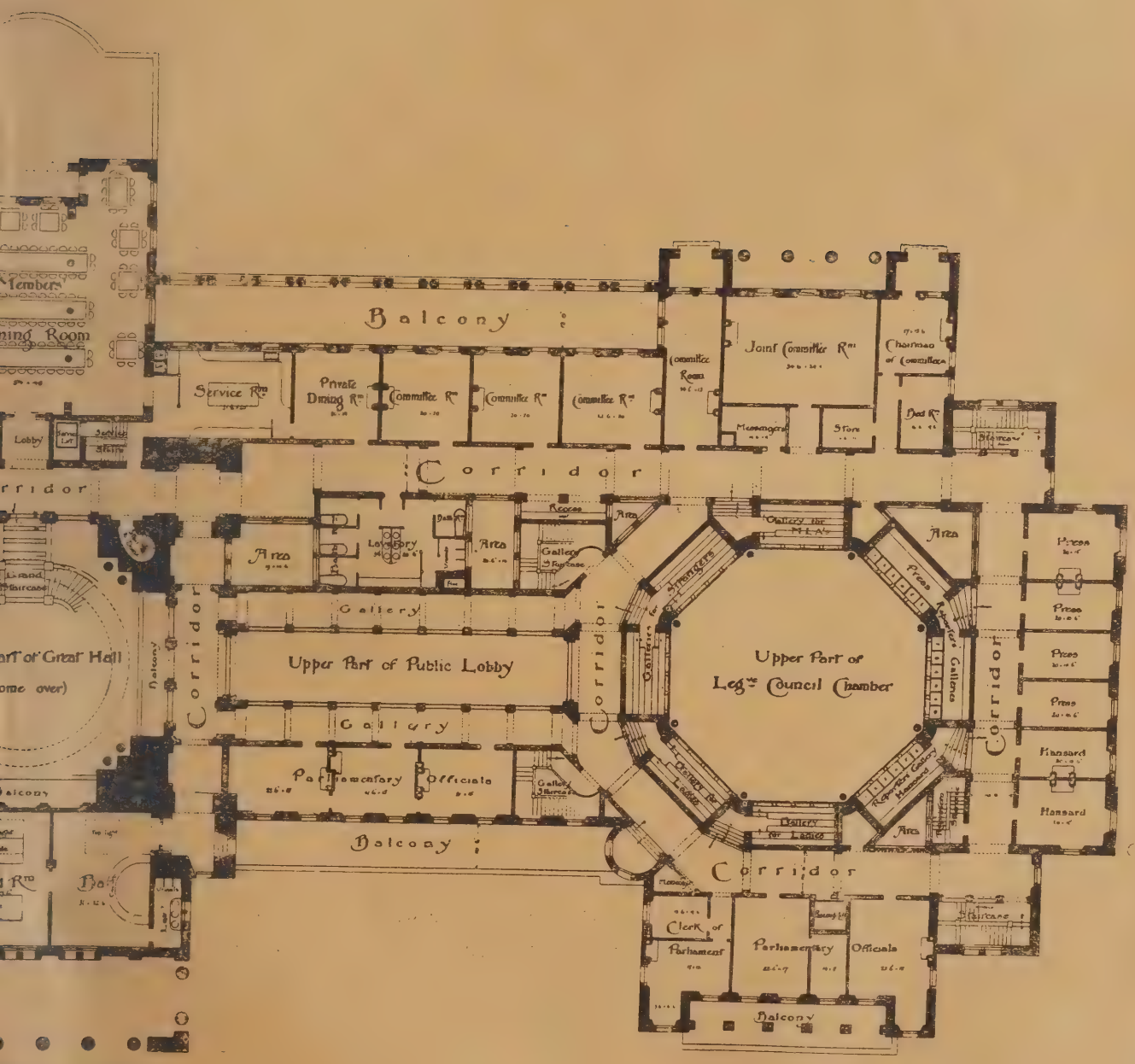

Balcony
Service Rm
Private Dining Rm
Committee Rm
Committee Rm
Committee Rm
Committee Room
Joint Committee Rm
Chairman of Committees
Messengers
Store
Bed Rm
Staircase
Corridor
Area
Lavatory
Area
Gallery Staircase
Recess
Area
Gallery for M.L.A.s
Area
Press
Press
Press
Press
Hansard
Hansard
Gallery
Upper Part of Public Lobby
Gallery
Parliamentary Officials
Gallery Staircase
Balcony
Corridor
Upper Part of Leg^ve Council Chamber
Gallery for Strangers
Gallery for Ladies
Gallery for Ladies
Reporters' Gallery Hansard
Area
Corridor
Corridor
Clerk of Parliament
Parliamentary Officials
Staircase
Balcony
Lobby
Service Lift
Service Stairs
Grand Staircase
Balcony
Corridor
Balcony
Bath

Floor Plan

THE NATIONAL GALLERY OF BRITISH ART.

THIS building was commenced about September, 1893, and is to be opened by H.R.H. the Prince of Wales on the 21st inst. On Wednesday a private view of the buildings took place, when the donor, Mr. Henry Tate, J.P., and Sir Edward Poynter, P.R.A., met the visitors. We illustrated the Gallery and gave plans in our issue for March 17, 1893. The foundations are carried down about 30ft. below ground-level, and cost alone about £12,000. The style of the building is a Free Classic, handled with reserve and a richness of detail showing study and breadth of treatment. The elevations are symmetrical, and are faced with Portland stone. The chief features of the façade overlooking the Thames at Pimlico is the lofty central portion with a portico of six Corinthian columns with a pediment over. This portion projects some distance beyond the main face of the building, and has a flight of steps up to the entrances, and at the extreme ends of the block are two pavilions, having an order of Corinthian pilasters raised on pedestals and terminating in pediments—between the pilasters are deep niches with an Ionic order of columns and pilasters supporting entablatures with semicircular arches over. The intervening portion of the elevation is a plain ashlar wall, having in the centre of its length another niche flanked with Ionic pilasters with a semicircular arch over. A rusticated basement, 10ft. high, runs entirely round the elevations, supporting a pedestal treatment 6ft. high, from which the various orders of columns and pilasters spring. The length of the front elevation is about 290ft., that of the side, including the projecting central portion, is about 140ft. The projection of the flight of entrance steps is about 40ft. beyond, forming a handsome approach to the main entrance, though the general effect is for the present somewhat spoiled by the erection of a very ugly temporary wall put up by the London County Council, preceding the erection of the new bridge at Vauxhall. The total height of the entrance-portico from ground-level to apex of pediment is about 65ft. 6in. A figure of Britannia on a high Acroteria block surmounts the main pediment, with a lion and unicorn on either side. The entrance-doors lead into a rectangular vestibule 50ft. long and 26ft. wide, which has an Ionic Order 13ft. high running round the sides, with banded rustication between them for wall-surface, all in Portland stone. The ceiling is a plaster barrel vault with panelled stone ribs springing from the Ionic entablature over the coupled columns. The height from the pavement to the crown of the vault is about 25ft. 6in. The vestibule is lighted from the ends by semicircular headed windows with ornamental iron grilles, and with an order of Doric columns at the side, and the effect is exceedingly massive and monumental. From the vestibule is entered a corridor surrounding the central octagonal sculpture hall, which has four entrances and four semicircular niches or recesses for seats or sculpture. A pavement fountain imparts a cool and decorative effect. Above, the architecture is florid, and the whole is surmounted by a glazed dome 76ft. high from the floor. From the corridor or sculpture hall the various picture galleries are entered, and so arranged that there is no necessity to retrace one's steps. Drinking-fountains on each side, located in wall niches, are prettily managed. There are seven picture galleries, three of them being 59ft. long by 32ft. wide, the long gallery is 93ft. long and 32ft. wide, and the square gallery 32ft. by 32ft. The inside of the flanking pavilions are treated as octagons, used as picture galleries. They are roofed by a glass dome with panelled and ornamental plaster ribs and cornices. The galleries are all top-lighted, the ceiling being formed with elliptical panelled plaster ribs and ornamental spandrels, the height from floor to apex of ellipse being 26ft., W. E. Rendle and Co.'s patent glazing being used. The corridor on the ground floor is divided up by piers into squares and ellipses, and has small flat domes over each. At the ends of the corridors are circular staircases, which lead up to the first-floor sculpture gallery and to the picture gallery over the vestibule, which is about the same size. The stairs are white marble. The basement of the building is to be used for picture restoring and cleaning rooms, students' easels, store-rooms, offices, and boiler-house. The floors of central part are in Sicilian marble and marble mosaic, and the galleries have polished oak floors. Dennett and Ingle's fire-proof construction is used for floors; the carving has been carried out under the direction of Mr. Christopher Smith, and Messrs. Drake and Gorham and Mr. Russell are responsible for the electric lighting, and, as before mentioned, Messrs. W. E. Rendle and Co. have done the roof glazing. The builders are Messrs. Higgs and Hill. Mr. Sidney R. J. Smith, F.R.I.B.A., is the architect. The cost has been about £80,000.

We have not left ourselves much space to notice the collection of modern English pictures with which the walls of the galleries are hung. They are derived from four sources: the splendid series of works, about a hundred in number, which Mr. Tate has been purchasing from time to time, and which hitherto have been hung in the owner's house at Streatham, and are now presented with the building to the nation; seventeen pictures by Mr. G. F. Watts, and given by the artist; the canvases purchased by the Chantrey trustees, and hitherto very imperfectly shown at South Kensington; and lastly, a liberal selection from the British works hitherto hung at the National Gallery.

In the Tate collection proper are included about a hundred pictures, among which we noted Leighton's well-known circular canvas, "The Sea giving up her Dead," Millais's "Vale of Rest," "Ophelia," "North-West Passage," "St. Bartholomew's Day," "St. Stephen's," and "Knight Delivering a Lady." There are also Landseer's "Uncle Tom and his Wife for Sale" (two black pug dogs), an early landscape by Old Crome, three works by Orchardson ("Her Mother's Voice," "The First Dance," and "The Quarrel"), Fildes' "Doctor," and examples of Muller, Albert Moore, J. W. Waterlow, A. Gow, Briton Riviere, G. H. Boughton, J. C. Hook, Henry Woods, and others.

Mr. Watts's gift includes "Love and Life," "Love and Death," "Death Crowning Innocence," "Sic Transit," "Hope," "The Man who had great Possessions," and "Jonah."

In the Chantrey Bequest are Watts's "Psyche," Millais' "Speak," Leighton's "Bath of Psyche," Poynter's "Visit to Esculapius," Dicksee's "Harmony," Orchardson's "Napoleon on the Bellerophon," Herkomer's "Charterhouse Chapel," Vicat Cole's "Pool of London," seascapes by Colin Hunter, Brett, and W. L. Wyllie; landscapes by Corbet and Adrian Stokes, Mrs. Merritt's "Love Locked Out," and works by Tuke, Sargent, Walter Hunt, and La Thangue.

The pictures transferred from the National Gallery include small works by Crome, Holland, Creswick, and Wilcock, two examples each of Landseer, Wilkie, Leslie, and E. M. Ward; Cecil Lawson's "August Moon," Frith's "Derby Day," and Rossetti's "Annunciation."

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

THE annual meeting of the Association of Municipal and County Engineers was opened in the Westminster Town Hall on Thursday in last week. Sir A. R. Binnie, C.E., chief engineer to the London County Council, presided, and there were present about one hundred Metropolitan and provincial engineers and surveyors. Sir A. R. Binnie, in his presidential address, having given an historical sketch of the growth, progress, and government of London, dealt with the institution and work of the London County Council. With reference to local government, he was of opinion that there was a great deal of energy wasted in the useless discussion of professional details. Local governing bodies must, of course, discuss the general principles of the work which they intrusted to their officials; but having done so, he thought it would conduce to the general welfare if there were less discussion of details and criticism of uncompleted work. He knew there were many points relating to the housing of the working classes, and the rates of pay and working hours of the labouring classes with which only a deliberate assembly representative of the ratepayers could properly deal; but on purely professional details, he thought there was too much criticism. Mr. W. J. Dibdin, chemist to the London County Council, afterwards read a paper on "The Biological Purification of Sewage," and Mr. Thomas, county surveyor of Buckinghamshire, read a paper on "The Buckinghamshire Road System of the Equalisation of County Roads." In the evening, Sir A. R. Binnie, occupied the chair at the annual dinner held at the Trocadero Restaurant, Piccadilly-circus, W. The company included Mr. J. P. Skinner (Mayor of Eastbourne), Dr. Rentoul, M.P., Mr. Jesse Jacobs (Master of the Carpenters' Company), Dr. Shirley Murphy, Mr. W. A. Blaxland, Mr. F. J. C. May, Mr. C. H. Lowe, Mr. O. C. Robson, Mr. W. Weaver, and Mr. Thomas Cole (secretary). Mr. Bassett Hopkins proposed "The Association of Municipal and County Engineers." The career of the association had, he said, been one of uninterrupted progress. It now numbered something like 800 effective members, who were to be found in every quarter of the globe. It encouraged young men by holding examinations in those departments of study which were most essential to municipal engineers, and its members held periodical meetings for mutual instruction and information. By its operations it had distinctly raised the *status* of the profession. The president, in response, said that at present municipal and Parliamentary institutions were somewhat overburdened by the duties thrown upon them, and he looked in the future to a larger development of municipal life to relieve Parliament of many of those matters with which at the present time it had to deal. Other toasts followed.

The conference was resumed at the Town Hall, Westminster, on Friday, Sir A. R. Binnie presiding. Mr. J. T. Eayrs, C.E., of Birmingham, read a paper on "Brick-paving for Carriageways." He said the question of paving roads with bricks had received very little attention in England, and although this country was justly celebrated for the quality of its bricks, and notwithstanding the fact that such large quantities were used for footpaths, strangely enough it had been left for their American cousins to show what could be done in the way of providing brick pavement for carriage-way traffic. One American State alone produced 500 million paving bricks per annum; another produced 300 million. He had obtained particulars from 52 towns and cities, where no fewer than 410 miles of brick-paved roads had been laid. Having dealt with the composition, size, quality, testing, and laying of brick pavements, Mr. Eayrs said it was claimed that neither granite, asphalte, nor wood could offer so many advantages as vitrified brick as a paving material, and that if properly laid it was as noiseless as any other kind of pavement. The surface was smooth without being slippery. It offered a minimum amount of resistance to the passage of traffic, and inflicted a minimum amount of wear and tear on horses and vehicles. It was practically impervious, and therefore perfectly sanitary; was easily cleansed, and required far less scavenging than any other paving. It could be washed without injury or becoming slippery when wet, was readily taken up and relaid, reasonable in first cost and maintenance, and had a life which compared favourably with other materials, such as wood, asphalte, &c. Mr. L. H. Isaacs, F.R.I.B.A., surveyor to the Board of Works for the Holborn district, read a paper on tramways laid in asphalte carriage-way pavements in the city of Berlin, and Mr. W. Weaver, C.E., Kensington, read a paper on street scavenging. The afternoon was devoted to a visit to the works of Messrs. Doulton and Co., at Lambeth.

On Saturday a visit was made to the works of Messrs. Aveling and Porter, of Rochester, leaving Victoria station by special train to Rochester Bridge. On arrival at Rochester an inspection of the works was made. Afterwards visits were made to the Cathedral and the Castle. The members were then entertained to luncheon, after which a trip on the river was made, returning from Chatham station in the evening.

Lady Brooks laid the foundation-stone of a nurses' home at Ashton-on-Mersey on Saturday, as a permanent memorial of the Queen's Jubilee. A site has been given by Sir William Cunliffe Brooks, and the cost of building and furnishing will be over £2,000.

Colonel A. J. Hepper, an inspector appointed by the Local Government Board, held an inquiry at the town-hall, Dudley, last week, as to the application of the town council to borrow £3,123 for various public improvements, including £1,431 for the provision of night-soil depots, £1,000 for the purchase of land in Stone-street for mortuary, weights and measures offices, &c.; £320 for the improvement of Vicar-street, £182 for works of sewerage and drainage, £120 for additions to the public baths, and £70 for a women's lavatory in Stone-street.

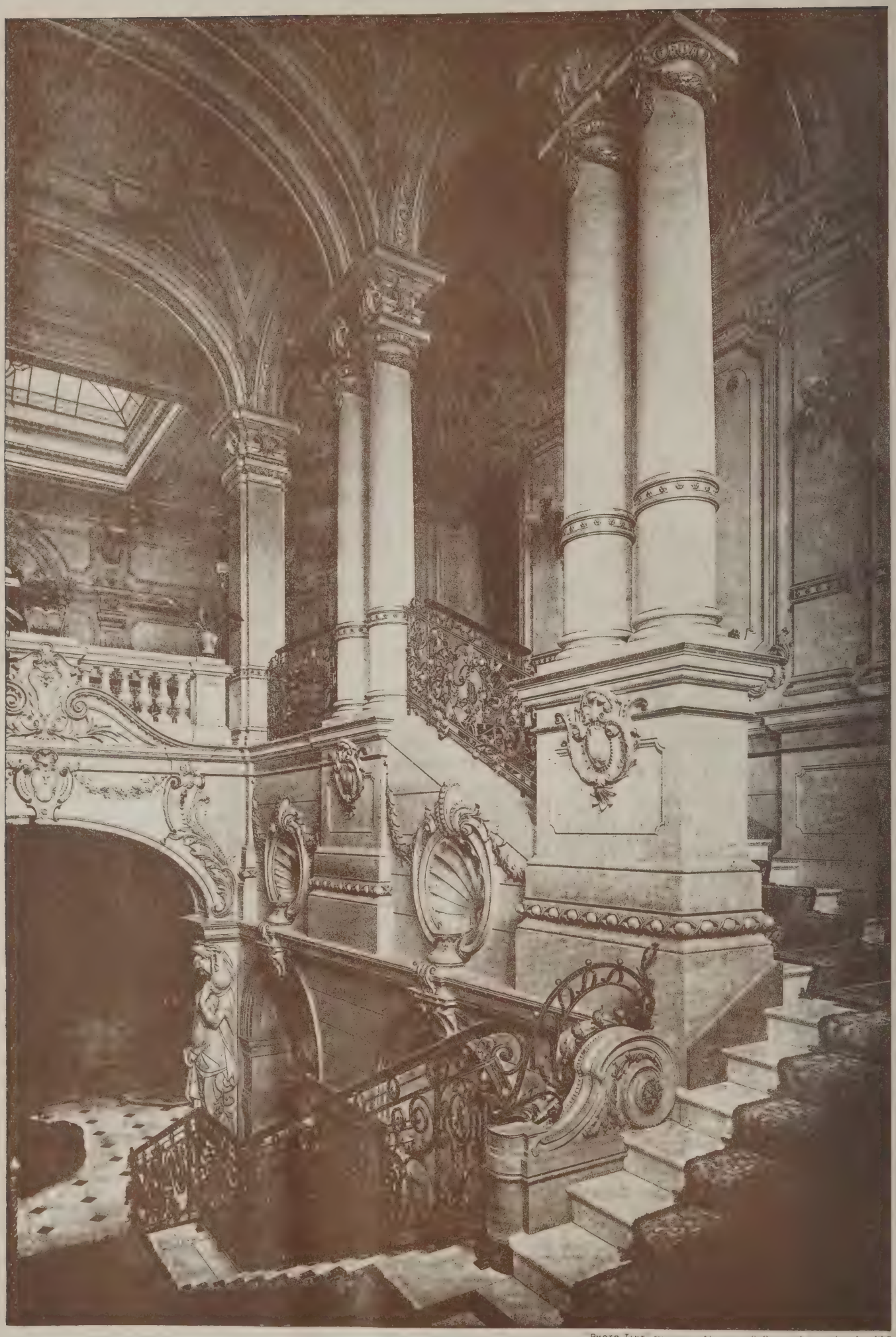


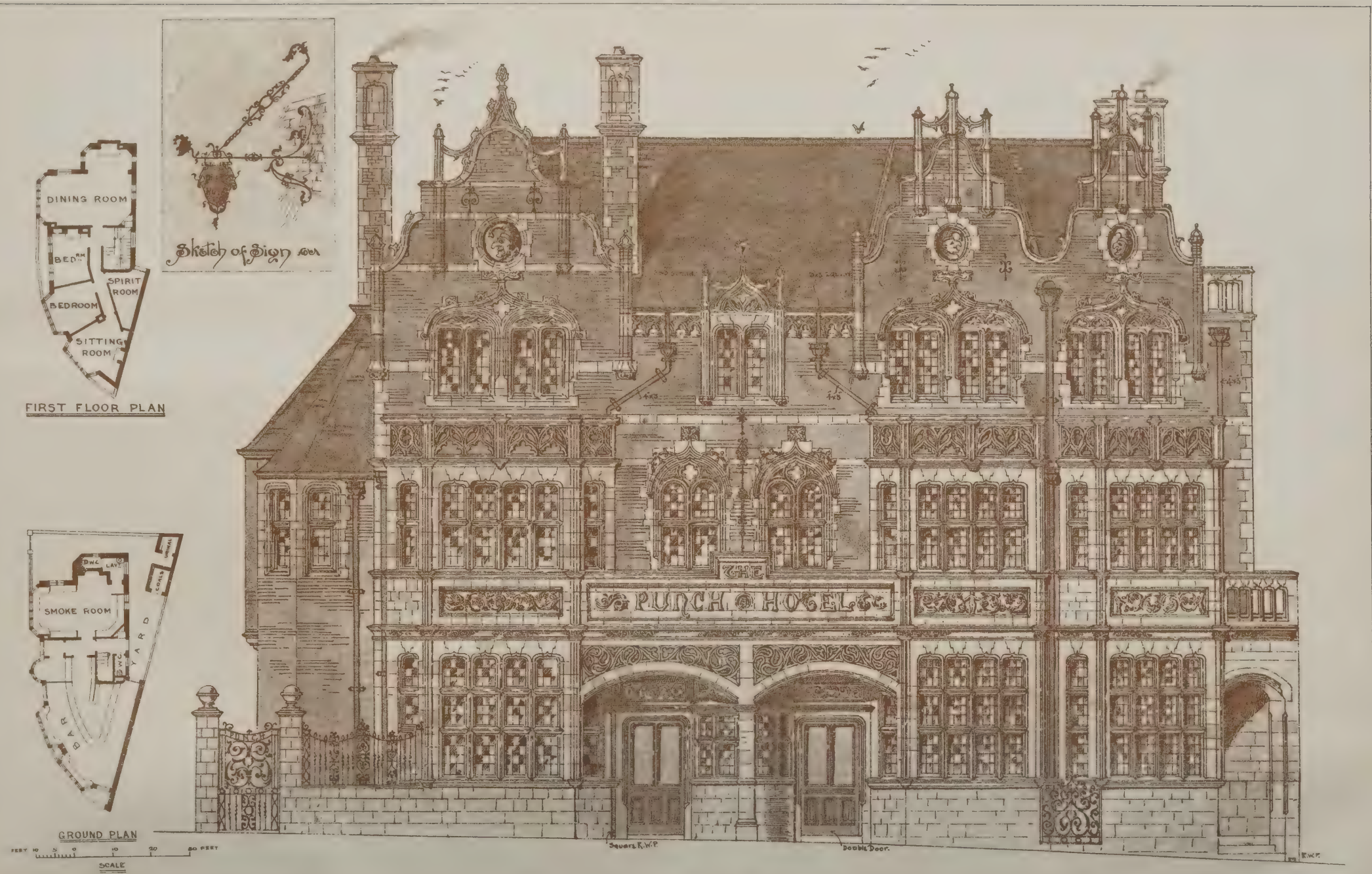
PHOTO TINT by James Akerman 6 Queen Square London W.C.

STAIRCASE IN VILLA DELIUS AIX-LA CHAPELLE. GEORG FRENTZEN ARCHT.

MODIFIED DESIGN WITH DOME

"PHOTO-TINT" by James Akerman 6, Queen Square London W.C.

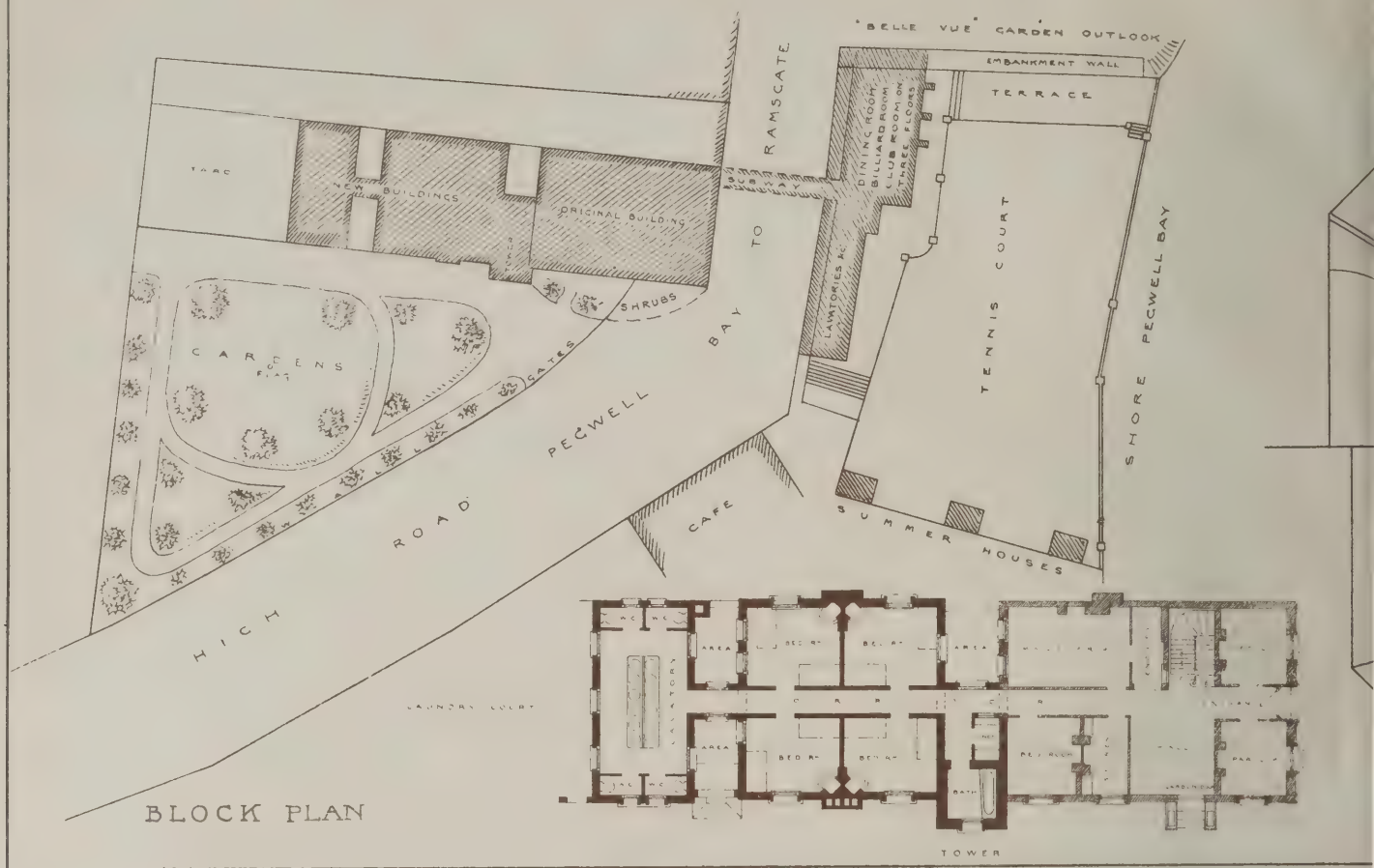
NEW HOUSES OF PARLIAMENT SYDNEY · N.S.W. W.L. VERNON · F.R.I.B.A. GOVERNMENT · ARCHITECT N.S.W.



THE PUNCH HOTEL · HULL · MESSRS. SMITH BRODRICK & LOWTHER ARCHTS.

"PHOTO-TINT" by

NATIONAL SILVER MEDAL DESIGN FOR THE DECORATION OF AN OVERMANTEL BY JOSEPH OGDEN



BLOCK PLAN

PASSMORE EDWARDS' CONVALESCENT HOME

FOR THE WORKING MEN'S CLUB & INSTITUTE UNION,

PEGWELL BAY RAMSGA

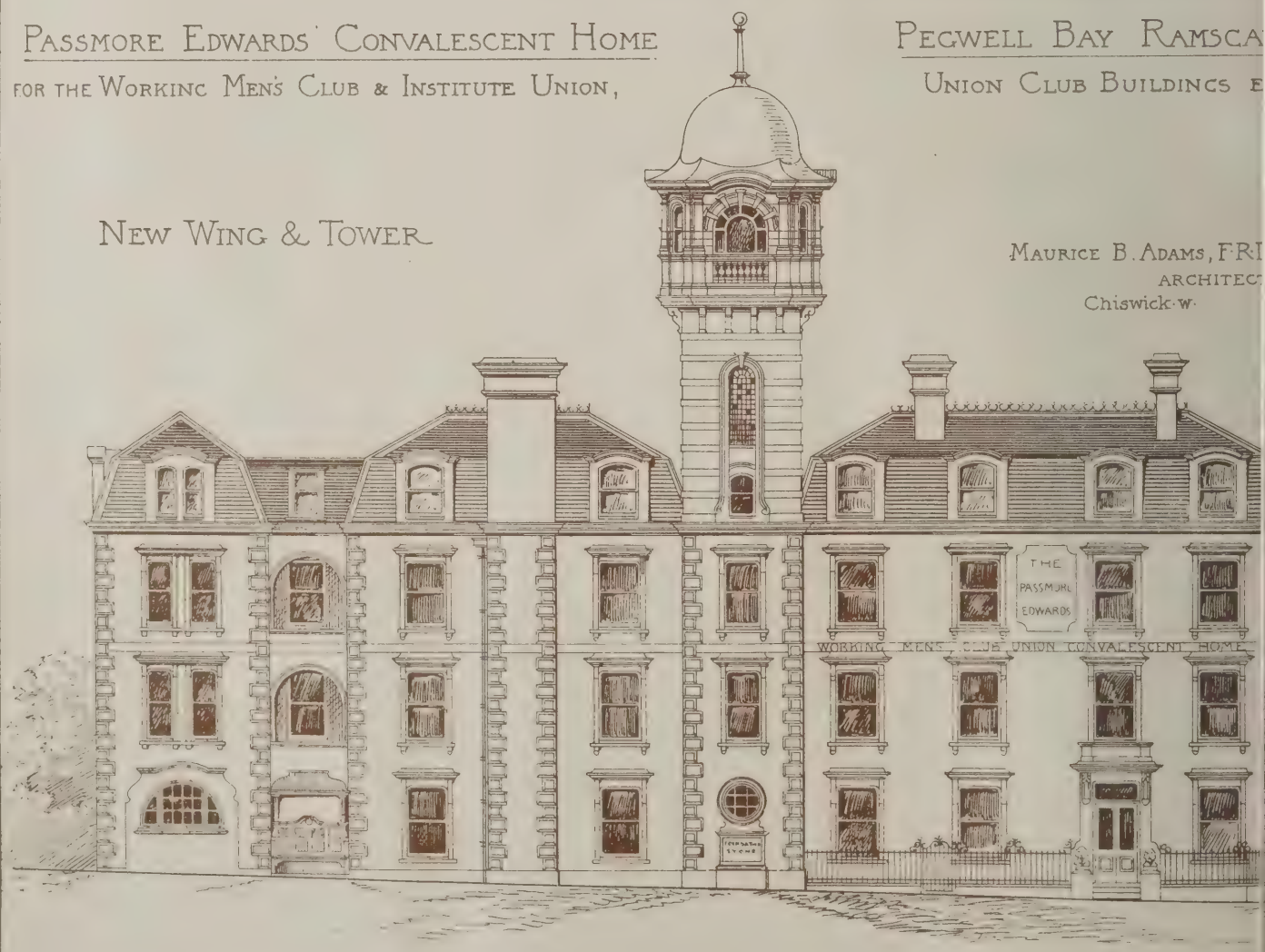
UNION CLUB BUILDINGS E

NEW WING & TOWER

MAURICE B. ADAMS, F.R.I

ARCHITEC

Chiswick·W·



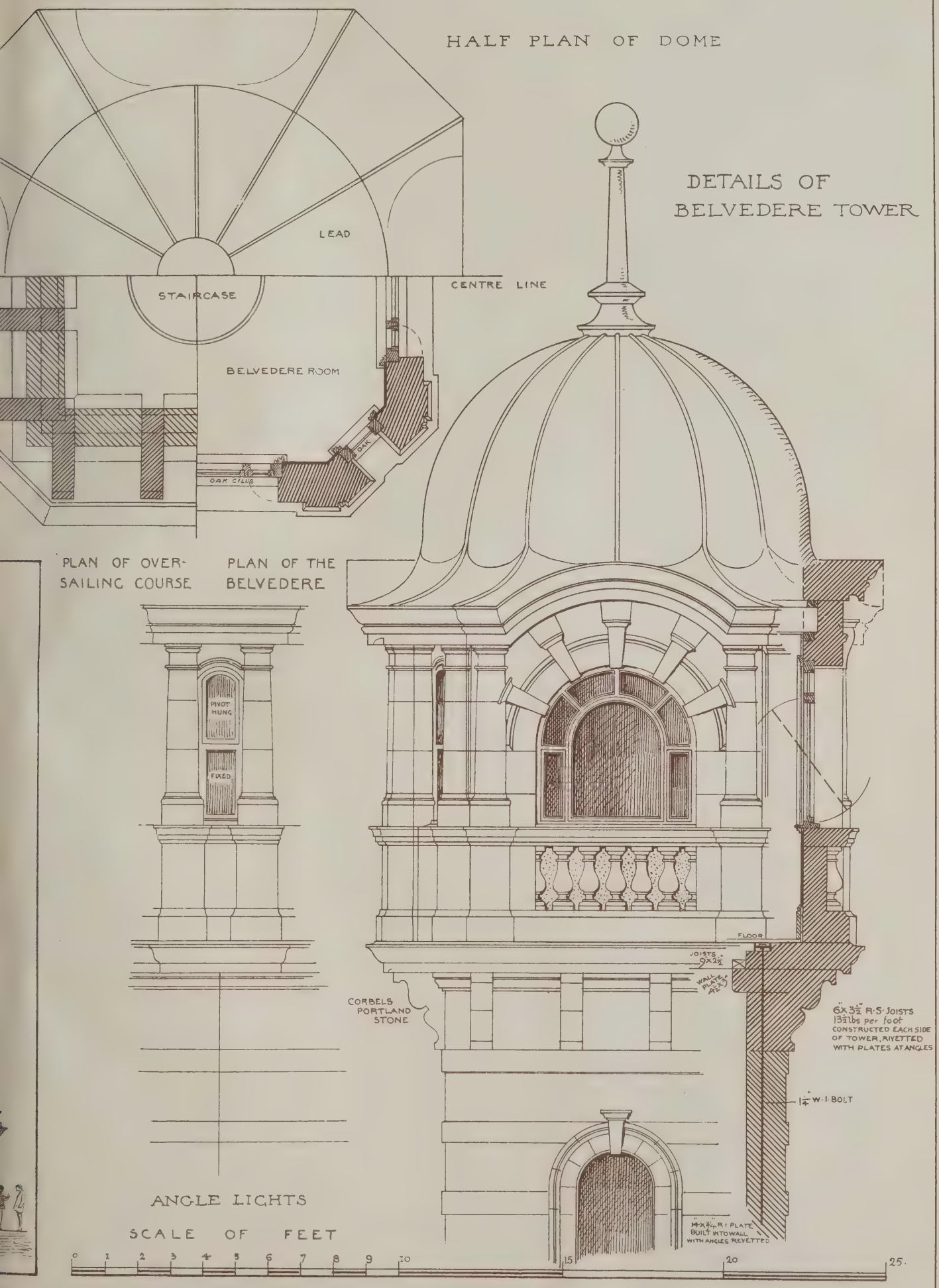
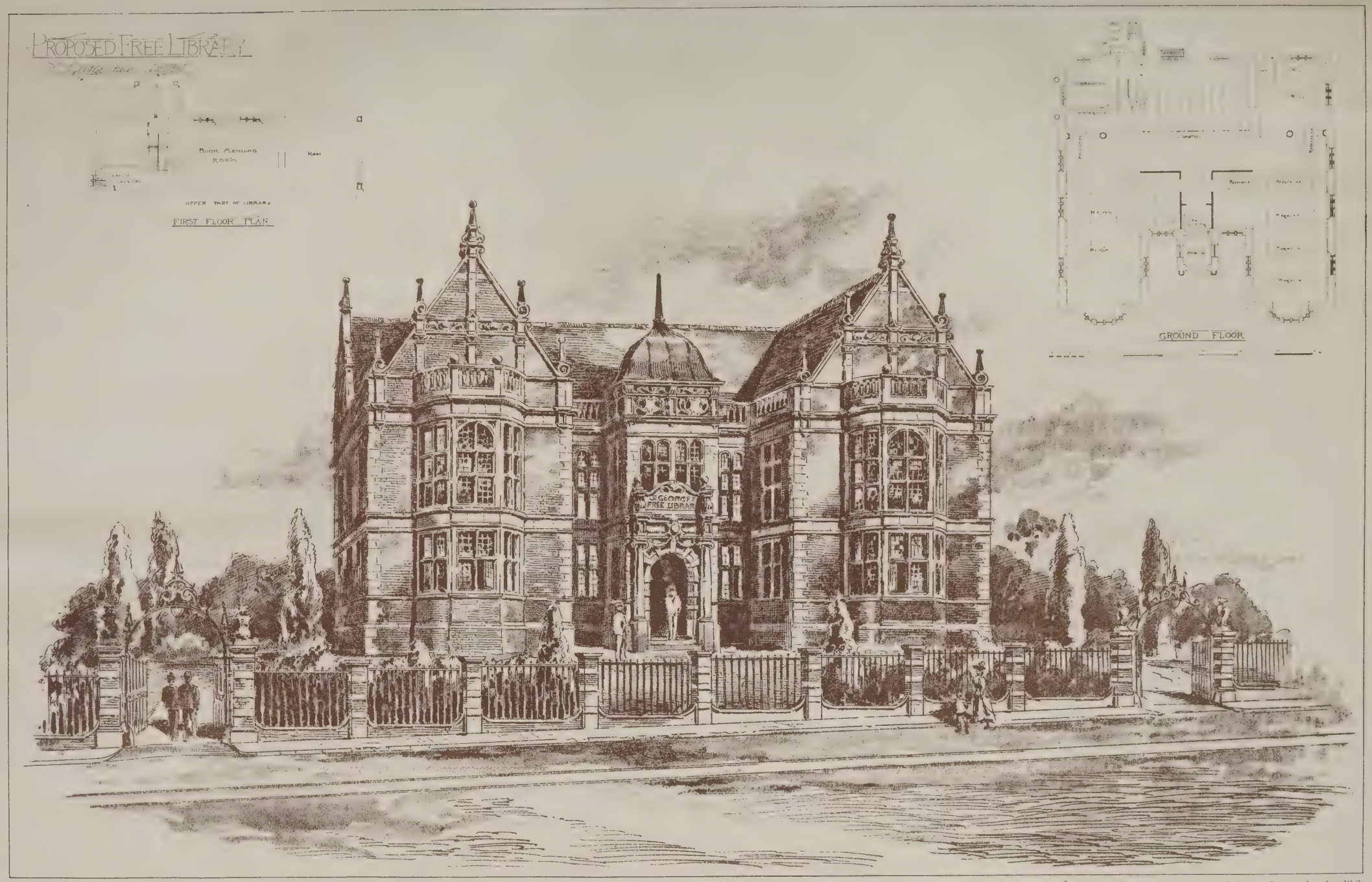


Photo Lithographed & Printed by James Akerman & Queen Square W.C.



"PHOTO-TINT" by James Akerman 6 Queen Square London W.C.

FRANK W. WILLS, ARCHITECT

THOUGHTS AND FANCIES.*

MR. COTTON, whose pleasant little volume entitled "Song and Sentiment" we noticed nearly six years since, and whose "Suggestions in Architectural Design" we reviewed just about this time last year, has published another collection of healthy virile verse, embellished by etchings and sketches of his own of considerable excellence.

Mr. Cotton is catholic in the selection of his themes, and seldom falls back on professional images or associations. He has a decided gift in the condensation into pithy couplets of sentiments well worth remembrance—such, for instance, as the following:—

CLEVERNESS AND STUPIDITY.

The brilliant man is no more worthy praise
Than is the dullard fool deserving blame;
There is no merit and there is no shame
In what depends on birthgift, or the ways
Of freakish fortune, which no skill can tame.

Credit is due, alone, to him who strives—
As his best lights direct him—to improve
His natural endowments, and remove
All baser taints; that his successors' lives
May be upraised into a higher groove.

The volume is nicely printed and produced, and deserves friendly professional recognition.

OBITUARY.

MR. SAMUEL A. WARNER, a well-known architect of New York, died a fortnight ago, in his 75th year. Mr. Warner was born in Geneseo, in the interior of New York State. He received his professional training in New York, in the office of his father, Cyrus L. Warner, and succeeded to his business. For many years he carried on an extensive practice. In the busy time succeeding the War he designed a large number of mercantile buildings, but he had also commissions of other sorts, and several important public buildings in the South, as well as the Reformed Church on Fifth-avenue and Twenty-ninth-street, are from his plans. Although he had acquired a large fortune, it was his pleasure to continue his active practice, which he only resigned last year, on the appearance of serious malady, to his brother and nephew.

THERE died at Dogsthorpe Grange, Peterborough, on Friday morning, Mr. JAMES MCCULLUM CRAIG, who was practically the founder of the great brick industry at Fletton. As a young man, in 1854, deceased went to Peterborough to assist his uncle, Mr. J. B. Craig, in the Scotch trade. He subsequently bought Mr. Foote's business in the Market-place, was very successful, and afterwards opened a brickyard at Fletton. The dry process of brickmaking came in vogue soon after, and knowing the Fletton brick-earth to be invaluable for this method, he bought up land freely, opened other yards, and sold out at prodigiously remunerative figures. He had lately erected much house property in the city, having bought the old Pond estate in Lincoln-road, through which Craig-street perpetuates his name. Mr. Craig died at the comparatively early age of 59.

Mr. George Law, contractor, of Kidderminster, has secured the contract for the construction of the electric tramway from Kidderminster to Stourport, and for the necessary building connected with the undertaking. The amount is about £24,000, and the work is to be completed in a period of seven months, and will, therefore, be vigorously pushed forward.

The opening of a new Primitive Methodist church and schools at Nuneaton, the architect of which was Mr. F. J. Yates, of Birmingham, took place on Friday. The new building is in style Modern Gothic. It will hold 500 worshippers, and the schools will contain 350 to 400 children. The site cost £230, and the contract was for £2,250. Mr. C. Williams, of Tamworth, was the builder.

The plans of Mr. John R. Thomas for the new Hall of Records for New York have been formally adopted, as a result of a favourable report by a board of experts, consisting of Professor W. R. Ware and Messrs. Henry G. Marquand and Montgomery Schuyler, and will be carried out at once. The design of Mr. Thomas was selected a few years since in the abortive competition for the rebuilding of the City Hall of New York, and the present commission for the Hall of Records is awarded him as a kind of consolation prize.

* Thoughts and Fancies. By JOHN COTTON, F.R.I.B.A., author of "Song and Sentiment." London: Simpkin, Marshall, and Co.

COMPETITIONS.

PATRICROFT.—Acting on the recommendation of the building committee, the Barton Board of Guardians decided on Friday on six designs submitted to them for a new workhouse hospital, to be erected at Patricroft. They awarded the first premium, £50, to "Sanitas," Messrs. T. Worthington and Sons, architects, Manchester; the second, £30, to "Red Cross," Messrs. Booth and Chadwick, Manchester; and the third, £20, to Messrs. Maxwell and Tuke, Manchester. The estimated cost of the hospital of the selected design was £22,000, and the others varied from £16,000 to £17,000.

TONBRIDGE.—At the last meeting of the urban district council it was reported that the committee, with Mr. F. W. Hunt, F.R.I.B.A., of London, had gone through the twenty-seven plans sent in for the new Technical Institute and Free Library, and had awarded the first premium to "Art," by Mr. J. H. Phillips, of St. John's Chambers, Cardiff, whose estimate was for £4,074; the second to "Light," by Mr. John Johnson, A.R.I.B.A., of 9, Queen Victoria-street, Mansion House; and the third to "Expert," by Mr. H. A. Cheers, of Twickenham.

WORCESTER.—The city council recently received 22 competitive schemes for the disposal of the sewage of the city, the estimates ranging from £5,000 to £62,000. These schemes were referred to Mr. George Chatterton, M.I.C.E., and pursuant to his advice the premiums referred to in the advertisement have been awarded as follows:—First premium of £125 to the authors of the scheme marked "P," Messrs. Fredk. Beesley and Son, 11, Victoria-street, Westminster; second premium of £75 to the author of scheme marked "X," Mr. R. E. W. Berrington, Lichfield-street, Wolverhampton; and the third premium of £50 to the authors of scheme marked "Y," Messrs. Hinnell and Murphy, Corporation-street, Manchester. Messrs. F. Beesley and Son's scheme provides for conveying the sewage from the Diglis outfall by a siphon under the river to the west side, connecting the St. John's outfall with the same sewer, and thence to a pump-well on the site purchased by the Council at Bromwich, the sewage being pumped by steam-engines, and dealt with chemically by precipitation in tanks, the effluent being filtered through coke-breeze filters, then run over 17 acres of the irrigation ground before its discharge into the river, the sludge being dealt with by sludge presses. The dry-weather flow is taken at 2,000,000 gallons per day, and in wet weather 10,000,000 gallons. The estimated cost of the works is £48,165, and the working expenses £2,210 per annum.

CHIPS.

The Society of Architects will pay a visit to Canterbury on Saturday in next week, the 24th inst., starting from Victoria Station about 11 a.m., when the Dean, Dr. Farrar, an hon. member of the society, has kindly promised to receive the party, and give every facility for a thorough inspection of the cathedral. It is just seven years since the Society last visited this city.

An organ in pitch-pine case was dedicated on Friday at the Baptist chapel, Bampton, Devon. The instrument was built by Messrs. Hardy and Son, of Stockport.

The Sparrow's Nest estate at Lowestoft, consisting of nearly six acres of well-laid-out grounds, adjoining Belle Vue Park, was sold by auction on Wednesday, and bought by the corporation, as an addition to the park, for £7,200.

At St. Andrew's Church, Derby, on Saturday afternoon, a stained-glass window, costing £800, and erected to the memory of the late Rev. Robert Hey, for 16 yars vicar of the parish, was unveiled and dedicated. The general design of the window illustrates "The Benedicite."

A two days' bazaar was held in the picturesque grounds of Witton Hall, Witton-le-Wear, last week, in aid of the restoration fund for the parish church. Plans for the work of restoration and enlargement, at a total cost of about £1,800, have been prepared by Mr. C. Hodgson Fowler, of Durham.

A Local Government Board inquiry was held by Mr. Ducat at Radcliffe on Tuesday and Wednesday respecting an application of the Radcliffe District Council to borrow £13,000 for sewage works. The amount would have been much larger but for a concession granted by the Local Government Board after Colonel Mellor had raised the question in the House of Commons.

Building Intelligence.

KENNINGTON-ROAD, S.E.—The new public baths built at the corner of Kennington and Lambeth roads for the Lambeth vestry were opened on Saturday by the Prince of Wales. The building covers an area of 33,000 square yards, and it has been erected from designs by Mr. A. Hessell Tiltman, and was illustrated in our pages on December 20, 1895. The frontages are of red brick, with a sparing use of Portland stone. The accommodation provided is three swimming baths (with provision for a fourth at an early date), 96 slipper baths, and a public washhouse containing 64 washing compartments. The sizes and areas of the swimming baths are as follows:—First-class men's, 142ft. 6in. by 56ft. 8in.; pond, 132ft. by 40ft.; second-class men's, 98ft. by 42ft.; pond, 90ft. by 30ft.; women's swimming, 60ft. by 40ft.; pond, 56ft. by 25ft. The hall, when arranged for entertainments of any kind, will be entirely shut off from any other portion of the establishment, and will afford seating accommodation on the ground floor for 1,222 persons, and on the gallery floor for another 300. The general contractor was Mr. Walter Wallis, of Balham, with Mr. E. Smith as clerk of works. Messrs. William Edgcumbe Rendle and Co., of 5, Victoria-street, Westminster, makers of the well-known Invincible glazing, supplied all the glazing to the baths. The baths are lighted throughout by electricity.

WANTAGE.—Lady Wantage laid, last week, the foundation-stones of two new buildings which are to be erected at Wantage in connection with St. Mary's Home, raising the number of schools from three to five. One new group of buildings will be erected, under the care of the Sisters, between Ormond-road and Wallingford-street, and will stand in five acres of ground. It will have a frontage of 310ft. and a height of 56ft., and will be a plain substantial brick building relieved with some stonework, and a red-tiled roof. In addition to a chapel at the east end, there will be in the rear a large swimming-bath 70ft. by 30ft., covered in and heated with steam pipes, with dressing-boxes, and a gymnasium close by. The building will also contain a school hall, classrooms, Kindergarten school with offices, students' room, dining-room, guests' room, waiting-rooms, recreation-rooms, drawing-rooms, studios, mistresses' sitting-room, library, chaplain's room, music-practising rooms, dormitories, chapel, and infirmary. There will be room for 112 boarders and 100 day scholars. At St. Michael's, in Tanner-street, the Sisters have decided to add a new wing, which will afford accommodation for 40 more pupil teachers. This new wing will be connected with the present building by a long corridor. Mr. Mowbrey is the architect for both works.

Engineering Notes.

DOVER GOVERNMENT HARBOUR.—An official memorandum issued by the Admiralty on Thursday gives some facts with respect to the progress of the naval works now in course of construction. The document is attached to the Naval Works Bill, which asks for £654,000, the excess of the total estimated expenditure up to the end of next March over the balances of £2,088,900 available from previous Acts. As regards Dover Harbour, a complete survey and plans, prepared by Messrs. Coode, Son, and Matthews, and concurred in by the Civil Engineer-in-Chief of the Admiralty, have been officially considered and approved by a joint committee representing the Admiralty, War Office, and Board of Trade. They provide for an inclosed harbour of 610 acres at low water, and follow in the main the plan of the harbour recommended by the Royal Commission of 1844. The estimate given for this undertaking a year ago was two millions; but it was explained at the time that this reckoning was subject to revision, and it is now estimated that its cost will amount to £3,500,000. The new works at Dover Harbour are being entered upon during the current year, and £200,000 will be spent on them in the course of the year, and the whole undertaking will be finished by 1908.

THE LIGHT RAILWAY COMMISSION.—The following is a full list of applications for Orders

authorising light railways:—England: Bridlington, Beeford, and North Frodingham, East Riding, Yorkshire, 9½ miles, steam; Corporation of London Foreign Cattle Market, Deptford, ¾ mile, animal, steam, or electric; Dartford District, Kent, 24 miles, Derby and Ashbourne, Derby, 12 miles, Dudley and District, Worcester, 8¾ miles, and Goole and Marshland, West Riding, Yorkshire, 14 miles, electric; Kelvedon, Tiptree, and Tollesbury, Essex, 10 miles, Lastingham and Sinnington, North Riding, Yorkshire, 3½ miles, Leek, Caldon, Low, and Hartington, Staffordshire, 17¼ miles, Lincolnshire and Northamptonshire (Lincolnshire and Northants), 9 miles, Lizard, Cornwall, 11¼ miles, and North Holderness, East Riding, Yorkshire, 12½ miles, steam; Norwich and District (No. 2), Norfolk, 6 miles, electric; Pewsey and Salisbury, Wiltshire, 20¾, and Rea Valley, Salop, 8¾ miles, steam; St. George and Hanham, Gloucestershire, 1½ mile, Taunton, Somerset, 2 miles, and Torquay and Paignton, Devon, 4 miles, electric; West Manchester, Lancashire, 5¼ miles, steam or electric. Wales: Llandudno and Colwyn Bay, 8¼ miles, electric; Llanfyllin and Llangynog, 10½ miles, Tanat Valley, Montgomery, Denbigh, and Salop, 15 miles, and Welshpool and Llanfair, 9¼ miles, steam. Scotland: Dunfermline and Kincardine, Fife, 10¾ miles, Echt (extension), Aberdeen, 3¼ miles, Fraserburgh and St. Comb's, Aberdeen, 4½ miles, Gifford and Garvald, Haddington, 13 miles, and Loch Fyne, Argyll, and Dumbarton, 18¾ miles, steam. Of these 28 projected lines, Dartford District, Norwich and District, Llandudno and Colwyn Bay, and Gifford and Garvald are applying again, and the Echt proposal is an extension of a light railway already granted.

THE PANAMA CANAL.—The British Consular officers at Panama and Santa Martha describe in their last reports the present condition of the work on the canal across the isthmus. The New Canal Company, formed in Paris in 1894 to continue and complete a ten-lock canal rising to a maximum altitude of 133ft. 8in. in place of the original sea-level scheme of M. de Lesseps, has made good progress with the small capital at its disposal, and the reduced canal trough, or cunette, in the Emperador and Culebra sections is now assuming definite proportions. Although the end in view was the final completion of the canal, it could hardly have been supposed that this great undertaking could have terminated and the canal opened for maritime traffic with only 2½ million sterling, of which only about half was to be spent on the canal proper. The work is of a purely experimental character in order to demonstrate that a lock canal is feasible. It consists of a watercourse 98½ft. wide at the surface, with 49ft. depth of bed. About 60 millions sterling have been raised since the inception of the scheme 16 years ago for the purpose of the canal, and have been spent in one way or another.

CHIPS.

At the Provincial Grand Lodge of Mark Master Masons, held at Norwich on Tuesday last, Bro. J. W. Start, of St. Nicholas Lodge, Harwich, was unanimously elected provincial grand treasurer for East Anglia.

The report for June of the Labour Department states that on the whole there has been some falling-off in the state of employment during the past month, almost all the principal branches of industry being more or less affected by the decline. Employment, however, remains better than a year ago. Employment in the building trades, though still good, was scarcely so brisk at the end of the month, when the percentage of unemployed in unions making returns was 1·5, compared with 0·8 in May. The percentage for June, 1896, was also 1·5.

The memorial of the late Archbishop Benson in Canterbury Cathedral is to take the form of a canopied tomb beneath the north-west tower, close to the site of the place of burial.

The Prince of Wales has presented the drawing entitled "Summer Slumbers," by the late Lord Leighton, exhibited last winter among his works at Burlington House, to the collection of sketches which has been secured for the nation and is now being hung on the walls of the late President's house.

The West Mersea School Board have instructed Mr. J. W. Start, F.S.I., architect, of Colchester and Harwich, to prepare plans for a mixed school for 300 children, with central hall, and to utilise the present buildings as far as possible for cloakrooms, heating-chamber, &c.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and Sixpence for every eight words after. *All Situation Advertisements must be prepaid.*

NOTICE.

Bound copies of Vol. LXXI. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LIV., LVIII., LIX., LX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

*** IN response to complaints from readers that they are unable to get the BUILDING NEWS at Messrs. W. H. Smith and Son's bookstalls, we can only suggest that they should order the paper of some other newsagent. Messrs. W. H. Smith and Son recently requested us to allow them an extra discount beyond that allowed to the general trade, and because we declined they have ceased to send the paper out to their bookstalls. We have, of course, no remedy; but we do not think the demand was a fair one.

RECEIVED.—B. A. B.—H. D.—R. B.—Y. C. L. G.—W. J. M. and Co.—T. R. N. W.

Correspondence.

PROCEDURE AT THE R.I.B.A.

To the Editor of the BUILDING NEWS.

SIR,—The meeting at 9, Conduit-street yesterday evening was pre-eminently a characteristic one—redolent of the early days of the present Council (some time ago now)—and worthy of its traditional treatment of Associates. The Council and its followers came with the fixed determination, evident in every feature, to preserve to the bitter end an unruffled front. The *third* chairman of this one-subject discussion certainly gave little opportunity for a fair and square fight, and two or three of the old and well-tried sticklers for soft phrases and buttered adjectives turned up, after a somewhat prolonged and regrettable absence from the meeting-room, to give him the benefit of their ancient experience in quelling turbulent spirits.

The case which I wish now to place before the profession is this: The Council brought forward certain resolutions with reference to the election of Fellows. A question arose as to whether Associates could vote on those resolutions, having regard to clause 28 of the Charter. The chairman, at the meeting of June 14 (p. 393 *Journal* R.I.B.A.), after reminding Associates of clause 28, ruled as follows, that "if, however, when the report was put as a whole, they (the Associates) objected to any part of it, Associates could then exercise their right of voting against its adoption." The *Journal*, p. 394, states as follows:—"The motion for the adoption of the report, as modified, was then put, and carried by a majority of nineteen, forty-four voting in favour and twenty-five against." By-law 62 states, *inter alia*, as follows with reference to a resolution affecting a by-law:—"If the same be supported by a majority of at least *two-thirds* of those present having a right to vote and voting thereon."

Now, Sir, I contend that the ruling of the chairman gave Associates the right to vote on the report, and they voted, the result being that the *two-thirds* majority required by by-law 62 was not obtained—forty-six votes were required, and only forty-four secured. It can surely never be contended that when the chairman gave his ruling he was trifling with the Associates, and proclaiming peace when there was no peace! Then the alternative is that the whole proceeding is null and void, and must be, to become operative, gone through entirely again. It is this, of course, which the dear old Council cannot contemplate with equanimity; it is this which threatened to moisten the starch of the unruffled front; and it is this which we Associates should do our best to put right. Personally, I have no objection to placing in the hands of the council the election of Fellows as they desire. I have, as I stated in the room, confidence in their integrity in that respect; but I protest strongly against this transparent desire to shuffle through a mistaken procedure.

Clause 33 of the Charter terminates as follows:—"Provided always that no such by-laws (this includes alteration of by-laws) shall be of any force or validity whatever unless and until they have been approved by the Lords of the Most Honourable Privy Council."

What we have to do, therefore, is to bring formally before the Privy Council the facts of the case, and to ask that the request of the Council to add to the by-laws as they desire be not complied with.—I am, &c. W. WOODWARD.

13, Southampton-street, Strand, July 13.

RHOS-ON-SEA BUILDING ESTATE COMPETITION.

SIR,—Plans for the above competition were sent in on the 10th of January last, over six months ago. I have heard nothing as to the result. Can any reader give any information?—I am, &c.,

July 12. J. L. S.

THE LATE MR. J. J. COLE.

SIR,—My attention has been called to your notice of my father in your issue of May 14. May I ask you to state that he did not design the Equitable Society's Offices in the Poultry, but those of the Gresham Life Assurance Society, which adjoin the former building?

His chief work, which is little seen by the public, was the large hall forming the New Stock Exchange, erected in 1885, which is worthy of note for its massive piers of polished granite, stone arches, and iron dome, the lantern of which is 100ft. from the floor.

My father was much interested in antiquities; but was not a member of the Society of Antiquaries.—I am, &c.,

R. LANGTON COLE.

23, Throgmorton-street, E.C., July 9.

At Tuesday's meeting of the London County Council a recommendation by the Highways Committee for the substitution of the electric light for gas on the Victoria Embankment and Westminster and Waterloo Bridges, at an estimated capital outlay of £22,000, was agreed to after a long discussion.

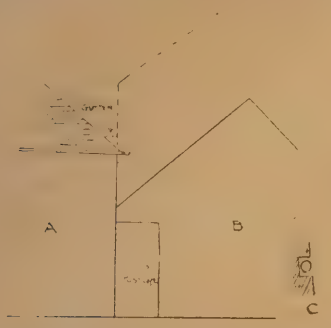
A tall decorative electric lamp which Mr. M'Ewan has erected in the open space outside the M'Ewan Hall, Edinburgh, and presented to the city, has just been completed. It has been designed by Dr. Rowand Anderson, and rises to a height of 45ft. from the ground. The base, which is triangular in form, consists of three grey granite steps, and the column tapers upwards by graduated stages, all richly decorated, to the lantern, which is of metal work, 12ft. high, and contains six Jandus lamps of 800c.p. each. The central stage of the structure, which, with the exception of the steps, is of Portland stone, contains three pieces of sculpture representing respectively the city arms, Mr. M'Ewan's coat of arms, and Jove holding aloft the lightning, with figures on either side of Darkness flying away and Light breaking. On the stage immediately below the lantern there is a frieze of dancing cherubs.

Intercommunication.

QUESTIONS.

[11702.]—**Drainage.**—A pair of semi-detached villas are being erected where there are two systems of drainage, the rain-water pipes being kept separate and distinct from the soil drains, and not connected in any way. Should the down-pipes discharge over gullies, or should they be connected to drain with an easy obtuse bend, and have one disconnecting trap before entering into rain-water sewer in road?—PROUD SALOPIAN.

[11703.]—**Eaves of Adjoining Building.**—It is proposed to raise building B to dotted lines. In order to do this, eaves of A would have to be cut away and a gutter formed. Would owners of B have a legal right to do this, and, if so, must a proper notice be served on owners of A? The wall is not a party one. Would not the projecting eaves of A, as shown, be an encroachment



on B. A was built after B, and the rain-water pipes from the eaves gutter is let into a chase in the wall (see C), thus indicating that the owners of A anticipate that B might at some time be remodelled and raised, consequently pipe is chased, so that it should not project into any room which might take the place of the present passage.—EAVES.

[11704.]—**Cement for Rottenstone.**—Could any reader give a recipe for cementing rottenstone or Fuller's earth into a concrete form?—P. WILLIAMS.

[11705.]—**Moulding Sawdust.**—Is there any stuff which, added to sawdust, makes the latter plastic, so as to run into a mould, and yet of such a nature that it gives off no disagreeable smell, or gives a disagreeable taste, or has any ill-effects on liquids?—A. BOSWORTH.

[11706.]—**Levelling Instruments.**—What is the best way to affix new papers on levelling staff to avoid any marked error in the shrinking or expansion of papers when mounting? Also, what is the proper method to test and adjust a surveyor's level?—B. E. J.

[11707.]—**Everest Theodolite.**—What is the general method of taking altitudes with this instrument? After setting-up and levelling the horizontal limb, should the telescope then be raised to make the horizontal wire cut the required point of which the altitude is to be taken, and now bringing the index-level bubble to the centre of its run, or should the index level be manipulated before making the observation? I have tried the latter method, and find that after raising the telescope the bubble has always moved a little with the telescope, and requires readjustment. Should this be so?—D. M. Y. R.

REPLIES.

[11676.]—**Architect's Responsibility.**—The contractors can claim their contract money if the property is sold, if there is a properly drawn-up contract, when a clause is generally inserted providing against such a contingency. In case of the bankruptcy of employer, his obligations under the contract will fall on his assignee or trustee, and the contractor can claim for any balance against the estate. I should advise "Pro et Con." to consult a solicitor, as the contract will determine the question of liability.—G.

[11701.]—**Floor Construction.**—The most substantial and economical construction for floors of the kind described by "Devonian" would be rolled steel girders every 3ft. or so apart, and joists supporting concrete arches or slabs of the Granolithic Company's material, or the Dennett system. The Expanded Metal Co.'s system has many good features, as the arches of concrete are strengthened by expanded-metal meshes, which are inserted in the concrete. The Roebling floor system is also a good one. Small concrete arches turned between I rolled iron or steel joists are used; the arches are turned on bands of wire netting stiffened by ½in. iron rods every 2ft. apart. A wire netting is fixed below flanges for the plaster ceiling. (See articles appearing in this journal on "Arches in Concrete.") The concrete used had better be left to the manufacturers of the floor system, who have by experience found out the proper aggregate and matrix to be used to give the best result.—C. C. C.

[11683.]—**Elliptical Arches.**—I send the following in answer to "J. W. S.'s" further inquiry for a geometrical construction of an ellipse, having given both height and width. It was given me a few years ago at a brickwork and masonry class, but I have never had occasion to use it:—A B = span of arch, A C = C B; C D = rise, D E = ⅔ of D C; and A F = D E. Join F E and bisect it at right angles by G H, which cuts D C produced in H. Join H F and produce to K. Then H is the centre for arc D K with radius H D, and F is centre for arc A K with radius F A. The other half is similar.—W. F.

The remarkable and unique collection of flint implements brought from Egypt by Mr. Seton-Karr has been purchased by the Liverpool Museum. Dr. Forbes has undertaken to describe the collection, and figure many of the specimens.

LEGAL INTELLIGENCE.

CARDIFF BUILDERS AT VARIANCE.—UPHAM V. BURGESS AND SAUNDERS.—In this case, tried at the Cardiff County-court last week, £20 was claimed by plaintiff, a Cardiff builder, against defendant, Burgess, another Cardiff builder, as damages for the construction by defendant of the water pipes of an adjoining house to plaintiff's in Pentrebane-street, so that it discharged water into plaintiff's down pipe and on to plaintiff's land, and an injunction was claimed against Saunders, the present owner and occupier of the house. Plaintiff's counsel, in opening, admitted that since the action had been taken, the chief nuisance alleged—a pipe which discharged water on plaintiff's front garden—had been removed. The plaintiff gave evidence, but it appeared, in cross-examination, that no water was now discharged on the garden, but defendant still had his pipe connected with his (plaintiff's) down pipe. He had had an action against defendant already for the value of the pipe-end, and had been awarded £33. His Honour, after viewing plans and photographs, gave judgment for plaintiff for one farthing damages, without costs, and refused to grant an injunction.

MAKING-UP PRIVATE ROADS — ARBITRATION APPEAL.—In the Chancery Division on Friday, Mr. Justice Kekewich had before him the case of the "Urban District Council of Handsworth v. Derrington," which was an action to recover from the defendant, as owner of certain houses in Putney-road, his proportion of the cost of making, paving, and sewering the road. Defendant declining to comply with the usual notice to do the work, it was tendered for, and, upon its completion, the apportionment was referred to arbitration, with the result that in October, 1896, the arbitrator's award apportioned to Mr. Derrington £158 11s. 8d. as the sum for which he was liable. This was £2 less than the sum allotted by the surveyor. The points raised were three in number. The first and most important, counsel stated, was whether Putney-road was sewered already. It was perfectly true that the road contained one or more sewers in one sense, a drain made by the owners of certain houses serving more than one house, and being connected with sewers running down other roads in Handsworth. As a whole, the street was unquestionably not sewered; and it was submitted on plaintiffs' behalf that the mere existence of drains in the street did not bring them within the definition of a sewered street within the meaning of the Act. This was obviously so, because these sewers were made by the owners of particular houses. They were not available for other houses in the street, and still less were they available for houses to be built on parts of the street not built upon. Plaintiffs' second point was that even if the existence of these sewers did constitute the sewering of the street as a whole, it must be shown by the defendant that the street was sewered to the satisfaction of the local authority, in order to prevent the Act from coming into operation. The third point was a technical objection raised by the defence to the effect that at the point where Stamford-road crossed Putney-road there was no adjoining owner, and therefore the local board had included too much in that which they had charged the frontagers. Plaintiffs' answer to this was that it was too late to take such an objection now. Any objection which went to show that the local board were trying to throw too much on the frontagers could only be dealt with by appeal to the Local Government Board. At the conclusion of the arguments, his lordship gave judgment for the plaintiffs for the amount claimed, with 4 per cent. interest, holding that they had acted entirely within their rights.

ARCHITECT'S CLAIM FOR DILAPIDATIONS AT BIRKDALE.—At Southport County Court on Tuesday, before Judge Collier and a jury, Stewart Speddy, architect and property owner, Southport, sued John Davie, sack merchant, Oxton and Liverpool, for £50, reduced from £80, for dilapidations at Temple House, No. 18, Trafalgar-road, Birkdale, let by plaintiff's agent to defendant for three years from July, 1893, at £90 per annum. Plaintiff said "a pig would leave its stye in a cleaner condition than this house was left." For the defence, counsel commented on the facts that the case took nine months for its incubation, and that originally £45 rent in lieu of notice was alone claimed; but this was afterwards abandoned when it was found that due notice had been given. He tendered expert and other evidence to show that the house was left in a proper state of repair, but it had since remained open to the public. Two items of damage only had been admitted, and 20s. paid into court. Defendant swore that he spent over £60 in repairs during his tenancy. In his reply, plaintiff's counsel said there had been no real delay in bringing the action. His Honour, in summing up, quoted this sentence from plaintiff's evidence: "When I found I could not get another six months' rent I thought I would go in for the dilapidations," and said the solicitor's letter demanding £80 was very peremptory. As to the suggestion by the defence that tramps had damaged the house, one witness for the defence went so far as to say the house was in the same condition when defendant left it as it was now.—After twenty minutes' deliberation the jury found for the plaintiff for £25, including the £1 paid into court. Judgment was given accordingly, with costs.

STAINED GLASS.

MOSELEY.—A large stained-glass window, commemorative of her Majesty's sixty years' reign, is about to be placed in St. Agnes's Church, Moseley; and from the various competitive designs submitted, the award has been gained by Messrs. A. Ballantine and Gardener, of Edinburgh. The proposed window is ranged in five lofty Gothic lights with tracery. The central figure is that of our Lord, seated in majesty. The archangels St. Michael and St. Gabriel are on either side. Angels hover in concentrating groups. Biblical figures in attitudes of adoration occupy the three central lights, while the lights adjoining these, right and left, contain figures of the Blessed Virgin Mary and St. Agnes; also Abbess Hilda, King Alfred, and Queen Margaret, saints in the Royal line, and other saints as typifying the progress of religion, literature, arts, and science. In a rich mosaic band, dividing the figures from a Royal heraldic base, will be inscribed, "There are differences of administration, but the same Lord."

CHIPS.

The sanction of the Local Government Board was obtained on Saturday by the Northwich Rural District Council to borrowing £1,659, which, with nearly £2,400 raised by the Runcorn Urban District Council, will be expended upon the road between Runcorn and Barnton. The highway is now in a deplorable state, and is regarded by cyclists as the worst in Cheshire.

Mr. G. B. Benmore died on Saturday at Budleigh Lodge, Exmouth, at the age of 73. An Exmouthian by birth, he spent a number of years in Wales as architect, and later returned to pursue his profession at Exmouth. He was an active member of the old local board, and also represented the district on the Devonshire County Council. He had been in failing health for some months.

Additions are being made to the infirmary at Peterborough, and special consideration has been given to the ventilation, which will be carried out on the Boyle system.

Mr. James Neish, Stud.Inst.C.E., of Dundee, who was a pupil and latterly an assistant with Mr. D. Balfour, M.Inst.C.E., of Newcastle, has been appointed surveyor to the Pocklington Rural District Council, East Riding.

The annual exhibition of drawings, needlework, designing in paper and colour, modelling in clay and cardboard, woodwork, cookery, laundrywork, and kindergarten, executed in the various schools of the School Board for London, will be held at the Hugh Myddelton School, St. James's-walk, Clerkenwell Green, from (to-day) Friday to Wednesday next (Sunday excluded), from 12 noon to 8.30 p.m. The exhibition will be opened to-day by the Marquis of Londonderry (chairman of the board).

A Local Government Board inquiry was held in the Mayoress's Parlour, Coventry, on Thursday in last week, by Colonel Albert J. Hepper, D.S.O., R.E., into the application of the city council to borrow £5,416 for the purpose of the construction of a new street from Coventry to Earlsdon. The city surveyor (Mr. J. E. Swindlehurst) and the town clerk (Mr. L. Beard) explained the proposals.

At a meeting of the Hartley Council, held at Southampton last week, it was unanimously decided to provide additional classroom and sanitary accommodation at the Hartley Institution in that town at an estimated cost of £2,500.

The Bill promoted by the London County Council for powers to construct a subway under the river Thames from Greenwich to Millwall came on Monday as an unopposed Bill before Lord Morley's Committee of the House of Lords. The preamble having been formally proved, the committee passed the Bill as already sanctioned by the House of Commons. The subway will be constructed for foot passengers only. It will begin near Brewhouse-lane, Greenwich, and terminate near the western boundary of the Island Gardens, Poplar.

With the assistance of their electrical engineer, Mr. Thomas L. Müller, the Bootle Watch Committee have drafted a scheme for providing the borough with electricity, and they recommend the town council to apply to the Local Government Board for sanction to borrow £35,000 to cover the estimated cost.

The Bill to abandon the undertaking of the London, Walthamstow, and Epping Forest Railway Company has been withdrawn, the lenders of the amount required for the Parliamentary deposit (who caused the Bill to be presented) having been repaid.

PARLIAMENTARY NOTES.

LONDON COUNTY COUNCIL IMPROVEMENTS.—A Select Committee of the House of Lords began on Monday the consideration of the London County Council (Improvements) Bill. Mr. Freeman, in opening, said this was a Bill to empower the carrying out of three distinct improvements—(1) the construction of an approach to the Tower Bridge on the north similar to that on the south side, which is now being carried out—this portion of the bill was now unopposed; (2) the widening of the Tottenham Court-road at the Oxford-street end at Bozier's-court; and (3) the widening of the Strand by the removal of the block of buildings between the two churches of St. Mary-le-Strand and St. Clement Danes.—Mr. Andrew Young, valuer to the London County Council, gave formal evidence as to the Bozier's-court improvement. In his opinion, the Oxford Music-hall was a proper subject for the improvement charge. The removal of the block of buildings would give further advertisement to the hall by enabling the entrance to be seen from the Oxford-street crossing. Evidence was given as to the improvement which the sweeping away of these buildings would be to the Oxford, and rebutting evidence was given on behalf of the Oxford (Limited).—The Chairman announced that the committee were of opinion that the Oxford Music Hall should be included in the improvement area. The committee also decided that Mr. Schmarr, photographer, Tottenham Court-road, must go to arbitration under the general Act. The petition was then proceeded with of Mr. Roberts, the owner of some of the condemned property in the Strand, who contended that he would be hampered in dealing with his property until the County Council actually took it, and who, therefore, sought special compensation. After legal argument the committee decided that this case, too, would be covered by the general law. The preamble was then declared proved, and the clauses were adjusted.

LONDON COUNTY COUNCIL (GENERAL POWERS) BILL.—The same committee then proceeded to consider this Bill. Mr. Pope explained that the object of the Bill was to widen Long-lane, Borough, eastward from St. George's Church to Crosby-row, by taking property on the south side of the thoroughfare, and at the same time to construct a spur-street running from High-street, Borough, on the north side of St. George's Church, to Long-lane. Dr. Burke, who occupied a house which was involved in the scheme, held that the Bill did not provide him with sufficient compensation. The committee eventually decided against Dr. Burke, and, formal evidence as to the remaining provisions of the Bill having been adduced, the preamble of the Bill was found proved.

PROJECTED IRISH RAILWAYS.—Mr. Gerald Balfour made a general statement on Monday night respecting the application of moneys under the Railways (Ireland) Act, 1896. A narrow-gauge railway from Buncrana to Carndonagh, Co. Donegal, a distance of 18½ miles, had, he explained, been certified for by the Lord Lieutenant, reported on by the Board of Works, and approved of by the grand jury of the county, who had presented for a sum of £5,000 in aid thereof. Arrangements had been made for its future working and maintenance, free of cost to the county, by the Londonderry and Lough Swilly Railway Company, who were to equip the line fully with rolling stock at a cost of not less than £10,000. This railway would serve the greater portion of the peninsula of Inishowen, and would develop the fish and shirt industries in the district and the trade in bog ore and kelp. At the ensuing summer assizes for county Donegal it was intended to submit to the grand jury for their approval proposals for the construction of a railway from Letterkenny through the most congested districts of North-West Donegal to the districts known as "The Rosses." The length of the railway would be 50 miles, and the Londonderry and Lough Swilly Railway had undertaken to work and maintain the line when made free of expense to the county.

The new English Presbyterian Church, St. Columba's, Smithdown Gate, Sefton Park, Liverpool, was dedicated on Friday evening. The church will accommodate about 600 persons on the ground floor, and 100 in the gallery. The building is lighted throughout by electricity. The architects are Messrs. Woolfal and Eccles, of Liverpool, the contractors being Messrs. Morrison and Son, of Wavertree.

On Saturday a special service was held at the church of St. Andrew, Derby, at which the stained-glass west window (a memorial of the ministry of Robert Hey, vicar 1878-94) was unveiled. The window, which is the work of Mr. F. Holt, of Warwick, represents the Benedicite. The artist has treated the subject allegorically, the twelve angels in the two side lights symbolising "The Winds of God," "Showers and Dew," "Green Things upon the Earth," "Fire and Heat," "Light and Darkness," &c.

WATER SUPPLY AND SANITARY MATTERS.

LEEDS.—For some years past the city council have, says the *Leeds Mercury*, been aware that the sewage of the city was not effectively treated at the works of Knostrop. They have also been cognisant of the fact that a considerable volume of water, laden with impurities, has been poured into the already-polluted river Aire. Within the last three years the West Riding Rivers Board have frequently urged that this state of things ought not to allowed to continue in a large and enterprising city like Leeds. As their early appeals produced no result, their later representations have partaken somewhat of the character of mild threats, and the corporation, knowing the powers which the Rivers Board possess in these matters, have at last felt it expedient to make a move. At the March meeting of the city council it was resolved, after a long discussion, to accept the tender of Mr. Isaac Gould for constructing seven additional settling tanks and raising the level of one of the existing tanks at the Knostrop Sewage Works, at the sum of £27,991. The chairman of the sewerage committee pointed out that about twenty million gallons per day passed through the works. The present tanks only held 2½ million gallons; the additional tanks proposed would provide accommodation for another 2¾ million gallons, and would permit the necessary time to elapse for precipitation. The corporation were bound to do something; the West Riding Rivers Board compelled them to take immediate action. If they did not put down additional tanks, then they must at once provide a better and more costly precipitant, the cost of which would be from £15,000 to £16,000 a year. The filtration experiments that are being tried at Barking, where sewage is being treated biologically—by a system in which certain harmless bacteria are introduced into the effluent which destroys the poisonous bacteria, formed the subject of a lengthy discussion at a meeting of the Sewerage Committee on Monday last, and it was eventually resolved to take the advice of an expert as to the best system to adopt for effectively treating the sewage of the city. It was pointed out that the varied character of the trade effluents which found their way into the sewers might not be favourable to the adoption of the biological treatment referred to.

SALFORD TAKES AN INDEPENDENT COURSE.—A special meeting of the Salford Town Council considered on Monday a report of the River Irwell Conservancy Committee relating to the disposal of the borough sewage. Disapproving of the scheme prepared by the borough engineer, which the council has already adopted, the Local Government Board has withheld its sanction to an application for power to borrow money for its execution. The opinion of counsel (Mr. Fletcher Moulton, Q.C.) has been obtained favourable to the corporation borrowing money for the purpose in view, without the Board's sanction, under section 235 of the Public Health Act, 1875. After some discussion, the council decided, by 18 votes to 10, in favour of borrowing £80,000 for the purpose stated without reference to the Local Government Board.

SOUTH LONDON WATER SUPPLY.—A Select Committee of the House of Lords, on Tuesday, gave formal sanction to the Southwark and Vauxhall Water Bill—a measure which is intended to enable the company to take legally from the River Thames the quantity of water which they are at present taking illegally. The company need some 40,000,000 gallons daily, and they thought they were entitled to take that or whatever quantity they required; but in January last an injunction was obtained by the Thames Conservancy Board restraining them from taking more than 24,500,000 gallons daily. The present Bill, which is purely a temporary measure, will be operative for only two years, it being obligatory on the company to come to Parliament next year with a comprehensive scheme, when all matters in difference will be open for full discussion.

It appears highly probable that the proposal to erect a Protestant cathedral in Belfast will have to be abandoned, as funds are not forthcoming. The plan prepared by Mr. Thomas Drew, of Dublin, as adopted would involve an expenditure of £100,000; but towards the cost of the first section, estimated at £20,000, after the greatest energy in canvassing, only £8,000 has been promised. It is now proposed to throw over the grandiose project, and to provide a central church at a cost of from £7,000 to £15,000.

Mr. James Edmeston, F.R.I.B.A., writes:—The marble group called "Charity," which was executed by the eminent French sculptor, M. Dalou, and erected at the rear of the Royal Exchange, was found to have suffered greatly from the weather, and the only thing that could be done was to use the marble as a model, and to cast the group in bronze, which has now been done by Mr. Moore at his foundry at Thames Ditton. The weather has no effect on the bronze, which will, the Deputy of Broad-street Ward predicts, be as sound 500 years hence as it is to-day.

Our Office Table.

MR. BALFOUR made the satisfactory announcement in the House of Commons on Monday night that although there was no legal objection to the proposed removal of Captain R. R. Burges's monument from its position in the south aisle of St. Paul's to the crypt of the cathedral, in order to make room for the Leighton Memorial, the Dean and Chapter, after reviewing all the circumstances of the case, had decided not to remove it. Thus all's well that ends well.

YET another watering-place is projected to be created on the North Kent coast. The site this time is the freehold manorial estate of Leysdown, which, embracing about 1,087 acres, forms the north-east corner of the Isle of Sheppey. It has a foreshore of nearly 1,700 acres, over three miles of sea beach, and contains two coastguard stations. The estate, which is to be sold by auction at the Mart, Tokenhouse-yard, on Friday in next week, is now chiefly laid out in meadow pastures, and a considerable portion lies high and enjoys fine views of the German Ocean. It is also pointed out that a new railway is in contemplation connecting Queenborough with Leysdown, and that several boats pass within a short distance, the services of which, when Leysdown is developed, there ought to be no difficulty in obtaining.

AT the distribution of the prizes, &c., at King's College, by Sir Owen Roberts, D.C.L., the chief prizes in the Arts Division were taken by sons of members of the architectural profession. The Jelf Medal was awarded to Mr. Gilbert Lovegrove (only son of Mr. Henry Lovegrove, F.S.I., Vice-President of the Society of Architects, and district surveyor of South Islington and Shoreditch), who took also the Special Prize for Ancient History and English Literature; and Mr. Chas. W. Chastel de Boinville, who took the Brewer Prize for Modern History, the Barry Prize for Divinity, and the prize for French Literature (son of the late Mr. de Boinville, A.R.I.B.A., of H.M. Office of Works).

THE first step in the direction of providing Peterborough with a more adequate town-hall and municipal buildings was taken on Friday in last week, when the corporation of that city considered in committee a sketch-plan submitted by Mr. Walshaw, the borough surveyor. The scheme embraces a give-and-take proposal—that of throwing a portion of the site of a tenement in Exchange-street into the Market-place, and annexing in its stead a portion of the Market-place. A square, with frontage 85ft. by 60ft., will then be available for building over. On the ground floor a butter cross, 42ft. by 33ft., can be provided, together with convenient mayor's parlour, committee rooms, porter's room, &c. On the first floor will be the council chamber, also 42ft. by 33ft., with other offices, &c., for the officials in the various departments. The plans were generally approved; but some members thought the scheme hardly extensive enough. A sub-committee of nine members was nominated to consider the whole question, and report to the general body.

A DEPUTATION from the Manchester and Salford Sanitary Association waited on the gas committee of the Manchester City Council, on Friday, and presented a memorial expressing concern "at the growing practice of municipal gas committees and gas companies using water-gas as an ingredient in the composition of gas for illuminating purposes." The product was declared to be very poisonous. Mr. Alderman Gibson, chairman of the committee, said it was water-oil gas, and not water-gas, which the committee proposed to introduce in a small proportion with the coal-gas. This was commonly done here and in America, and there had been no evil results, while the convenience to the public had in various ways been great. Water-oil gas was very quickly manufactured, and by laying down the plant proposed the committee would be able to cope, as they were not now able to do, with the demands made upon them on a succession of foggy days.

IN a letter to a Newcastle newspaper, the Marquis of Londonderry points out the necessity for greatly enlarging Seaham Harbour and developing the collieries. His Lordship proceeds:—"In order to keep pace with the times there can be no doubt that developments of the harbour and collieries are very desirable. I have a very large capital invested in my present

undertakings, and I feel that it would not be prudent for me to increase my responsibilities. The tendency in the present age is to form large undertakings into companies with limited liabilities. I have given instructions to have plans prepared for the enlargement of the harbour with an estimate of the cost; this work will be undertaken by Mr. H. H. Wake, engineer to the River Wear Commission, and I have requested Messrs. Geo. B. and T. E. Foster, and Messrs. William Armstrong and Sons, eminent firms of mining engineers, to make valuations of the collieries and other works in which I am interested, and as soon as these are completed it is my present intention to offer the whole to the public and form a limited liability company. I shall myself retain a very large interest in the properties."

MEETINGS FOR THE ENSUING WEEK.

TUESDAY.—Annual Meeting of the National Master Builders' Association at Bristol.

SATURDAY (JULY 24).—Society of Architects. Day Visit to Canterbury. Train from Victoria Station, 11 a.m.

Trade News.

WAGES MOVEMENTS.

BURY, LANCS.—The plumbers in the Bury district have obtained an advance in wages of a halfpenny per hour.

DUNDEE.—The members of the Dundee district of the Scottish National Operative Plasterers' Federal Union have made application for an increase of wages to the extent of ½d. per hour, the present rate of pay being 8½d. per hour. According to the rules of the Union, a six months' notice has to be given on either side, so that, in the event of the increase being granted, it will not come into operation until the 1st of January next. As yet no reply has been received from the employers.

EXETER.—Three employers have accepted the men's demands, so that the extent of the dispute is gradually being decreased. Other batches of bricklayers and masons have left the city this week for various destinations where work has been found for them. This reduces the number of men now out to about fifty, and negotiations are in progress from which it is expected that more will be despatched to other towns in a day or so. The bulk of the men sent away will obtain higher wages than are being sought for at Exeter.

FLEETWOOD.—The plumbers of this port are on strike because the masters will not sign the rules.

LIVERPOOL.—Owing to the strike of plasterers which has existed in Liverpool for some weeks past, the whole of the building trade is affected, and building operations in the city are now almost at a standstill. The Liverpool Master Builders' Association state that they are willing to appoint a board of conciliation on the lines suggested by the men. They point out that the men have hitherto persistently declined arbitration. The master builders have also issued a circular, showing the concessions which they are ready to make. They are willing to give the following rate of wages to the several trades:—Wages shall be paid by the hour, all the year round, at the rate of: carpenters and joiners, 9d. per hour; bricklayers, 9½d.; slaters, 9d.; plasterers, 9½d.; plumbers, 9d.; painters, 8d. With regard to apprentices, they propose that all apprentices after three months' trial be legally bound for not less than five years. Before the dispute commenced, the men state, there were 400 plasterers and 150 apprentices and improvers in Liverpool.

OPERATIVE BRICKLAYERS' SOCIETY.—On Saturday the London Order of Operative Bricklayers' Society held their annual demonstration in Manchester. A large number of the members assembled in Albert-square and marched to the Belle Vue Gardens. There, after tea, a meeting was held, under the presidency of Mr. F. M'Farlane. It was stated that the Society has 27,000 members, with funds amounting to nearly £70,000, and has close upon 300 branches. Mr. John Batchelor, the general secretary, urged upon the members the necessity of strengthening their union. If trade-unionism was to be successful, the unions must be larger and stronger. Small unions were useless, and he hoped that one day there would be but one union in the building trade. He asked that support should be given to the scheme for the provision of cottage homes for aged members. Representatives from London, Leicester, Warrington, and other towns were present at the meeting. Next year the society will celebrate its jubilee, and a demonstration will be held in London.

PRESTON.—The strike of bricklayers at Preston, which occurred about three months ago consequent on a demand for an increase of wages from 9d. to 10d. per hour, has been settled. The men have been granted the additional 1d. per hour; but the employers' stipulation for an alteration in the rule with respect to apprentices has also been conceded. Formerly an employer was allowed to have only one bound apprentice, but under the modification of the rule all lads working will be bound.

THIRSK.—A meeting of bricklayers in Thirsk and Sowerby was held on Friday night at the King's Head Hotel, Thirsk, for the purpose of considering an advance in wages. Up to the present 5½d. per hour has been paid, and the men wanted 6½d. per hour. The masters would not accede to the request, but offered an advance of 1s. per week, which the men refused to accept, and they accordingly ceased work.

CHIPS.

In the House of Lords on Tuesday, the Patent Office Extension Bill and the Public Office (Whitehall) Site Bill passed through Committee and were reported without amendment.

The Howrah House, Poplar, London, is being warmed and ventilated by means of Shorland's patent Manchester stoves and grates and special ventilators, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

Dr. Temple is resolutely putting the Archbishop's house in order. He has resolved to spend £5,000 in improving the drainage, some portions of the system being nearly as old as the Palace.

The 17th-century brick houses occupying the site of Nos. 10, 11, and 12, Walbrook have just been replaced by a Portland stone fronted block of offices, built from designs by Mr. Delissa Joseph, and known as Brook House. The building contains 52 rooms, let out in suites of offices, and fitted with the electric light. Messrs. J. Allen and Sons, of Kilburn, were the builders.

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LATEST PRICES.

IRON, &c.

	Per ton.		Per ton.
Rolled-Iron Joists, Belgian	£5 15 0	to	£6 0 0
Rolled-Steel Joists, English	6 0 0	,,	6 10 0
Wrought-Iron Girder Plates	5 15 0	,,	6 10 0
Bar Iron, good Staffs	7 0 0	,,	8 0 0
Do., Lowmoor, Flat, Round, or Square	17 0 0	,,	17 0 0
Do., Welsh	5 15 0	,,	5 17 6
Boiler Plates, Iron—			
South Staffs	7 17 6	,	8 5 0
Best Snedshill	10 0 0	,,	10 10 0

Angles 10s., Tees 20s. per ton extra.
Builders' Hoop Iron, for bonding, &c., £6 15s. 0d. per ton.
Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.

Galvanised Corrugated Sheet Iron—	No. 18 to 20. Per ton.		No. 22 to 24. Per ton.
6ft. to 8ft. long, inclusive gauge	£10 15 0	...	£11 0 0
Best ditto	11 5 0	...	11 10 0

	Per ton.		Per ton.
Cast-Iron Columns	£6 0 0	to	£8 10 0
Cast-Iron Stanchions	6 0 0	,,	8 10 0
Cast-Iron Sash Weights	—	,,	4 2 6
Cast-Iron Socket Pipes—			
3in. diameter	5 10 0	,,	5 15 0
4in. to 6in.	5 5 0	,,	5 10 0
7in. to 24in. (all sizes)	4 15 0	,,	5 0 0

[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]

Pig Iron—	Per ton.
Cold Blast, Lilleshall	105s. to 110s.
Hot Blast, ditto	57s. 6d. to 62s. 6d.

Wrought-Iron Tubes—Discount off Standard Lists f.o.b.			
Gas-Tubes	75p.c.	Fittings	77½p.c.
Water-Tubes	70	,,	72½
Steam-Tubes	62½	,,	65
Galvanised Gas-Tubes	60	,,	62½
Galvanised Water-Tubes	55	,,	57½
Galvanised Steam-Tubes	45	,,	47½

	10cwt. casks. Per ton.		5cwt. casks. Per ton.
Sheet Zinc, for roofing and working up	£22 10 0	to	£23 10 0
Sheet Lead, 3lb. per sq. ft. super.	14 0 0	,,	15 0 0
Pig Lead, in 1cwt. pigs	13 10 0	,,	14 10 0
Lead Shot, in 28lb. bags	16 10 0	,,	17 10 0
Copper Sheets, sheathing and rods	60 0 0	,,	61 0 0
Copper, British Cake and Ingot	51 15 0	,,	52 15 0
Tin, Straits	63 10 0	,,	64 10 0
Do., English Ingots	66 15 0	,,	67 15 0
Spelter, Silesian	17 10 0	,,	19 10 0
	Per ton.		Per ton.
Cut Clasp Nails, 3in. to 6in.	£8 15 0	,,	£9 15 0
Cut Floor Brads	8 10 0	,,	9 10 0

Wire Nails (Points de Paris)—

0 to 7	8	9	10	11	12	13	14	15	B.W.G.
8/6	9/0	9/6	10/3	11/0	12/0	13/0	14/9	16/9	per cwt.

TIMBER.

Teak, Burmah	per load	£14 5 0	to	£16 10 0
,, Bangkok	,, ...	11 10 0	,,	15 10 0
Quebec pine, pitch	,, ...	—	,,	—
,, yellow	,, ...	2 0 0	,,	4 0 0
,, Oak	,, ...	5 10 0	,,	6 10 0
,, Birch	,, ...	4 5 0	,,	6 0 0
,, Elm	,, ...	4 0 0	,,	5 5 0
,, Ash	,, ...	3 5 0	,,	4 10 0
Dantsic and Memel Oak	,, ...	2 10 0	,,	3 10 0
Fir	,, ...	2 15 0	,,	4 5 0
Wainscot, Riga p. log	,, ...	2 0 0	,,	4 5 0
Lath, Dantsic, p.f.	,, ...	4 10 0	,,	5 10 0
St. Petersburg	,, ...	5 0 0	,,	6 10 0
Greenheart	,, ...	8 0 0	,,	9 0 0
Box	,, ...	4 0 0	,,	15 0 0
Sequoia, U.S.A. ...per cube foot		0 1 9	,,	0 1 10
Mahogany, Cuba, per super foot 1in. thick		0 0 4½	,,	0 0 6
,, Honduras	,, ...	0 0 5	,,	0 0 6½
,, Mexican	,, ...	0 0 4	,,	0 0 5
Cedar, Cuba	,, ...	0 0 4½	,,	0 0 5
,, Honduras	,, ...	0 0 4	,,	0 0 5
Satinwood	,, ...	0 0 7	,,	0 1 0
Walnut, Italian	,, ...	0 0 3½	,,	0 0 7

Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 11in.:—

Quebec, Pine, 1st	£19 10 0	to	£25 10 0
,, 2nd	14 0 0	,,	16 10 0
,, 3rd	6 10 0	,,	10 0 0
Canada Spruce, 1st	10 10 0	,,	12 0 0
,, 2nd and 3rd	8 0 0	,,	9 5 0
New Brunswick	7 15 0	,,	8 5 0
Riga	7 10 0	,,	8 10 0
St. Petersburg	9 10 0	,,	13 0 0
Swedish	9 0 0	,,	16 10 0
Finland	8 0 0	,,	8 10 0
White Sea	9 10 0	,,	16 0 0
Battens, all sorts	5 0 0	,,	20 0 0
Flooring Boards, per square of 1in.:—			
1st prepared	0 8 6	,,	0 15 6
2nd ditto	0 7 0	,,	0 12 0
Other qualities	0 5 0	,,	0 6 6
Staves, per standard M:—			
Quebec pipe	—		—
U.S. ditto	35 0 0	,,	42 10 0
Memel, cr. pipe	230 0 0	,,	240 0 0
Memel, brack	200 0 0	,,	210 0 0

OILS.

Linseed	per ton	£14 5 0	to	£14 15 0
Rapeseed, English pale	,, ...	26 10 0	,,	27 5 0
Do., brown	,, ...	23 10 0	,,	25 10 0
Cottonseed, refined	,, ...	14 10 0	,,	15 10 0
Olive, Spanish	,, ...	27 0 0	,,	28 0 0
Seal, pale	,, ...	23 0 0	,,	24 0 0
Cocoanut, Cochin	,, ...	26 10 0	,,	27 0 0
Do., Ceylon	,, ...	23 5 0	,,	23 10 0
Palm, Lagos	,, ...	20 15 0	,,	22 10 0
Oleine	,, ...	19 0 0	,,	20 0 0
Lubricating U.S.	per gal.	0 6 3	,,	0 7 6
Petroleum, refined	,, ...	0 0 4¾	,,	0 0 1⅞
Tar, Stockholm	per barrel	1 2 0	,,	1 5 0
Archangel	,, ...	0 12 6	,,	0 15 0
Turpentine, American	per ton	21 0 0	,,	21 10 0

LIST OF COMPETITIONS OPEN.

Howth—Presbyterian Church	£20 (merged) and £10	Rev. James Wilson, 4, Rhoda Villas, Howth, Co. Dublin	July 20
Chippenham—Cottage Hospital (£1,100 limit		E. M. Awdry, Mayor of Chippenham	,, 20
Rugby—Municipal Buildings (no Assessor)	30gs. (merged), 20gs.	D. G. Macdonald, Surveyor, Rugby	,, 21
Bootle—Technical School, Balliol-road (£15,000 limit)	50gs., 30gs., 20gs.	J. A. Crowther, Borough Engineer, Bootle	,, 31
Surbiton—Council Chamber and Offices (£5,000 limit)	£30, £15	J. Bell, Clerk, Council Offices, Victoria-road, Surbiton	Aug. 13
Bury, Lancs—Art Gallery and Public Library (£16,000 limit)	£75, £50, £25	John Haslam, Town Clerk, Bury, Lancs	,, 31
Ipswich—Higher Grade School, Tower-st. (local Competition)	No premium; 5 per cent. com.	Clerk to School Board, Ipswich	Sept. 14
Battersea—Baths and Washhouses, Battersea Park-road	£100 (merged), £50, £25	W. M. Wilkins, Vestry Clerk, Municipal Bldgs., Lavender Hill, S.W.	,, 22
Newcastle-on-Tyne—New Infirmary (local Architects)	(No first) £150, £100, £50	Secretary, Building Committee, Newcastle (1898)	Jan. 1
Carlton, Victoria—Children's Hospital	£100, £50, £25	J. Nicholson, Hon. Sec., Pelham-street, Carlton, Australia ...(1898)	,, 30
Chesterfield—Enlarging Stephenson Memorial Hall (£3,500 limit)	£25, £10	Borough Surveyor, Salter Gate, Chesterfield	—
Wadhurst, Tunbridge Wells—Vicarage Hall (£1,500 limit)		Secretary Jubilee Committee, Wadhurst, Kent	—
Hereford—Bridge over Wye (£1,200 limit)	£10	T. W. Meats, Secretary Jubilee Bridge Committee, Hereford	—
Huddersfield—Victoria Tower on Castle Hill	20gs.	R. Welsh, Hon. Sec., Jubilee Committee, Town Hall, Huddersfield	—
Kirkham—New Workhouse for 300 Inmates	£150, £100, and £30	J. Thompson, Clerk to Fylde Board of Guardians, Kirkham, Lancs.	—
Brighton—Artisans' Dwellings (local Architects only)	£75, £25	F. J. Tillstone, Town Clerk, Brighton	—
Cardiff—Town Hall and Law Courts	£500 (merged), £300, £200	The Town Clerk, Cardiff	—
Boscombe—Hospital Enlargement, Shelley-road		J. Pratt, Assistant Sec., 126, Christchurch-road, Boscombe	—
Tottenham—School Board Offices		J. F. Adams, Clerk, School Board Offices, Tottenham, N.	—

LIST OF TENDERS OPEN.

BUILDINGS.

Thornaby-on-Tees—Completion of Tower, St. Paul's Church		T. H. and F. Healey, Architects, 42, Tyrrel-street, Bradford	July 17
Birtley—Police Station	Durham County Council	W. Crozier, County Surveyor, Durham	,, 17
Killybegs—Sacristy, St. Mary's Church		Rev. John Sweeney, P.P., Killybegs	,, 17
Stowmarket—Additions, Rose and Crown Inn, Bridge-street	Geo. Diaper	H. G. Bishop, M.S.A., Market-place, Stowmarket	,, 17
Leeds—Eight Houses and Two Shops, Woodview Mount		C. Fredk. Wilkinson, Architect, 35, Park-square, Leeds	,, 17
Thomastown, Co. Kilkenney—Convent	Sisters of Mercy	Samuel F. Hines, F.R.I.B.A., Architect, 41, South Mall, Cork	,, 17
Penygroes—County School		E. Evans, Architect, 8, Castle-street, Carnarvon	,, 17
Newton-le-Willows—Purifying House, Gasworks	Urban District Council	R. Brierley, Surveyor, Town Hall, Earlestown	,, 17
Kanturk—Repairs to Cottages		Guiney, Clerk, Kanturk	,, 17
Morpeth—Bathrooms and Outside Corridors at the County Lunatic Asylum	Northumberland County Council	John Cresswell, A.I.C.E., County Archt., Moot Hall, Newcstle-on-T.	,, 17
Halifax—Engine House, Stony Royd Mills		Samuel Robinson, Architect, Cheapside, Bradford	,, 17
Howden-le-Wear—Additions to Schools	North Bedburn School Board	Edward Milburn, Clerk, Howden	,, 17
Barrow-in-Furness—Wesleyan Chapel		Waddington and Son, Architects, 17, St. Ann's-square, Manchester	,, 17
Belfast—Enlarging Roof, Railway Station	Belfast and Northern Counties Ry.	W. R. Gill, Secretary, York-road Terminus, Belfast	,, 17
Arisaig, N.B.—Hotel		D. Cameron, Architect, Inverness	,, 17
Cringlestone—Three Houses and Outbuildings at Dirtcar	W. Monseair	Fawcett and Ainsworth, Architects, Wakefield	,, 17
Askern—Board Schools		Athron and Becks, Architects, Dolphin-street, Doncaster	,, 17
Crook—New Warehouses	Jos. Anderson, Currier	H. T. Gradon, Architect, 22, Market-place, Durham	,, 17
Malden, Surrey—Repairs to Houses		Clerk to Motspur Park Estate Trustees, Malden, Surrey	,, 17
Walsall—New Infants' School	Walsall School Board	Bailey and McConnall, Bridge-street, Walsall	,, 19
Radstock—Enlarging Working Men's Hall	Radstock Collieries Co.	E. M. Heppel, Hon. Secretary, Radstock, near Bath	,, 19
Heaton—Pair of Semi-Detached Villas, Wilmer-drive		Jas. Ledingham, F.R.I.B.A., District Bank Chambers, Bradford	,, 19
Cork—Roman Catholic Church, Attendant's Quarters and Scullery at District Lunatic Asylum	Board of Control, Dublin	W. H. Hill, Architect, 28, South Mall, Cork	,, 19
Luton—Repairs to Board Schools		W. Hoyle, Clerk, Weller-street, Luton	,, 19
Stratham Hill—Four Houses, Telford Park	Lees Knowles, M.P.	F. H. Harvey, F.S.I., 183, Lavender Hill, S.W.	,, 19
Wimbledon—Stabling, 2, Queen's-road	Urban District Council	W. H. Whitfield, Clerk, The Broadway, Wimbledon	,, 19
Minehead—Constable's House and Two Cells	Somerset County Council	W. J. Willcox, County Surveyor, 1, Belmont, Bath	,, 19
New Deer, N.B.—House		Jenkins and Marr, Architects, 16, Bridge-street, Aberdeen	,, 19
Crewe—Shedding	Cheshire Agricultural Society	Thos. A. Beckett, Secretary, St. Werburgh's Chambers, Chester	,, 19
Clown—Six Houses	B. Davies	B. Davies, Crown Inn, Clown	,, 19
Dewsbury—House at Westborough		Fredk. W. Ridgway, F.R.I.B.A., Bond-street, Dewsbury	,, 19
Baslow—Twelve Workmen's Cottages	Urban District Council	V. R. Cockerton, Clerk, Baslow	,, 19
King's Lynn—Pumping Station at Gayton	Waterworks	E. J. Silcock, Borough Engineer, Town Hall, King's Lynn	,, 19
King's Norton—Two Cemetery Chapels and a Lodge, Brandwood End, King's Heath	Rural District Council	Edwin Docker, Clerk, 10, Newhall-street, Birmingham	,, 19
Whitley—Shop and House	C. Anderson	Arthur Stockwell, Architect, 11, Pilgrim-street, Newcastle-on-Tyne	,, 19
Wakefield—Additions, &c., to Strafford Arms Hotel, Northgate		Simpson and Richardson, Archts, Southgate Chambers, Wakefield	,, 19
Great Grimsby—Alterations and New Premises at Fish Docks	Co-operative Fish Carrying Co.	Fred Lister, Secretary, Grimsby	,, 19
Wednesbury—Nurses' Institute	Committee	George Rose, Town Clerk, Wednesbury	,, 20
Lincoln—Central Electricity Station, Brayford Side (North)	Electric Light Committee	R. A. Macbrair, City Surveyor, Lincoln	,, 20
Devizes—Engine-House, Boiler-House, and a Chimney Stack	Visiting Committee, Wilts C.A.	Joseph T. Jackson, Clerk to the Committee, Devizes	,, 20
Lancaster—Four Shops	J. and C. Fell	J. Parkinson, Architect, 67, Church-street, Lancaster	,, 20
Peckham, S.E.—Four Terrace Houses	J. T. Smith	J. T. Smith, 8, Finsbury-circus, London, E.C.	,, 20
Oulton—Annex Workhouse Infirmary	Guardians	A. Clarke, 126, London-road, Lowestoft	,, 20
Tylorstown—Hotel		W. Williams, Partridge Hotel, Llwynpia	,, 20
Lincoln—Tall Chimney on Brayford Side (North)	Electric Light Committee	R. A. Macbrair, City Surveyor, Lincoln	,, 20
Berwick-on-Tweed—Infirmary Extension	Governors	J. L. Miller, Architect, 39, Hide Hill, Berwick-on-Tweed	,, 20
Morriston—Cottage at Station	Great Western Railway Co.	G. K. Mills, Secretary, Paddington Station, W.	,, 20
Newcastle-on-Tyne—House, Flint Hill		J. H. Moyle, Architect, Hobson Colliery	,, 20
Peckfield—Four Cottages	North-Eastern Railway Co.	C. N. Wilkinson, Secretary, York	,, 21
Cardiff—Sheds, Offices, and Inspector's House, Trade-street	Corporation	J. L. Wheatley, Town Clerk, Town Hall, Cardiff	,, 21
Cotton—Classroom at Schools		Isaac A. Clarke, Architect, Walsham-le-Willows	,, 21
Cleethorpes—Classroom, Barcroft-street School	School Board	William Brown, Clerk, Bank Chambers, Great Grimsby	,, 21
Barnsley—Two Houses, Beech-street		H. Crawshaw, Architect, 13, Regent-street, Barnsley	,, 21
Middlesbrough—Shed at Workhouse	Board of Guardians	J. J. Dales, Clerk, Municipal Buildings, Middlesbrough	,, 21
Mainsforth—Pair of Cottages		F. H. Livesey, Architect, Market-place, Bishop Auckland	,, 21
Hammersmith—Coroner's Court and Mortuary	Vestry	H. Mair, C.E., Vestry Hall, Hammersmith	,, 21
Middlewich—Technical Schools and Free Library	Urban District Council	R. T. Worth, A.M.I.C.E., Town Hall Chambers, Middlewich	,, 21
Hull—Workshops, &c., at St. Andrew's Dock	Humber Shipwright Company	Freeman, Son, and Gaskell, Architects, Albert Chambers, Hull	,, 21
Usworth—Six Cottages	North-Eastern Railway Co.	C. N. Wilkinson, Secretary, York	,, 21
Felixstowe—Shelter on Cliffs	Urban District Council	Chairman, General Purposes Committee	,, 21
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PRACTICAL DETAILS OF BUILDING.

COMPROMISE is a powerful factor in the relation between architect and contractor. The give-and-take principle may be a useful means of transacting business; but in art matters it does not answer, for it generally means a giving up of something, or a "watering down" of the artist's intentions. And yet the "put-off-with-something-equal" policy has ruled in many of our great buildings. All great architects in ancient and modern times have had to give up something. It is a matter of history that the design of Wren for the rebuilding of St. Paul's had to be abandoned for a less magnificent scheme. Inigo Jones had to considerably modify his plans for the design of the palace at Whitehall; and in our own day Barry's design for the Houses of Parliament underwent many prunings and amendments, as we know the more recent works of Scott and Street did, as in the Government Offices and Law Courts. In short, very few of our great public edifices have been carried out in the spirit of their designers. The exactions and whims of clients have nevertheless not been half so prejudicial to the architecture of our time as the modern contract, which imposes on the architect conditions that favour low tendering. Of what value are saving and arbitration clauses when a tender has been accepted which renders honest building out of the question? Where is the *Non possumus* of the architect? The only reply of the builder-contractor is: "We give you something that is equal." Compromise is an easy way of defeating the architect's intention. How to make the necessities of plan and construction architectural is a matter that cannot be left to chance. As a rule the profession are inclined to trust too much to the contractor and to those engaged in carrying out his intentions. They are afraid to impose conditions of design which may be costly or uneconomical, or, for example, they prefer that the engineer shall make his own arrangements and structural provisions to save the trouble of considering a number of details of which he is not cognisant. The consequence of this apathy is that the engineer is allowed to do what he likes in the way of altering the design to suit his particular work, rather than spend a few hours or minutes in considering how he can make his work or fittings conform to the design. And this surrender on the part of the architect to the engineer's free choice may make all the difference between a pleasing architectural design and a hideous structure. The apathy of the one and the desire to make a profit by the contracting firm are the combined enemies to good architecture; they are the conditions which obtain in all large buildings and contracts, and render it so hard for the architect to realise his design in bricks and mortar. Buildings designed for utilitarian purposes, like hospitals, workhouses, and business premises, are mainly in the hands of contractors, engineers, plumbers, and manufacturers. The architect has prepared plans and designs for the building, but the before-mentioned officials step in and carry out the work. Each branch falls into a particular groove, the brick and terra-cotta is regulated by the makers and the patterns in stock; or the time precludes special moulds being made for the work; the iron joists and columns are supplied by the iron merchant, there is no time to make special patterns, and the details devolve on the superintendent or clerk of works. If the architect submits designs for the columns, brackets, spandrels, they are set on one side as expensive, or impracticable; the plumber introduces the fixtures he has in stock, and the shopfitter, the electrician, the decorator, each comes in, and on various excuses sets to work in his own way. Is not this the way the big contract job is carried out? Let those who have had any experience say. A great deal goes by the board; there is a back way of introducing things, which the architect scarcely understands; and is not his and the contractor's way very far from being the same? The one looks at the design, the little details of moulding or finish, the other at the number of feet, cube or superficial, of material, and the labour in the work. A few thousand feet of framing or window sashes of the same pattern is a matter worth fighting for, if only the architect's conscience or whim can be salved; if he can only be induced to give up those tiresome little details for doors and panels and joinery which he has furnished. Is it not also much easier and cheaper to order a few thousand feet of the same moulding, and to use it for all purposes? The same brick mouldings will do throughout the buildings for window-sills and dressings, band-courses, and cornices; the same sash or iron casement can be used throughout the building. It is impossible to reconcile such commercial ideas of production with the architect's views. Who can expect such diverse ideas of building to lead to success? There are some features that are intractable, which cannot be made architectural under the conditions which prevail. They no doubt are utilitarian; use or necessity are at the root of them. The factory chimney is one. We seldom manage to make it architectural, very rarely pleasing. The factory engineer comes in and attenuates it, or gives it a rigid-lined tapering form with an ugly summit that is a lasting eyesore against the sky, or to hide what the factory-builder considers necessary, the architect attempts a compromise which is much worse. Instead of a plain brick stalk, which offends no one, the structure is cased by a square tower to a certain height, which is finished by a cornice or with pinnacles, and the inner shell goes up like a sliding pencil-case on end, an outline quite indefensible and ugly. Or, what is quite as bad, the chimney is disguised and made to appear a tower or Italian campanile, like that on the Grosvenor-road pumping-station, the Lambeth Waterworks, or the sewage outfall works, a form that is meaningless for conveying away smoke, besides being a satire on our architectural taste.

Take, again, the water tower as we see it treated in any large group of buildings like a hospital or an asylum—a feature that might, and ought to, be made something of. Between the water engineer, the water company, and the contractor, the architect has very little to do with the result. In the bird's-eye view of the design it appears an artistically-treated and handsome feature, if a little ill-considered for the purpose; the actual structure is a bare, stumpy tower, with a huge tank at the top like a locomotive feeding-tank. Of course, we do not mean to infer that a water-tower should represent any other structure, or that the existence of a great tank at the top should be suppressed; but such a use can be made conformable with good proportion and detail. We do not look for a church tower or an Italian campanile, or a square tower with a belvedere, or clock-dials on each face; but at least it can be made an architectural feature, and at the same time showing its character. But, instead of this, the architect gives it away to the engineer, or is so hampered by the structural details that are forced upon him that the water tower is often so spoilt as to become an erection that is better concealed than made an object of interest. We saw the other day in connection with a large hospital a water tower that was simply treated; but the upper story was made slightly larger than the tower below, with a balcony round it, but which had evidently been spoiled or denuded of its details in being carried out. The original design lost its character in the process of building.

Take another instance: a hospital pavilion. We do not expect much from so plain a building. The very conditions of health necessary to be observed render it a hard building to treat architecturally. The only features which the architect can turn to account are the ends with the detached or angular towers for lavatories and conveniences, and the balconies for convalescent patients which are sometimes provided between them. But take any dozen of our recently-built hospitals and see how few of them, if any, are carried out with a due regard to architectural effect. Any external dressings or features, the converting the angle-placed tower into an octogon at the top, or of making its windows and roof a little more finished and decorative, are very rare. In most cases these semi-detached towers are built with extreme plainness, the pyramidal roofs are shorn of decent proportion and finish, the windows are mere slits in the wall, and the balcony railing has a bare, impoverished look, being made of iron bars. They are more worthy of a back yard than the main front to a row of hospital pavilions. In eight or a dozen pavilions the extra labour of making them ornamental features, small as it seems, may make all the difference between the highest and lowest tenders. The architect cuts out the items of string-courses or stone dressings, or tile roofs and finials, and the contractor does his best to reduce their design still more, and the result is crude and ugly. Nothing spoils so quickly as a contractor's method of cheapening: it means not only denuding of extraneous details, but making everything flimsy and thin. Ironwork is one of the many details of a building which cannot bear this process with impunity. What looks meaner than the substitution of half-round guttering for the ogee section, the reduction of an inch or two in the diameter of an iron column, a plain bar of iron for turned wooden ones in balconies and fencing? No architect would prefer to substitute an iron truss roof for a timber one over any building which could be equally well served with timber as with iron. The reduction of the scantlings of a timber roof is one of the favourite devices of the modern contractor. He looks upon it as a perfectly honest and legitimate means of bringing down his tender, or, it may be, of making the quantity of timber given square with the actual demand. When the architect winks at this course the case is hopeless, as it means degradation throughout, an elimination of every decent detail of the design.

Again we have the common sash window. It seems to be one of the compromises between the old casement and mullion window, and the old sliding thick-bar sash of the last century. As containing the minimum of woodwork with the largest glass surface, it has found its way into popular favour. Little architectural effect can be obtained by it. The contracting builder has made it his own, for it is one of the items which can be multiplied. The architect may show thick sash-bars and mullioned openings in his elevations; but the builder manages to put in the ordinary sash window, and in a large building may make every aperture a multiple of all the rest. Every designer will admit that the common thin-barred sash gives a very depressing appearance to a building; nevertheless, it is one of the many stock items which the contractor turns to his own advantage. We have seen many designs in which the windows are shown filled with sliding sashes or casements with transoms,

a style of window eminently suitable to buildings of the Renaissance character; but in execution the ordinary sash has been substituted, probably because a little saving has been effected. Many other features may be instanced to confirm the same compromising spirit in the carrying out of our large contract buildings. The architect's skill may be unquestioned; but it is often baffled by circumstances over which he seems to have little control.

HAND AND EYE TRAINING IN THE LONDON BOARD SCHOOLS.

WHEN so much has been said about technical education, it is of some interest to inquire—How the experiment of providing for technical instruction in our Board schools is working? An exhibition of a very interesting kind was opened last Friday for a few days at the Hugh Myddelton School, Clerkenwell, by Lord Londonderry, including drawings, designs in paper and colour, modelling in clay and cardboard, woodwork, needlework, and other branches sent in by the various schools of the Board. The chief principle which has been kept in view by the promoters of this scheme is that the work given to the pupils is disciplinary only, or as training for the hand and eye, and is not intended to instruct the pupils in a trade or to come into conflict with the crafts. The importance of this rule must be acknowledged in the interests of the trades. It has been thought by many that technical training in the schools was for the purpose of teaching boys a trade, a mischievous notion which would be suicidal to the whole scheme. The exhibition at the Hugh Myddelton School will at once show the object of the promoters. Here we have brought together in two or three rooms the work done by the London Board school children. In the kindergarten section we see specimens by 52 schools, representing some three or four thousand infants and junior boys and girls; but we chiefly draw attention to the technical knowledge exhibited in the paper and woodwork specimens. The exhibits showing designing in coloured paper in the "hand and eye" section are interesting, as they prove how easily young children can be taught the rudiments of form, and colour, and design on flat surfaces. We see here some very carefully-executed designs in squares and tesseræ, some by overlays of paper of different colour. In a more advanced stage we notice design in colours, and one or two examples of bold designs for friezes and borders, by Frank Jolly, of the Minnow-road Schools. The "brush-work" designs are interesting, and develop a freehand for decorative work. Modelling in cardboard of solids and various objects is another good exercise, as it tends to draw out the pupil's power of conceiving form in solid geometry or stereography, and helps him in his geometrical studies. Many of the clay models show artistic perception.

But we particularly call attention to the woodwork exhibits, which occupy two or three large tables. We were shown by one of the instructors the courses of exercises given to the pupils who go in for this branch of handicraft. There are several of these graduated exercises, beginning with the simplest operations intended to teach the pupil the use of the rule—in setting-out grooves, at right angles and obliquely. In these beginning exercises, which are illustrated by models, the youthful student begins to learn the use of the gauge, chisel, plane, and to apply them to simple grooving, housing joints, chamfers. He goes on to more advanced objects in which all these initiatory operations are combined with curved lines. The centre-bit and other tools come into play. We see lamp or dish mats with different coloured woods, with their edges shot, glued-up into elliptical shapes; letter-racks, inkstands, &c. A second year's course continues the same operations, but applied to more complex articles, like brackets, shields, trays, knife-boxes, inkstands, and the like, a development of the same principles being made in ever fresh stage. The student is also taught economy in the use of stuff. Thus we see a bracket turned out from one piece of board, planed up to a certain thickness, which is divided and cut for the projecting shelves and bracket supports. The shields cut out of soft wood are exercises intended to teach the pupil correct outline and the development of curves. The shape of the shield and its curved surfaces illustrate a more complex development of curves, which in some specimens is finished by the use of sandpaper. A more advanced course shows the making in a more complete and finished manner of similar articles: boxes, stools, book-racks, brackets, trays, inkstands, and other ordinary articles. Every pupil must accompany his specimens with drawings to scale, without which the work done is not accepted. From these remarks it will be seen that the student is first taught the simplest abstract principles of the craft, and afterwards the complex and concrete. The groove leads up to the inlay of different coloured wood, or to the simple housing joint, and these in their turn lead up to mitre and dovetail joints and more complex developments. The examples we see on the tables of boys' work show that these general principles have been followed. A very favourite simple exercise is the dish-mat of oval shape with pieces of dark walnut let in; other specimens show chess-boards, star devices on flat surfaces, in all of which edge shooting is the chief operation. Examples of inlay designs are numerous. One or two very excellent examples of inkstands with curved edges show an artistic sense of curvilinear form. One young lad sends a revolving bookcase, which is very ingenious, and carefully executed; and we see also specimens of knife-trays, boxes, and other useful articles. These articles are mostly executed in basswood or a white, soft, even-grained wood, the other woods used being ash, sycamore, American walnut, and Honduras. The Hazetone-road Lower School sends several creditable specimens.

The exhibits of the evening continuation schools are more varied, and greater latitude is allowed the pupils. The drawing from models and the specimens of wood-carving, chiefly panels, the models of objects of a constructive kind, like a pile-driving machine, are very creditable instances of industry and applied skill. We may also refer to a few examples of beaten copper or *repoussé* work, and to the stumping in coloured chalk. The drawings shaded from models and the cast and those of natural flowers comprise several creditable examples. The needlework section is a large and admirable display of the girls' work. Looking at the exhibition generally, the work done by the pupils shows a great improvement on past efforts, and prove that under the system introduced it may fairly be said that we can show quite equal, if not superior, results to those of the Continental schools.

THE NATIONAL ASSOCIATION OF MASTER BUILDERS AT BRISTOL.

THE members of the National Association of Master Builders of Great Britain held their half-yearly meeting in Bristol on Tuesday. The proceedings were opened by a gathering at the Guildhall, under the presidency of Mr. Thomas F. Rider, of London. The following delegates were present:—S. Ambrose, Bath, — Atherton, Bolton; F. G. Barnes, Dorset; A. Brown, Derby; Councillor J. Bowden, Stoke-on-Trent; John Biggin, Sheffield; President W. Bowers, Hereford; C. H. Barnsley, Birmingham; R. Beevers, Hull; Stanley G. Bird, London; Alderman John Bowen, J.P., Birmingham; James Beckett, Dublin; W. Blackburn, Newport, Mon.; Joseph Bell, Saffron Walden; W. Church, Bristol; J. Howard Colls, London; W. Cartledge, Burslem; Henry Cave, Wolverhampton; W. Cunliffe, Bolton; Alfred Crowther, Huddersfield; M. Carine, Douglas; R. C. Cock, Wells; J. Dickinson, Derby; G. Durant, Derby; P. Drake, Bradford; John Dawson, Bradford; J. Davis, Hereford; J. Dimckley, Northampton; J. Dawson and wife, Huddersfield; — Dapthorne, Plymouth; W. Dyer, Weston-super-Mare; Councillor W. Dunk, Barnsley; C. Dye, Southsea; J. H. Ford, Burslem; G. F. Fisher and wife, Northampton; C. Garlick, Coventry; W. Grant, Burslem; H. Gough and wife, G. Gough, Wolverhampton; Y. Goates, Hull; H. Green and wife, Northampton; C. W. Green, Liverpool; W. Green, Cardiff; J. A. S. Hassal, Liverpool; Chas. H. Haywood, Coventry; G. Hardington, Leicester; Ald. Wm. Holdsworth, J.P., Bradford, Yorks; L. Hodges, Hereford; J. Herbert, Wolverhampton; H. Holloway, London; R. S. Henshaw, Strand, London, W.C.; Jesse Hayward, Bath; E. Henshaw, Liverpool; R. G. Jenkins, Devonport; Ald. W. H. Jessop, J.P., and Mrs. Jessop, Huddersfield; W. Irwin, Leeds; A. Krauss, Bristol; Wm. Kitch, Bridgwater; G. Kett, Cambridge; W. P. Lewis, Hereford; A. Lynea, Walsall; W. E. Lee, Birmingham; A. Lethbridge, Walsall; C. H. Long, Bath; J. Linton, Newport, Mon.; E. J. B. Mercer, Bath; the Right Hon. Ald. Meade, P.C., Dublin; C. Myers, Leeds; J. Norwood and wife, Coventry; W. Nicholson, Leeds; Councillor L. and Mrs. Price, Stoke-on-Trent; Dyson Parfitt, Newport, Mon.: F. Pratt, Bath; S. F. Rider and wife, Southwark; Jos. Randall, London; Lewis Radcliffe, Huddersfield; Robert Rymer, Barnsley; W. Sapcote and daughter, Birmingham; W. E. Starkey, Leicester; John Spink, Sheffield; T. Skett, Wolverhampton; Wm. Shepherd, London; H. J. Spiller, Taunton; W. Symond, Cardiff; Wm. Townson, Bolton; J. E. Turner, Cardiff; Councillor E. R. Taylor, Barnsley; T. Vincent, Bath; R. Weston, Derby; John Walker, Derby; — Wistance, Walsall; W. E. Wooster, Bath. The Bristol Association was represented at the meeting by Mr. A. Krauss, president; Mr. Wm. Church, vice-president; Mr. George Humphreys, treasurer; Messrs. Geo. Wilkins, E. Walters, G. A. Hayes, J. Eastabrook, J. E. Jones, C. Cowlin, J. E. Wilkins, J. E. Gosling, H. A. Forse, A. S. Scull, H. E. Thomas, H. Kepple, J. Bastow, Frank N. Cowlin, and H. J. Spear (secretary). The association was welcomed by the High Sheriff (Mr. J. Colthurst Godwin), who said Mr. Krauss, his friend, the president of the Bristol Association, had asked him to offer to the master builders of Great Britain a hearty welcome to that most ancient and loyal city. It was twelve years since their association last met in Bristol, and they had a very pleasurable recollection of that visit. Since that time very considerable progress had been made in Bristol, and although they did not go ahead there with the pace that other towns did, yet their trade was as safe and sure as in any town he knew of. They would notice some improvements in Bristol since last they were there. They would see that the old Drawbridge, which existed for many years, and respecting which there had been over and over again discussion in the town council, had been removed, and there was a wide way made, over which carriages could go as often as was wished. They had improvement in their buildings, and although they had Cardiff very often put up against Bristol as a rival town, yet it was satisfactory to know the imports of Bristol were larger than the imports of Cardiff. It was true that in Bristol they had a small export trade compared with Cardiff, but they had a very large import trade, and it was gratifying the imports were in excess of Cardiff, a town of which they had heard so much. He would ask them if they could not manage their contract forms, so that if builders undertook what turned out to be unfortunate contracts, the goods supplied by the merchants should not be hypothecated by their clients. He spoke as a merchant, and it seemed exceedingly unfortunate the builders did not, at the time those disastrous contracts were entered into, give notice to the merchants. When a bankruptcy occurred, the merchants were told that the assets formed part of the property of their clients. Could not the builders strike out some of the unfortunate clauses from the contracts? And as to fine, it was only weak-kneed builders who entered into those forms; but strong builders, such as

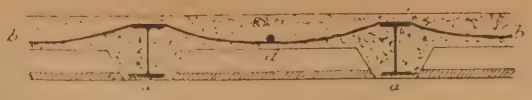


FIG. 1.

Since it is next to impossible to ascertain what the absolute amount of the loading uniformly distributed over a floor really attains to, it is necessary to assume a certain weight, and proceed with the calculations upon that assumption in determining the strength of the combined system of construction. Commencing with the floors of ordinary dwellings of a large size, such as those of flats, hotels, and others, upon which there are never

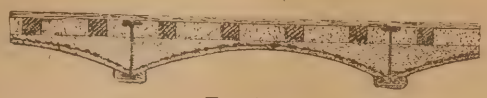


FIG. 2.

any heavy concentrated loads, the minimum weight permitted in the capital and two other very important cities in the United States is fixed at 70lb. per square foot. There is no doubt that this estimate is high, for the weight of human beings inhabiting dwellings of the description cited, together with that of their furniture, luggage, and general belongings, could not possibly average this amount. On the other hand, it must be borne in mind that the floors of these buildings are liable, although probably only occasionally, to be subjected to loads which would sensibly approach the limit laid down by the Building Laws. Again, the strength of a floor, similar to that of a bridge, cannot be determined by the *average* load brought upon its unit of area,

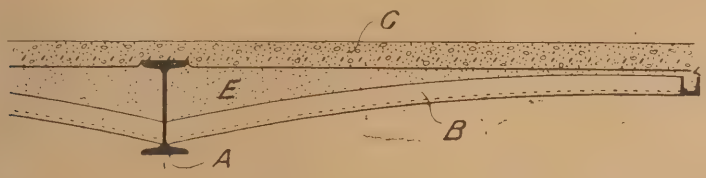


FIG. 3.

but must be apportioned to carry the *maximum* load, whether statical or dynamical, that might, under all possible circumstances, be placed upon it. Averages, calculated from the aggregation of a comparatively large number of miscellaneous objects of widely different individual weights, are seldom trustworthy. They are very frequently as much above the actual maximum load as they are below it, the significance of the difference consisting in the fact that in the latter case the discrepancy is of no importance, whereas in the former it might be attended with very serious consequences. So far as the dead load of a floor is concerned, it must obviously be calculated for every separate type of flooring.

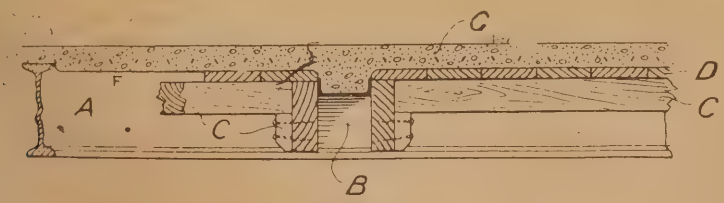


FIG. 4.

Assuming our minimum live load at 70lb. per square foot, it will range up to twice this amount for larger and more public offices and buildings. For warehouses and stores, and where machinery and mechanical appliances are constantly employed, it may rise to 4cwt. or 5cwt. per square foot; but these are all special instances, for which not even an approximate rule can be given. They may be safely left to the experience and judgment of the superintending architect or engineer.

Some tests have been made with the modified system previously described, in which flat bars were used to further increase the strength of the combination. These experiments, although not quite conclusive, will afford some interesting information respecting the resistance of arches built of concrete, and also serve for the purpose of instituting a rough comparison between them and other types to be yet considered. The spans are small; but as the total loads brought upon any one arch, as well as the reduction of them to their equivalent uniformly-distributed loads per unit of area, are also worked out, the corresponding resistances can be readily estimated.

TABLE III.

No.	Span.	Total Load.	Load per Square Foot.
1	4ft. 0in.	13·31	0·64
2	4 0	7·11	0·69
3	4 3	2·50	0·60
4	5 0	3·39	0·85

In Table III. the second column gives the clear span in feet and inches between the flanges of the rolled beams upon which the concrete arches rest, and against which they might abut. Both the total load and the load per square foot are in tons and decimals of tons. Of the four experiments, of which the ultimate results are recorded in the table, three of them failed, but the other, No. 3, evinced no signs of yielding. If our readers will for a moment turn back to Articles II. and III. relating to the present subject, they will be able to institute a comparison between the simple and compound systems. In the first place (see Table I. in the Article III.), the arch of ordinary bricks and that of special bricks, together with the two examples of corrugated iron arches, must be rigorously eliminated from the list, as they have nothing in common with the four tested arches in the accompanying Table III. Our attention, therefore, must be concentrated for, at any rate, the present on the first three experiments recorded in our previous article, which are the arch of rammed concrete, that of plain Monier cement, and the arch of Monier cement concrete. It was this last specimen which bore the maximum breaking load of 0·643 of a ton per square foot; but No. 4, belonging to the combined system in Table III., did not yield until the breaking load reached 0·85 of a ton. The arch of plain Monier concrete in Article III. and No. 3 in the present article may be struck out of the comparison, since their respective breaking weights, 0·593 and 0·60, are practically identical. There remains, therefore, two examples of the compound system, with breaking loads of 0·69 and 0·64 tons against the arch of plain rammed concrete, with its inferior breaking weights of 0·513 of a ton.

From the evidence just adduced, it may be fairly concluded that the compound system does unquestionably possess superior powers of resistance to the simple type. It will not, however, quite do to jump to conclusions which might turn out to be too hastily formed. The conditions of testing in the two series or sets of experiments were not quite identical, and the number of them in both instances is very limited. It is illogical to argue *a particulari ad universale*, and we need further analysis, more experiments, and a greater number of results before an impartial and thoroughly reliable verdict can be arrived at, and one which, at least to a very considerable extent, will settle a question which has not yet been definitely decided upon, although the coming event is casting its shadow before.

In Fig. 2 is represented a cross-section of the arrangement for utilising the expanded metal in the construction of concrete arches. There are numerous other forms or methods used for floor-building; but the example we have selected is that best adapted for the subject we are discussing. The appearance of the diamond-shaped expanded metal is, no doubt, familiar to our readers; but we are not at present concerned with this detail, nor with the process of its manufacture, which is exceedingly ingenious, curious, and interesting. For spans exceeding 8ft. or 10ft. up to 20ft. or 25ft., arched channel steel is employed with advantage. A section of this method is shown in Fig. 3, in which A represents the rolled steel floor-girder, B is the channel steel, which is filled and covered with the concrete E, while the thick black line F is the expanded metal, which acts as a through-bond in the concrete, and, in accordance with the principle we have drawn attention to, takes up the tensile stresses which might under certain circumstances be brought upon the structure. Over the expanded metal F is laid the finished concrete floor G, with expanded metal core resting upon the arched ribs. In Fig. 4 a section through the steel channel arch is given, which requires no further explanation except to point out that the letters C and D are the temporary wood centring and lagging boards forming the necessary false work. The connection between the separate sheets of the expanded metal is made by overlaying one over the other—that is, by a lap joint. In our previous columns, putting F for the modulus of rupture, or also called the coefficient of the bending strength of the material, W equal to the weight situated at the centre of slab, beam, arch, or, briefly, any form of specimen under an experimental test, L equal to the clear span between bearings, and b and d for other dimensions of the slab or beam, the value for F was given by the equation—

$$F = \frac{3 \times W \times L}{2 \times b \times d^2} \quad \ldots\ldots\ldots\ldots\ldots (1)$$

and it was then stated that this value was purely an empirical one, an observation which applies not only to concrete but to steel, iron, stone, and all materials used for constructive purposes. But in all structures, whether of an engineering or architectural character—and it is becoming daily more difficult to draw the line of demarcation between them—the practical method of estimating the weight upon them seldom involves the consideration of a central or even only a single weight. Hoisting cranes, travelling gantries, shear-legs, and derricks are exceptions, and so also are columns. On the other hand, all large and important structures of more than ordinary magnitude have their powers of resistance apportioned to withstand the effect of a uniformly distributed load, or the effect of numerous concentrated loads reduced to an equivalent load uniformly distributed. The practice of employing in the calculations for the strength of both road and railway bridges, especially in the latter, the equivalent reduction of a number of rolling loads ununiformly distributed, instead of estimating in the first place their effects singly and then by integration arriving at the aggregate, is extending itself more and more. It saves a very large amount of useful time, it avoids a laborious, circuitous, and unnecessary amount of calculation, and when it does err, it does so on the side of safety.

It is an axiom in bridge and girder arch and suspension construction that a weight placed at the centre has exactly the same effect, or, in

other words, produces the same stresses upon the structure at the centre, as twice the weight does when uniformly distributed over it. As this statement is often accepted, as many others are without proof, it may be as well to show how the relation is established.

Let A B in Fig. 5 represent a beam, the weight of which may be neglected, supporting a single

FIG. 5.

weight W at its centre. Put L for the span of the beam, and R R_1 for the reactions respectively at each abutment. Then, on the principle of the lever, we have—

$$R = R_1 = \frac{W}{2}$$

and as the moment of a force in the case before us is equal to the reaction multiplied by the perpendicular distance of the weight from the abutment, which distance is obviously equal to half the span—that is $\frac{L}{2}$.

Putting M for the moment at the centre, then—

$$M = \frac{W}{2} \times \frac{L}{2} = \frac{W\,L}{4}$$

In the second example, see Fig. 6, let M_1 = moment at centre, and let the moment be required at any point x which divides the girders

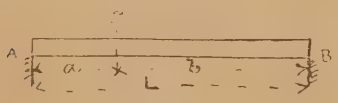


FIG. 6.

into segments a and b. Call this moment M_2. The general expression for M_2, no matter where the point x may be placed, is—

$$M_2 = \frac{W \times a \times b}{2\,(a + b)}$$

but at the centre of the girder $a = b = \frac{L}{2}$ and since $(a + b) = L$ the value of M_1 becomes—

$$M_1 = \frac{W \times \frac{L}{2} \times \frac{L}{2}}{2\,L}$$

from which we obtain

$$M_1 = \frac{W\,L^2}{8\,L} = \frac{W\,L}{8}$$

that is—

$$M_1 = \frac{M}{2}$$

or, inverting the former statement, the moment of a uniformly distributed load at the centre of a girder is exactly one-half of what the moment amounts to when the same load is placed at the centre of the girder. It will be found in investigating the results of future experiments in connection with the simple and combined systems, which we have not had space enough to commence in the present article, that many discrepancies exist in the tests, notwithstanding that the conditions are as precisely similar as care, skill, and supervision could make them.

THE SOCIETY OF ARCHITECTS AND THE QUEEN'S DIAMOND JUBILEE.

THE presentation of the Congratulatory Address to Her Majesty the Queen by the Society of Architects took place on Wednesday last, at St. James's Palace. Her Majesty having consented that the address should be presented personally, deputed H.R.H. the Prince of Wales to receive the same, at the hands of the President and a small deputation, on her behalf. The Lord Chamberlain notified to the Society Her Majesty's desire that six members should attend at St. James's Palace as a deputation for the above purpose. The deputation consisted of the president, Mr. Robert Walker, J.P., of Cork; Mr. Walter Emden, J.P., L.C.C., Mr. Henry Lovegrove, A.R.I.B.A., Major F. S. Leslie, R.E., Mr. Edgar Farman, and the honorary secretary, Mr. Ellis Marsland. The deputation was introduced to H.R.H. by Mr. Edgar Farman, who presented personally to H.R.H., the President, Mr. Robert Walker, and Mr. Ellis Marsland. H.R.H., after having shaken hands with the President, handed him Her Majesty's gracious reply to the Address of the Society, as follows:—

"On behalf of the Queen, my dear mother, I thank you for your loyal and dutiful address, and for the affectionate congratulations which you tender on the completion of the sixtieth year of her reign. It is a source of profound joy to the Queen to receive the expressions of devotion to her person and family which are offered by her subjects throughout the Empire. She is gladdened by the thought that the sixty years of her reign have been years of progress in knowledge and of increase in prosperity, and she prays that, by the blessing of Almighty God, she may always live in the hearts of her loving and beloved people."

The Society is to be congratulated upon the distinction and honour conferred upon it by her Majesty the Queen in thus receiving personally, at the hands of the Heir to the Throne, the expression of loyalty and congratulation contained in the address. The address was a beautifully-designed, illuminated document, specially prepared under the direct superintendence of Major Leslie, to whom the Council are much indebted. Accompanying the address was a list of members, specially bound in book form in vellum and gold, containing as a frontispiece a portrait of the president, Mr. Robert Walker.

[Copy of the Address to be presented to her Majesty the Queen by the Society of Architects.]

TO HER MOST GRACIOUS MAJESTY THE QUEEN.

MAY IT PLEASE YOUR MAJESTY,—The President and Council of the Society of Architects humbly approach the Throne that they may, with others of your faithful subjects, offer, with profound respect, their loyal congratulations on the celebration of the sixtieth anniversary of your accession to the throne of your ancestors. In your Majesty, as in your illustrious husband, the lamented Prince Consort, the Arts have ever found a noble patron, and the Council is, therefore, emboldened to hope that your Majesty will graciously accept this humble address in the name of the Society of Architects.

That it may please the Great Disposer of Events to prolong your Majesty's glorious reign, and to grant you every blessing, spiritual and temporal, is the fervent prayer of your Majesty's obedient and faithful subjects.

ROBERT WALKER, President.
ELLIS MARSLAND, Hon. Secretary.

PUBLIC LIBRARY ARCHITECTURE.

AT the closing meeting of the International Congress of Librarians, held at the City Guildhall on Friday, general papers on the architecture of public libraries were read and discussed.

Mr. F. J. Burgoyne (librarian of the public libraries, Lambeth), read a paper on "Public Library Architecture from the Librarian's Standpoint," dealing with the subject from the point of view that the librarian was of course chiefly concerned with the internal arrangement of library buildings. He referred to the rapid growth of libraries as showing the great importance of having the sites for library buildings sufficiently large to provide for future extensions. He dealt in detail with what his experience had shown him to be the best plans on which library buildings should be laid out, and the most suitable arrangement of rooms and shelving of the books, and also with the various systems of issue, of lighting the rooms, and of heating and ventilation. The problem, he pointed out, was different, according to the means at the disposal of the authorities. The rooms should not be too large; two or more of a smaller size were better than the same area in one room, as small rooms were less draughty and warmer. Books should be accessible without ladders, the windows should be high, the ceiling lofty, the lighting good and well distributed, skylights should be double so as to prevent the access of the direct rays of the sun, and the windows should be double where there was much traffic. If gas was used, ventilating shafts should be provided to carry away the fumes, and some form of incandescent gas should be employed. The Aberdeen public library was a model of what such a library should be.

Mr. Beresford Pite, F.R.I.B.A., followed with a paper on "Library Architecture from the Architect's Standpoint." He regarded a library building as an extended bookcase with mechanical functions, but he also considered that as a good book deserved a good binding, so a good collection of books deserved a good building. From this arose the æsthetic function—the providing of a library building most fitting for the expression of pleasure in construction and design. He went on to make a number of suggestions for such design. Such a building should be marked by dignity, simplicity, and restraint, and the ornamentation of the various rooms—the reading-room, the entrance hall, &c., should be in fitness with the uses to which the rooms were put. He dealt with the proper use of decorations as opposed to their abuse, and then described at length the various architectural styles that had been adopted for libraries, from the philosophic Greek to the romantic Gothic. He concluded by describing what he regarded as an ideal building for a modern public library.

In the discussion which followed, Mr. Crunden, Dr. Justin Winsor, and others, expressed their opinions on the most desirable appliances for heating, ventilation, and other matters. The chairman, the Earl of Crawford and Balcarres, gave an account and criticised the lighting and ventilation of the Houses of Parliament. Sir H. Howorth, M.P., said the question was, Are the books meant for the library or the library for the books? In his view the librarian ought to arrange his books, whereas generally a library was intended mainly to glorify the architect. Smirke's room at the British Museum was an admirable example of the adaptation of a room to its use. Mr. Dewey said the most conspicuous failures had been the libraries at Boston and Chicago, on which a mint of money had been spent. In designing a building, the best thing would be to compile a list of things to be avoided, and if such things were avoided, the best conceivable plan would be found to be the residuum. Dr. R. Garnett said that to him many years ago an empty shelf was a much more beautiful object than a full one, for he had no place for the ever-accumulating mass of books. But now he had not the same satisfaction at unoccupied space which he used to feel, for the sliding press had, in the economy of space effected, been a veritable boon to the librarian. It would be a good thing if the architect would subordinate all æsthetic considerations to practical requirements, and would make his plans not only for the present, but for the future.

THE BRITISH SCHOOL AT ATHENS.

THE annual meeting of the subscribers to the British School at Athens was held on Thursday in last week at 22, Albemarle-street, Piccadilly, under the chairmanship of Sir Edward Poynter, president of the Royal Academy. The report stated that, in spite of the political disturbances, culminating in the disastrous war in Greece, the British School in Athens had had a very satisfactory session. The number of the students had been considerably above the average, and good work had been done. The students' hostel had now become an accomplished fact. The total cost of the building and furnishing would be about £1,500; £1,000 had been subscribed, and further subscriptions were asked for. The report spoke of the high value of the excavations which had been made. The Government grant for five years of £500 a year had been ratified by the House of Commons, and the first instalment had been paid. The President, in moving the adoption of the report, referred to the success of the school during the past year, adding that it was evident, however, that that school still stood in need of considerable assistance if the work it had to do was to be efficiently carried out and further developed in the direction of usefulness. An important step in this development was in the establishment of an hostel for students. This would be ready to receive students when they went out next session. Mr. Cecil Smith and his colleagues had got nearly £1,100 in subscriptions, and the other £400 was to be provided from the school fund. It was to be hoped that some liberal person would provide the balance. The good work which the school had achieved was seen from the directors' report. It was difficult to resist the hope that at some future time the funds of the school might place the directors in a position to purchase a site in the modern part of Athens, where excavations might be made. The Government grant of £500 a year—given through the liberality of Sir William Harcourt—had been of great value, and it was to be hoped that it would be continued after the five years' limit. He hoped the operations of the British school and the foreign school in Athens might lead to the foundation of a University of Archæology. Professor Percy Gardner seconded the adoption of the report, which was agreed to. Mr. Cecil

those in Bristol, drew their line through it, and as to a fine, it was only country builders who entered into that form. Then as to excessive competition, he could not understand when they found the highest tender £20,000 and the lowest £10,000 how the man who did the work at the latter price could get a profit. He was glad to see that not only were the Bristol builders receiving the National Association, but the Bath builders were also going to welcome the association. The builders of both cities were on the most happy terms.

Mr. Rider, on behalf of the National Association, thanked the High Sheriff for the welcome which he had extended. That was not the first or second visit of the association to Bristol, and amongst all the various places in England there was none from which they carried back more pleasant recollections than the ancient city of Bristol. There was an element of sadness in their gathering that day, as most of them recollected their distinguished past president, Mr. Cowlin, who was then president of the National Association. No one occupied that position with more ability or greater courtesy and kindness. As to the question of contracts, one of the objects of their association was to see that fair contracts were insisted upon between builders and their employers. The point which the High Sheriff mentioned had occurred to them as most unfair, and anything they could do to set right that injustice he would be glad to do. As to excessive competition, he did not think the remedy was yet discovered, and the time was distant when builders would see their way to get a fair amount of profit from every contract.

The report for the past half-year was read by the secretary, Mr. J. A. S. Hassal. It ran as follows:—The Blackburn and Shrewsbury Associations, and Messrs. Wheeler Bros., Reading, and H. I. Sanders, Southampton, have resigned their membership, but new members have been found in Cheltenham, Douglas, Isle of Man, and Hereford Associations, and Mr. G. E. Hawes, of Norwich. Your council have pleasure in reporting that the improved condition of trade is steadily continued throughout the country. The Workmen's Compensation Bill brought in by the Government, although primarily intended to principally apply to those engaged in mines and similar employment, affects the building trade to a considerable extent. A special meeting of the council was held at Derby in May last to consider the subject, and a committee—consisting of the president, Messrs. J. S. Jones, S. G. Bird, R. Neill, jun., J. Bowen, and J. Bowden—were appointed to deal with the matter. The joint Parliamentary committee of the Builders' Institute and Central Association of Master Builders of London invited your committee to join them in a joint conference, which was held in London, the outcome of which was that the president of the London Association (Mr. Shepherd), Col. Stanley Bird, and the president of the National Association, were deputed to take such steps as they might think best in the matter. These gentlemen had a long interview with the Home Secretary, when the deputation explained to the right hon. gentleman the objections of the trade to the Bill as it then stood. Sir Matthew White Ridley listened most attentively to, took note of all that was said, and thanked the deputation for their visit, from which he told them that he had gained considerable information, and assured them that the points they had mentioned should receive his very careful consideration. Several amendments were introduced during the committee on the Bill and many more have been put down for the report stage by the Government and private members, but it is at present quite impossible to say what form the Bill will eventually take; at any rate, what is perfectly clear is that the risks of a builder's business will be much increased, and that consequently the question of insurance assumes greater improtance. The Plumbers' Registration Bill was presented and read a first time on the 22nd January. On the 30th April it was read a second time and referred to the Standing Committee on Trade, who, on the 13th May, reported the Bill as amended to the House, where it is still under discussion. Your council will continue to give their careful consideration to any legislation affecting the trade. In pursuance of the resolution passed at the meeting held in Edinburgh in July last directing your council to prepare and report a new form of indenture of apprenticeship, with power to obtain the opinion of counsel thereon, they have examined numerous copies of those at present in use in various parts of the country, supplied them by the local associations, and recommend one, the draft of which was read at the meeting of the association held at Blackburn in January last. It was there resolved that copies of the proposed indenture should be circulated amongst the members of the council for further consideration, and that the matter be adjourned until the next meeting of the executive. The proposed indenture is practically a combination of the salient points of those formerly issued by this association and that of the Lancashire Federation of Builders. An invitation has been received from the National Association of Builders of Belgium to attend a conference in Brussels in August next. Principally through the energy of Mr. Krauss and the Bristol Association, a federation of many of the local associations in the West of England has been started, and bids fair to be a great success. It is hoped that similar organisations will be formed in other districts, where local matters can be discussed with greater advantage than by the National Association, which by its name and constitution is intended to deal with those larger questions affecting the trade as a whole in all parts of the kingdom. The continued increase in the number and importance of trades' unions, no less than their arrogant behaviour, renders it of more importance than ever that masters' organisations should be formed in every town in the kingdom, and affiliated to the National Association, which would have the effect of increasing the power and usefulness of the "National" to a degree commensurate with the importance of the interests and welfare of the trade it was established to consider and protect.

The President, in proposing the adoption of the report, said there had been a large number of demands made during the past half-year, and alterations in consequence. There had been 67 alterations, 60 of which were for alterations in wages. He wished the increase of wages resulted in an increase of work, but he was afraid experience showed that an increase of wages meant decrease of work. Competition would, he feared, long continue, and there should be greater consideration for each other and less desire to get work no matter at what price. He referred to the Workmen's Compensation Bill, and said the employers should not have a double-barrelled pistol presented at their heads, so that a man having proceeded under the Employers' Liability Act, should not be allowed to go on under the Workmen's Compensation. One great objection to the Bill by the building trade was that it did not include the trade as a whole, or leave it out altogether. He advocated local federations being formed in different parts of the country, and spoke of the arrogant nature of the demands made by trade unions, especially in the case of the bricklayers, who refused to allow any but the sons of bricklayers to be apprenticed. The plasterers, too, were very troublesome. He believed they would have to fight once for all as to whether capital should rule labour, or labour rule capital; and an association like theirs would be of the greatest possible service in such a warfare. Mr. Bowen, of Birmingham, seconded the resolution. Mr. W. Shepherd, of London, gave some particulars respecting the Employers' Liability Bill, which he described as the latest phase of Socialistic legislation. If the incidence of the Bill extended over the whole of their industry, instead of being partially extended, it would be better. He wished that meeting could strengthen the hands of the House of Lords, who were endeavouring as far as possible to intercept that latest specimen of immature and ill-considered legislation, and prevent it passing into law; to ask the Lords to postpone their assent to that Bill till the operation of it could be better seen, and its probable effects better calculated. Mr. Krauss made some remarks on the organisation of the West of England Federation. The report was then adopted.

Mr. C. W. Green subsequently presented the treasurer's statement, which was adopted.

The meeting next considered the report of the council on the following:—(*a*) Proposed form of apprentice indenture to be adopted by this association. (*b*) A resolution passed by the Central Association of Master Builders of London, respecting the scarcity of plasterers.

On the Workmen's Compensation Bill the council reported that the Bill, as passed, was unsatisfactory, and efforts should be made to amend it in the House of Lords. A resolution expressing the opinion that the measure would act injuriously in the interests of employers and employés was also passed.

It was fixed that the next half-yearly meeting of the association should be held in London.

ANNUAL DINNER.

In the evening the Bristol Master Builders' Association gave a banquet to the delegates and some others at the Victoria Rooms, Clifton. Mr. A. Krauss (president of the Bristol Association), took the chair.

The President having proposed the loyal toasts, Mr. Frank N. Cowlin submitted "Our Defenders on Land and Sea." Sub.-Lieut. Goodenough Taylor and Col. Stanley George Bird responded.

Alderman Inskip gave the toast "Imperial Parliament," to which Col. Sir Edward S. Hill, M.P., responded.

Mr. J. Howard Colls submitted "The City and Port of Bristol," and Mr. G. H. Perrin responded.

Mr. Arthur Lee, in proposing "The Architects, Engineers, and Surveyors," said they had seen improvements in the houses of the poor, and they now had houses which let for £15 or £20 a year which afforded greater convenience than some of the best homes which were to be obtained in ancient Athens. Mr. J. M. McCurrich, Mr. Frank Wills, and Mr. Henry Williams returned thanks.

The High Sheriff submitted "The National Association of Master Builders of Great Britain," which was acknowledged by Mr. T. F. Rider, President of the National Association.

Mr. A. A. Hudson, Q.C., proposed "The Bristol Master Builders' Association." He said there were two or three things which made success in life. The first was to buy or contract well, the next was to carry the contract out well, and the last thing was to get paid. He considered builders were especially badly used, as when they had to get their money they had the most expensive process known to the law to get it. Another matter he thought was that no builder should sign a contract unless there was an arbitration clause. Mr. A. Krauss, in responding, referred to the formation since the last half-yearly meeting of the Builders' Federations of Lancashire and their own West of England and South Wales, and expressed a hope that the example would soon be followed all over the country. United they stood, divided they fell, as there were questions to be gone into of more importance than that of wages.

Mr. W. Church also responded to the toast. The list was brought to a termination with "Our Guests," proposed by Mr. W. H. Brown.

On Wednesday the delegates took part in a successful excursion to Chepstow and Tintern Abbey, and yesterday (Thursday) they paid a visit to the sister city of Bath, where they were welcomed and entertained by the Local Master Builders' Association.

GRAPHIC STATICS.—XI.

ANY plane rectilineal figure may be regarded as the skeleton diagram of a frame consisting of rigid bars freely hinged together, and may, therefore, be taken to represent a framed structure or truss, in which, whatever stiffness the joints may possess is to be neglected. The young student will, therefore, see the necessity of considering a few of the geometrical properties of plane rectilineal figures, to help him to an understanding of the laws which govern framed structures.

Deformable Figures.—A figure is said to be *deformable* if its *shape* may be altered without altering the length of any side. (The word *side* may here mean any line belonging to the figure.) It is easily seen that any four-sided figure is deformable; for instance, a square may be *deformed* into a rhombus. A deformable figure cannot represent a perfect truss.

Indeformable Figures.—A figure is said to be *indeformable* if its shape cannot be altered without altering the length of at least one side. A figure may be *strictly indeformable*, or it may have *surplus lines*. A figure is said to be *strictly indeformable* if it contain only the exact number of sides necessary to determine its shape. Such a figure becomes deformable if any one line be omitted.

A four-sided figure becomes *strictly indeformable* if one diagonal be added; and it has one *surplus line* if both diagonals be added.

A little care is necessary here to avoid mis-

understanding. It must not be supposed that the *shape* of a *strictly indeformable* figure is necessarily determinable when only the lengths of its lines are given, since more than one such figure can often be constructed with lines of the same given lengths. This is shown in Figs. 41 and 42, where the five sides C A, A B, B C, C D, D A are of the same lengths respectively in both figures. But each of these figures is *strictly indeformable*, since neither figure can, without breakage, be changed from the shape originally given to it as long as no line alters its length. It is in this sense that the *shape* of a strictly indeformable figure is said to be perfectly determined by the lengths of its sides. This will need to be borne in mind as we proceed.

A word may here be profitably said as to the manner in which the lines and vertices of figures are to be counted. In many cases, if the figure be not lettered, the counting of the vertices or of the lines of the figure may be done in different ways. For instance, in Fig. 41, suppose the diagonal B D to be drawn, and the figure to be unlettered, then it would be uncertain, from the figure alone, whether we were intended to count the point of intersection of the diagonals as an additional point. If the point of intersection be counted, we must consider that point as representing a joint, and each part of each diagonal must be counted as a separate line. The figure will then become one with five vertices and eight sides, and will be a particular case of Fig. 43.

We now pass on to discuss the means by which we may distinguish between the different classes of figures, and here a new definition of a *strictly indeformable figure* may be helpful. A figure is *strictly indeformable* when the fixing of *any two* of its points will fix every point in the figure. The position of any point P with respect to any two fixed points A, B, in the same plane with P may be determined in many ways. For example, the position of P may be fixed: (1) By the length of A P, Fig 44 (*a*) and the angle which A P makes with A B; (2) By the length of A P, Fig. 44 (*a*), and the length of B P. The first of these methods is not suitable for our purpose, since to fix the angle B A P, Fig. 44 (*a*), would necessitate a rigid joint at A, and the rigidity of joints does not enter into our calculations. The second method is entirely suitable, since the point P, Fig. 44 (*a*), is kept immovably fixed, as long as the lengths A P, B P do not alter. If, however, we were asked to *find* the position of P, having given only the points A and B, and the distances A P, B P, we should not be able with *certainty* to do it, because, Fig. 44 (*a*), the points P and P_1 both fulfil the same two conditions, and either of these points might be taken.

We see, then, that two points in a figure being fixed, every remaining point in the figure requires two conditions to fix it, and that, for our purpose, these two conditions must be its distances from two points previously fixed.

In any figure consider any one side, A B, and the two vertices, A, B, which it joins; then the position of every succeeding vertex in the figure will be determined by the lengths of two additional lines. Thus, in a strictly indeformable figure of s sides and v vertices, the number of sides $(s-1)$ exclusive of any one side must be twice the number of the remaining $(v-2)$ vertices. That is,

$$s-1=2(v-2),$$

and therefore— $$s=2v-3.$$

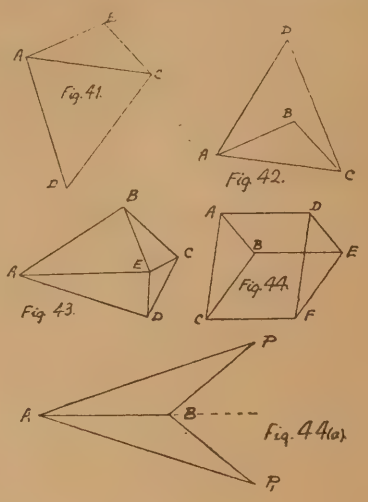
Every strictly indeformable figure fulfils this condition; but, as we shall presently see, it does not necessarily follow that every figure which fulfils this condition is strictly indeformable.

If the figure have n surplus lines, it follows that $s=2v-3+n$. If n' lines be required to make the figure strictly indeformable—

$$s=2v-3-n'.$$

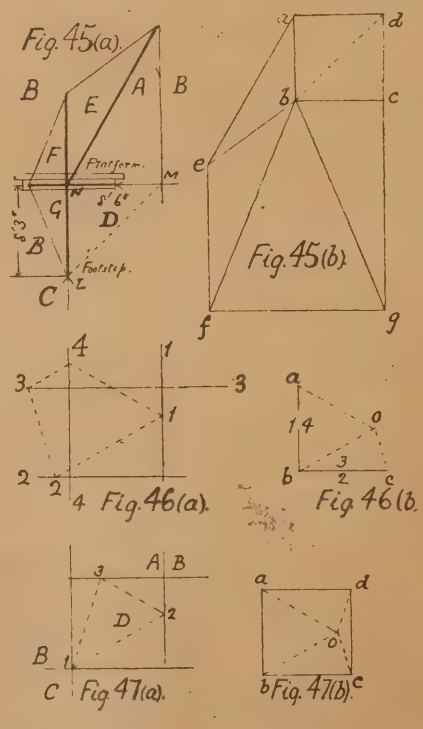
The condition that $s=2v-3$ is *necessary* in order that a figure may be strictly indeformable; but it is not always *sufficient*, since some figures which fulfil this condition have a deficiency of lines in one part and a redundancy in another part. The additional condition that *no part of the figure must contain a surplus line* is necessary. Observe, then, that a *strictly indeformable* figure may show a *deficiency* of lines in some parts, but *never a redundancy*. But even this does not make the test quite complete, as will now be shown.

In Fig. 44 we have two triangles, A B C, D E F, the sides of the one triangle being equal and parallel to those of the other respectively. Hence the lines A D, B E, C F, which join the corresponding vertices, will be equal and parallel (Euclid, I. 33); and, this being the case, it is easily seen that the fixing of *any line* of the figure will not fix the figure. Suppose the side A C fixed, this will fix the triangle A B C, but will allow the points D, E, F to move through arcs



having A B C as their respective centres, and the same sides which form a parallelogram in any one position will form a parallelogram in any other position of the figure. So also if one of the parallel lines A D, B E, C F be fixed, the other points may move through arcs having the two fixed points as centres.

Now, Fig. 44 has nine sides and six vertices, and $9=2\times6-3$—that is, the figure conforms to the condition $s=2v-3$; also no part of the figure



contains a surplus line. If the line A D be removed, and B D or B E be drawn, the resulting figure will be strictly indeformable. And it is worthy of notice that the fixing of any two *diagonally opposite* points, as A and E of Fig. 44, would fix the entire figure.

Much more might be said on this part of the subject, but it has already extended beyond the space it was originally intended to occupy.

The following question is taken from the "Honours" examination in *Machine Construction and Drawing*, Department of Science and Art, 1888: A crane is constructed—as shown in Fig. 45 (a). Draw the reciprocal stress diagram for determining the stresses on the jib, stays, and crane post, and the thrusts on platform and foot-step bearing.

We shall take the load as being *suspended* from the junction of jib and stay. If the chain is supposed to pass over a pulley, and the direction of the other part of the chain is known, the pull of that other part must be taken into account, as was done in Fig. 11 (c). (See No. 2178, p. 480.)

With respect to the supporting forces, it should be carefully noted that, as a rule, they are altogether indeterminate, both in direction and magnitude, unless special arrangements are made as to the nature of the supports. In the present case the *directions* of these have been given, and we are thus able to find their magnitudes. In this example the direct forces exerted by the members can be easily found without finding the supporting resistances, as there are only two members meeting at the point of application of the load.

Thus, make *a b*, Fig. 45 (b), represent the load to any scale. Then the polygon of forces for the point A B E A is the triangle *a b e a*; the polygon for the point E B F E is the triangle *e b f e*; the polygon for the point F B G F is the triangle *f b g f*; the polygon for the point A E F G D A is *a e f g d a*; so all the internal forces are found. The resistances B C, C D may now be found by drawing *b c* parallel to B C, and so completing the polygon *d g b c d* for the point D G B C D. On the principle on which the other points have been named, the right-hand end of the platform would be called the point A D A, and the polygon for that point is the double straight line *a d a*. All the internal forces and the supporting resistances have now been found; those members which are in compression are denoted by *thick* lines in Fig. 45 (*a*).

If more than two members met at the point of application of the load, it would be necessary to determine the other external forces before the internal forces could be found, and this may be easily done in a variety of ways, if we regard the truss as simply a rigid body kept in equilibrium under the action of the given and required external forces.

(1) Since there is equilibrium, the resultant of the load and the force D A must be equal and epposite to the resultant of B C and C D; and since each resultant acts through the intersection of its components, these resultants must each act along the dotted line joining these intersections in Fig. 45 (*a*).

Draw, then, the dotted line *b d* in Fig. 45 (*b*) parallel to that in Fig. 45 (*a*), so finding the point *d*; draw *b c* parallel to B C, and *c d* parallel to C D, so completing the polygon *a b c d a* of the external forces acting on the frame. It will, of course, be seen that *d b* represents the resultant of D A and A B, and that *b d* represents that of B C and C D.

(2) By the *principle of moments*, since the body is in equilibrium under the action of the external forces, the algebraical sum of their moments round any point must vanish—that is, the sum of the moments in one direction is equal to the sum of those in the opposite direction. Take moments about L the intersection of B C and C D. Then the moments of these two forces must each vanish, because the point about which the moments are taken is on the line of action of each force. Hence there remain only the moments of D A and A B to deal with. Therefore—

Moment of D A = moment of A B;
that is— D A × L N = A B × M N;
therefore— L N : M N : : A B : D A.

Thus the construction is join L M Fig. 45 (*a*); draw *b d*, Fig. 45 (*b*), parallel to L M; then from the similar triangles L N M, *b a d*—

L N : N M : : *a b* : *d a*.

Therefore *d a* gives the value of the force D A, and *b c*, *c d*, parallel respectively to B C, C D, give the value of these other forces.

It is thus seen that the *construction* in (2) is the same as that obtained in (1); but for purposes of *arithmetical calculation* the principle of moments is very convenient and highly valuable. Thus, since—

$$DA\times LN=AB\times MN,$$

we must have— $$DA=AB\times\frac{MN}{LN},$$
$$=AB\times\frac{8'\,6''}{8'\,3'},$$
$$=AB\times\frac{102''}{99''},$$
$$=AB\times\frac{34}{33}.$$

(3) The funicular polygon may be used with

great advantage when there are several given forces to deal with. In the present case there is no saving of labour by its use; but perhaps the principles will be the better understood from the fewness of the lines. We have to bear in mind that, since there is equilibrium, the force polygon and the funicular polygon must both close.

In Fig. 46 (*a*), the lines of action of the external forces are shown; the numbering indicates the order in which the forces will be taken in the force polygon. It is evident that each pair of parallel forces will also be equal, since the force polygon becomes a parallelogram when the forces are taken in a certain order.

In Fig. 46 (*b*), *a b* represents the force 1; therefore we know that *b a* will represent the force 4. Take any pole, *o*; join *o a*, *o b*; draw anywhere, Fig. 46 (*a*), the line 1, 4 parallel to *o a* to terminate on lines 1 and 4; draw 4, 3 parallel to *o b*; draw 1, 2 parallel to *o b*; join 3, 2; this is the *closing-line* of the funicular polygon. Draw *o c* parallel to 3, 2, to meet *b c* drawn parallel to the forces 2 and 3; then *a b c b a* is the polygon of the forces 1, 2, 3, 4; and thus the required thrusts are determined.

The reader is reminded that the side of the funicular polygon which terminates on the lines of action of two forces is parallel to the vector from the pole to the intersection of the corresponding forces in the force polygon, and that in Fig. 46 (*b*) two of the vectors coincide, since *b* is the point of intersection of the forces 1 and 2, and of the forces 2 and 3.

Another method of working out the unknown external forces is shown in Figs. 47 (*a*), 47 (*b*). Here the forces are taken in their original order.

In Fig. 47 (*b*) draw *a b* to represent the load; take any point *o*, and draw the vectors *o a*, *o b*. In Fig. 47 (*a*) starting from 1, the point of intersection of B C, C D, draw 1, 2 parallel to *b o*, to meet A B at 2; draw 2,3 parallel to *o a* to meet D A at 3; join 1, 3; then 1, 3 is the *closing-line* of the funicular polygon of the forces A B, B C, C D, D A; draw *o d* in Fig. 47 (*b*) parallel to 1, 3, to meet *a d* parallel to A D. Then *d a* represents the force D A, and *b c*, *c d*, parallel respectively to B C, C D, will complete the polygon of the external forces. The special feature of this construction is that one of the unknown sides of the funicular polygon (that which would be parallel to *o c*) is got rid of by using the point of intersection of the two forces, B C, C D, as a corner of the funicular polygon; this enabled us to find the direction of the fourth side, 1, 3, and so to get the direction of the vector *o d*, and, therefore, also the point *d*. It is often of great advantage for one side of a funicular polygon to be thus made to vanish.

J. C. PALMER.

NOTES FROM PARIS.

SOME uneasiness is being felt in certain quarters over the question of the proposed metropolitan railway for Paris, the work for which, it appears, will be carried out by the Compagnie Générale de Traction, with which company the municipal council is entering into contract. It is stated that out of 125,000 shares, subscribed by 58 persons, 7,750 are in the hands of English business men, whilst the acting directors are Belgians. If this is true, the undertaking will be largely in English hands, and the uneasiness shown by the Frenchman, who considers that such an affair should be strictly French, is easily understood.

A new and very interesting museum has just been installed by M. Jules Guiffrey at the Manufacture Nationale des Gobelins, and is destined to contain the best examples of retrospective and modern styles of tapestry in France since 1700. The new museum is arranged in the Chapelle des Gobelins, a building presumed to have been built by one of the Gabriels. There are examples of old tapestry work signed by Coypel, de Berain, Van der Meulen, Boucher, and other celebrated old masters, and to these are added a large number of water-colours reproducing the tapestries of all the schools from the 15th century, and the sketches of contemporary artists whose designs may be required by the national manufactory of tapestry. This museum is of high interest, and should be visited by all designers of tapestry; it will also form an addition field of study for the artisans and apprentices of the manufactory.

The picturesque corners and old smaller buildings of Paris are gradually disappearing; but, fortunately, the best and most interesting examples of old work are jealously guarded by those who make it a duty of doing their utmost to preserve such work. The interesting Hôtel d'Anglade, in the Rue des Archives, has just been sold to the highest bidder and is to be demolished, its position not allowing any means of preserving it. This mansion was built in 1667, under Louis XIV. for François de Juge, and is in all probability the work of the famous Mansart, or, some say, of his brother-in-law, Robert de Cotte, the official architect of Louis XIV. The sculpture decoration of the exterior and interior is the work of Coysevox and his pupils, and the three large painted ceiling panels are the work of Charles de Lafosse, pupil of the great Le Brun, the architect-painter, who designed the Apollo gallery at the Louvre, and whose pupil, Lafosse, was intrusted by Mansart with the decoration of the Invalides. This mansion was classed for some time as an historical monument, but had to be abandoned; it is hoped, however, that all work which may escape the hands of the demolishing contractor will be preserved for one of the museums.

The Minister of Commerce has announced that the future salons will be installed in the immense hall of the Galerie des Machines, in the Champ de Mars. The wide gallery of the first floor will be divided up by partitions, and will afford ample accommodation for the paintings and drawings of the two rival salons; the sculpture gardens will be arranged on the ground floor.

The following architects have now been definitely commissioned with the various portions of the work for the coming Exposition of 1900, and the list may not be uninteresting to those who intend sharing in the important display of exhibits which Great Britain proposes to make:—M. Girault is the chief architect of the two fine palaces now being erected in the Champs Elysées, MM. Deglane, Louvet, and Thomas being charged with various portions of the work; M. Binet has the monumental entrances on the Place de la Concorde and the Champs Elysées; MM. Cassien Bernard and Cousin have the designing of the decorative portion of this fine new bridge, Alexandre III., and the arrangement of the quays of the Seine above the Invalides; MM. Toudoire and Pradelle have the palaces of education and the buildings for the exhibits of national manufacture; Esquié, that to contain the exhibits of work for the decoration of private and public buildings; Gauthier, the palace of horticulture and the quays over the Alma bridge; Mewes, the buildings of social economy and congress; Tronchet and Rey, the pavilions of navigation, forests, hunting, and fishing, and the quays below the Alma bridge; Sortais, the palace of letters, science, and art; Varcollier, that of alimentation; and Blavette, those for textile arts and industries; Hermant, the palace of civil engineering and means of transport; Paulin, that of machines, mines, and metallurgy, and the Chateau d'Eau, in the Champ de Mars; Henard, the palace of electricity and that of chemical industries; Raulin, the arrangement of the Galerie des Machines as a Salle de Fêtes; Deperthes, the palace of the colonies; Troppey-Bailley, the pavilions of ceramic, crystal, and glass industries; Bonnier, is chief of the section of installations; and Masson Detourbet, the arrangement of the foreign sections.

One of the immense steel caissons for the abutments of the new bridge Alexandre III. is completed. These two caissons will be the largest and heaviest constructed up to this time, each one weighs 3,800 tons, with dimensions 154ft. by 125ft. All the powers have now promised their official adherence to the Exposition of 1900, excepting Brazil, Paraguay, Siam, and Venezuela. The United States Government has voted a sum of 500,000dol., an amount which should permit the States to be very completely represented at this Exposition.

A new room is being arranged in the Louvre Museum for containing the plaster casts to be taken from the ancient chefs-d'œuvre, the originals of which are scattered in the principal foreign museums. This new room, situated between the principal entrance to the Louvre and the Porte Jean Goujon, was once used as a riding school by the Prince Imperial. The vaulting is supported by a number of columns with capitals sculptured by Fremiet, representing hunting attributes; the decoration of the room, which was once very magnificent, has unfortunately been allowed to deteriorate, but will be restored in some portions.

The Arc de Triomphe of the Place de l'Etoile is still encumbered with the massive scaffolding necessary for the work of restoration; the first credit voted for this work was £5,000; but a larger sum will probably be required to execute the complete restoration of the monument and the chefs-d'ouvre of the sculptors Rude, Etex, Lemaire, and Chaponnière.

The recent disastrous fire of the Rue Jean Goujon has once more opened the eyes of the authorities to the necessity of prescribing rigorous measures and regulations for the security of the public in places of entertainment, and a number of theatres and music-halls have been temporarily closed for the necessary work. A sum of £7,000 has been voted by the Government for this work at the Grand Opera House. As the cost of a new iron curtain to the stage would be over £4,000 it has been decided to retain the existing one, and further protect it by a curtain of asbestos. This economy will permit the work in the various portions of the theatre to be executed in a very complete and thorough manner.

The works sent in by the students of painting, sculpture, and architecture at Rome, are now being exhibited at the Ecole des Beaux-Arts, and form an especially interesting show this year. M. Lefevre has a marble group entitled "Niobe," a really remarkable piece of work; the principal figure, personifying maternal grief, is very striking in its effect and execution. "The Tireure d'Epine" and "L'Amour du Guet," by M. Roux, are very prettily and excellently treated; the "Pelerin de la Vie," and a graceful statue sent in by M. Roussel, and the clever medallion relief, "Souvenir Français," by M. Coudray, complete the works of this year. The large hall of the first floor is devoted to the exhibits of painting and architecture; the strange and fanciful picture of M. Lavergne, "Œdipus," has great success, and "The Past Illusion," by the same artist, is characteristic of the bold qualities of the work of this young painter. "The Christ and the Adulterous Woman," by M. Descheneaud, is a picture remarkably well-lighted, and the "Samson and Delila," of M. Leroux, is rich in colour, the principal figures being exceedingly well-lighted and modelled. The picture by M. Larée, "The Body of St. Vincent Protected by Ravens," is clever, with its sombre twilight effect. In architecture, M. Pille has an interesting and carefully-measured drawing of a pretty Composite capital found at the Palatine Mount, the large-size details of which, drawn in red chalk, show the graceful curves of the acanthus leaves and the ram's horns. M. Recoura sends a large and well-drawn and coloured study of the funeral monument raised in the Church of Santa Maria in Ara Coeli, Rome, to the memory of Cardinal Lebretto (1465). M. Patouillard has a conscientiously washed drawing, giving the restoration of the entablature of the Temple of Peace at Rome. M. Chaussemiche gives the actual state and the restoration of the column of Mars the Avenger at Rome, and a few sketches, the most interesting being that of a Roman house of the 16th century, the façade of which is ornamented with very clever sgraffito work, which has been excellently indicated in the drawing. M. Eustache has measured the important excavations of the house of the Vestal Virgin in the Via Sacra, of great interest and archæological value, and M. Bertone sends the complete measured drawings and restoration of a temple of Ba'al Schamin at Palmyra, with large-scale details, drawn in red chalk with great exactness, giving the curious style of the sculpture and decorative work of this small temple.

The works of the students of painting who have competed for the Prix de Rome, are on exhibition at the Ecole des Beaux-Arts. The subject for competition was, "Vulcan, aided by Force and Violence, enchains Prometheus on the summit of the Caucasus." This subject, drawn from the tragedy of Æschylus, necessitated treating with much boldness, and the symbolical figures of Force and Violence should take a very important part in the composition of the picture. The candidates, however, appear to have lost sight of this, and to have misunderstood the real advantages which such a subject allowed for interpretation; the larger proportion of the ten paintings are, therefore, wanting in character and vigour, although several contain excellent qualities of grouping and execution. Amongst the best of these are the painting of M. Wielhorski, who shows us a Prometheus, with vigorously-contracted muscles; a Vulcan, whose pose is natural, with excellently modelled

figures of Force and Violence aiding him to bind Prometheus; that of M. Isaac Boisson, full of good qualities of colour and impressionist in style; those of MM. Galand and Charbonneau, both well painted, and that of M. Louis Roger, which is certainly the best of these. The two principal figures, of Prometheus and Vulcan, are shown in brilliant lighting and striking relief, and the strength and action of the two bodies are almost vigorously expressed.

A credit of £1,000 has been allowed for transforming the covered gallery surrounding the magnificent assembly hall of the Trocadero into a closed-in vestibule, and the architect, M. Bourdais, has been requested to submit a scheme for greatly enlarging the palace in view of the coming Exposition; it is proposed to add two important pavilions for salles de fêtes and exhibitions at the ends of the curved wings of the building; this would greatly change the aspect of the Trocadero and encroach largely on the gardens; but, on the other hand, the additions are necessary, and would not form an unpleasing feature in the ensemble.

The construction of six lines of railway through Paris has been voted by the municipal council, and it is hoped that Paris will at last have its much-wanted metropolitan railway. The lines will be of narrow gauge and electricity employed as motive power. The town of Paris is authorised to borrow 165,000,000f. for this work, which is to be intrusted to the Compagnie Générale de Traction. It is proposed to fix the fares at an equal sum for a portion only or the whole of distance available—a system which would work very well at Paris.

"GOOD TENANTABLE REPAIR."

WHAT constitutes "good tenantable repair" is a question of every-day importance in the preparation and signing of agreements and leases. The fault is often with a tenant himself, who signs an agreement to keep in repair a house that is dilapidated, and render it up in a better state. The reports of cases of this description give very little information for the guidance of lessees and tenants. A very ordinary clause in an agreement is that during the said term, say of three years, the tenant "agrees to keep the said premises in good tenantable repair, and so leave the same at the expiration thereof." But the question of "commissive" and "permissive" waste comes in—in other words, the tenant's liability depends on whether he has allowed the premises to fall into a dilapidated state from want of proper care and attention. As, for instance, the tenant may neglect to paint or do some little repair, and by his neglect further damage is caused to the building, and he must make good the further damage also. Many people who sign agreements with this covenant have an idea that the phrase "good tenantable repair" is intended only to refer to such trifling repairs as paper-hanging and painting, whitewashing, &c., and that they are not liable for any structural or substantial repair. But in many cases a person may find himself mistaken if he takes this view of his obligation. A man who has bound himself to keep the premises in "tenantable repair" may be called upon to do a great deal more than he expected—for instance, he may be called upon to make good damage to a roof or a chimney that was damaged by a storm. A high wind, for instance, may dislodge slates and cause damage to the ceiling below by rain coming through; or the wind may tear up a lead-flashing or a flat, exposing the roof to serious damage. The tenant would be answerable for such injury by neglecting to make timely repairs Yet it is very difficult to say under some circumstances what may be reasonably interpreted as tenantable repair. We may imagine the leadwork worn out, or the brickwork, through age and decayed joints, incapable of securing the lead, or the timber, through age, decayed so much as to render the slates insecure—a condition of things that would alter materially the question, and make it unreasonable to call upon the tenant to repair and make good what is worn out by age. The age and class of premises ought to be considered. One definition of tenantable repair appears to be reasonable, and may be considered as decisive. It was given by the late Baron Alderson, in "Belcher v. Mackintosh." He said, "It is difficult to suggest any material difference between the term 'habitable repair' and the more common expression, 'tenantable repair'; they both import such a state as to repair that the premises might be used and dwelt in not only with safety, but with reasonable comfort by the class of persons by whom, and for the sort of purposes for which, they were to be occupied." Applying this ruling to old premises which have become dilapidated, it is quite clear that the tenant is not expected to give the landlord new buildings at the expiration of his term, but that he should deliver them up fit to be occupied for the purposes they were used for. Lord Esher, in a judgment on appeal ("Proudfoot v. Hart"), decided in this sense. He considered it was not sufficient for the tenant to deliver up the premises in the same condition of repair as he took them, but in good repair, even if they were not in good repair when the tenancy began. Lord Esher also quoted Lord Justice Lopes' definition, with which he entirely agreed. "'Good tenantable repair' is such repair as, having regard to the age, character, and locality of the house, would make it reasonably fit for the occupation of a reasonably-minded tenant of the class who would be likely to take it." On these grounds it is considered that when the premises are not in repair when a tenant enters, and he undertakes to keep them in repair, he must put them into repair before he leaves, in order to discharge his obligation to keep and deliver them up in repair. We can apply this principle to such repairs as papering, painting, and decorating, which are the kinds of repair generally looked for by incoming tenants. It does not mean to assert that a tenant must repaper with a similar paper to that which was on the walls when he took the house, and repaint it with similar paint to that which was painted. Certainly not; but the tenant is still required to repaper and paint occasionally to keep the house in tenantable condition. If the paper or the paint is merely in a worse condition than when the tenant entered, he is certainly not compelled to repaper or repaint so long as a reasonable-minded person would regard it as in a fair state of repair. But if it has been torn off in places or become peeled off by damp, the tenant may reasonably be called upon to repaper, not with paper of the same value or of a richer pattern, but of a kind which would satisfy any reasonable man. So with painting. If it has been worn or washed off to such a degree as to expose the wood to decay or to look shabby, the tenant can be reasonably expected to repaint; and it ought to be in the same manner or style, if possible, that would suit the locality and the class of tenant. As to ornamental work, say a gilded or painted ceiling which has become worn and looks shabby, the tenant can hardly be expected to put it in the same condition so long as it is decent. As to more structural matters, like a rotten floor or leaky roof, a tenant who takes a house in such a state is to blame for not seeing it put in a proper state before he takes it. But if he takes it in such a condition, his obligation to keep in tenantable repair is binding upon him. So that if the roof is leaky he must make it watertight, and if a floor is too rotten he must put a new one down. And these demands are reasonable, though tenants regard them as arbitrary and exacting.

COUNTY COUNCIL WORKS DEPARTMENT.

THE Works Committee of the London County Council, having been inferentially abolished by the resolution passed by Council on June 28, the General Purposes Committee have prepared a series of regulations for the administration of the department under the new conditions. These rules define the manner in which work to be carried out without the intervention of a contractor must be undertaken. Unless otherwise ordered, they are to be carried out by the manager of the Works Department, who shall be responsible to the Executive Committee in the same way as a contractor would be. The Finance Committee is to have control of the finances of the department. It is also proposed that any Committee contemplating the execution of any work shall, before coming to a decision, obtain an estimate from the proper officer. When the estimate is received, if the Committee should then decide to recommend the Council to have the work carried out without the intervention of a contractor, they shall, before reporting to the Council, refer the estimate, together with full plans and specifications, to the manager of the Works Department for his examination and report. Most of the recommendations deal with minor details of administration, with the management of the staff, and with the finances of the department. Under this latter head it is proposed that the accounts shall be kept by a works accountant, who will be responsible to the Finance Committee of the Council. The position of the manager of the Works Department is defined in the following clause:—The head of the Works Department is to be styled "manager of works," and is to be responsible, unless in any case it is otherwise ordered, for the execution of all works executed on behalf of the Council without the intervention of a contractor; he is also to be responsible under the Finance Committee for advising as to the purchase of plant and material, the employment and supervision of all officers and workmen in his department or employed on works, and the care, regulation, and direction of all workshops and depots connected with the Works Department, including the central works; and is also to be responsible to the Finance Committee for the custody, issue, and use of all plant, materials, and stores purchased in connection with works executed; and, in addition to the other conditions on which he holds his appointment, he is to give his whole time to the duties of his office, and is not to take any private business; and any fees received by him, either as a witness or in any other capacity, and any discount or allowance on materials purchased are to be paid to the Council; and, further, on retirement he shall not be entitled and shall not make any claim to any retiring allowance under the Superannuations Act, 1866, and he shall be subject to the Council's regulations in respect of a superannuation and provident fund.

CONSTRUCTION OF ARCHES IN CONCRETE.—IX.

THERE are still two examples of the compound system of concrete construction remaining on our list to be inquired into, and their powers of resistance investigated. They are respectively the Metropolitan and the Expanded Metal Systems. A cross-section of one bay of the first type is represented in Fig. 1, and may be thus described. In the concrete or matrix, as it might be termed, are embedded a number of wire strands *b-b* from 2in. to 3in. apart, which are of sufficient length to extend in one stretch over some half-dozen of the rolled beams *a a*. A camber of about 6in. is given to the wire strands by causing them to pass underneath an iron rod *d*, varying in diameter from ½in. to ¼in., which is also buried in the matrix. In this particular example, the mixture or concrete, which is in a semi-fluid state, sets or hardens very rapidly, so much so that the temporary centres can be struck an hour after the filling in is completed. While the necessity of employing false centring, which has been shown not to be required in the Roebling System, is a slight disadvantage, they can be shifted so quickly as scarcely to cause any extra delay in executing work. Instead of sawdust, wood shavings as well as other mixtures, are employed, and also in a type of concrete flooring very similar to that shown in Fig. 1, and the iron rod is replaced by ordinary lengths of gas-piping. A modified form is also in use, which retains the wires in the flooring, but strengthens the ceiling with flat iron bars, resting on the lower flanges of the rolled beams, and also imbedded in the matrix. Where appearance is an object, as it is in all cases where a ceiling is brought in evidence, the great objection to the wire system is that the inevitable corrosion of the metal, if unprotected in any way, discolours the plastering. This drawback, which, however, does not exist for engineering structures of the character already described, may be almost entirely nullified by the employment of galvanised iron wires, or by any one of the many processes and devices by which that material is protected from rust and decay. Another objection is of considerably more importance, and by no means so easily remedied, although, fortunately, it belongs only to one particular method of construction—viz., that in which sawdust is used. This substance not only absorbs a very large proportion of water, but retains it for a great length of time. It, in fact, will not dry for a long time thoroughly, and the only manner (in instances in which rapid drying is essential) by which the evil can be effectually overcome is the employment of another material, of which there is a fair amount to select from.

Smith gave an address as to the excavations which had been made by the students of the school, and the proceedings terminated with a vote of thanks to the president for presiding.

IRON ROOF OVER THE MACHINE HALL OF THE GENEVA EXPOSITION.

IN a recent is ue of the *Bulletin de la Société Vaudoise des Ingénieurs et des Architects*, M. J. Gaudard discusses the novel structure erected by Messrs. Th. Bell and Co., of Lucerne, and designed by their engineer, Mr. C. Doucas, where the pure cantilever principle is applied to roofs. The cantilevers rest on columns 124ft. 8in. apart and 47ft. 5in. high; they are anchored down to standards 35ft. 6in. high at the side walls, which are 288ft. 8½in. apart. At the centre, between the free ends of the cantilevers, is a space of 25ft. 3in. spanned by a ventilator roof. The standards, being designed to resist the whole of the wind-pressure, have a base of 5ft. 7in., and are anchored on to blocks of concrete. The length of the building, 490ft. 6in., is divided into nine intermediate bays of 47ft. 7in. and two end bays of 31ft. 2in. The cantilever principals inclosing the end bays meet in an expansion-joint in the centre, the ventilator only extending over the inner nine bays. In this part there are 10 latticed purlins. The intermediate rafters supported by the purlins are 15ft. 10in. apart and 3ft. 3in. deep, and carry intermediate H-bar purlins. There is no wind-bracing except in the two end bays.

The main bracing in the principals, purlins, and intermediate rafters is arranged in single triangulation, and generally consists either of two angle bars riveted together or of single angle-bars, the length of these members varying from 4ft. to 10ft. Columns and standards are also made of single triangulation lattice-work. The lightness of the structure is remarkable.

Before carrying out the design, the committee of the Exhibition submitted it to the criticism of Professor Ritter, of Zurich, who approved of it, and recommended the following factors for the calculation of strength:—Snow load, 6·14lb. per superficial foot; wind-pressure, 16·38lb. per superficial foot; tension or compression on wrought iron, seven tons per square inch. The total weight of wrought iron is about 500 tons—i.e., 7·78lb. per superficial foot, or 0·135lb. per cubic foot inclosed. The iron structure, after having served its purpose, became the property of the contractors.

THE MARCHIONESS OF LORNE AS AN ARCHITECT.

PRINCESS LOUISE, Marchioness of Lorne, who opened Mr. Passmore Edwards' new convalescent home at Cranbrook on Tuesday, is familiar to the public as an amateur painter, and as one who can handle the sculptor's chisel. Her Royal Highness has now turned her attention to the more practical art of architecture, and workmen are at present engaged in completing a building designed by the Marchioness (with the assistance of a young London architect), and erected on the Argyll ducal estate in Scotland. The plans designed by her Royal Highness were for the extension of the little hostelry at Roseneath, a sylvan shaded resort most charmingly situated on the western bank of one of the long blue lochs that open off the Firth of Clyde. Roseneath is one of the most secluded retreats on the Clyde. On this account the Marchioness and the Marquess of Lorne have for some years past found in Roseneath a delightfully quiet recruiting ground at the close of the London season, and the little inn has been their home. The enlargement designed by the Marchioness is being carried out to provide a wing for the distinguished couple when they visit the district. The wing will include some half-a-dozen bedrooms, public rooms, a spacious hall and offices; and the plans have been drawn up with an architectural success so great that the work may in coming years be looked back upon as the pioneer design in the opening up of a new field for the ever-widening work of womankind. The drawing-room is a handsome apartment, and its large windows face the picturesque waters of the Gareloch and Ben Lomond; while a spy window has been inserted—no doubt for the purpose of commanding a pretty peep of the western sunsets and the Argyll hills. There is also an alcoved fireplace with arched stone mantelpiece. In the dining-room the windows have mediæval arches and iron mullions, with casements and small panes. A gun-room is also provided, and, as becometh a lady architect, the kitchen is a culinary poem in red tiles. Internally perfect in design, externally the building is straggling and far from pretty. It has many quaint features, however, in the form of knobbed rhones, spouts instead of rain-conductors, and basket windows. The design is royal and also unique, and the inn when finished will be by no means a conventional one. So close is the interest taken in the work connected with the rearranged hostelry by her Royal Highness, that she intends herself to paint the device on the sign that is to hang in old-time fashion over the doorway of the public entrance to the building; and the walls of the new apartments are to be artistically decorated according to the Marchioness's own scheme of treatment.

MODERN OPERA HOUSES AND THEATRES.

MR. EDWIN O. SACHS has sent us the second volume of his great work, published for him by Mr. B. T. Batsford, under the above title. Neither trouble nor expense have been spared to make the book as complete and thorough as possible, and, moreover, the drawings are uniformly delineated in firm, well-defined outline, at once practical and technical, showing the buildings chosen for illustration in a complete and useful way. The undertaking surpasses anything of the kind ever attempted in this country before, and the editor certainly has got together a collection of theatres and kindred buildings which is quite unique. When the first volume appeared some time since we spoke favourably of Mr. Sachs's venture, upon which he has in no way slackened his endeavour to make his book worthy of the occasion; indeed, as a financial success it must be exceedingly doubtful, so lavish has been the editor's outlay. Of this the subscribers and readers of this great folio have the distinct advantage. To the architect engaged on theatre or entertainment-hall buildings such a book must be of the utmost value, for there are in this volume alone 100 plates and 95 illustrations in the text. Among the English theatres illustrated in the present book are "The Lyric" and "Her Majesty's" in the Haymarket, "The Garrick," "The Empire," and "The Oxford" Variety Theatre, all in London; the Shakespeare Memorial Theatre, Stratford-on-Avon; "The Grand" Theatre, Leeds; and the "New" Theatre, Cambridge. The National Opera House Paris, and the "National" Opera Comique, and the "Eden" Variety Theatre are further representatives from Paris. Other theatres are included from Italy, Spain, Austria, Hungary, Germany, Greece, Roumania, Holland, and Switzerland. All of these are represented by plans, several are shown in sections, and elevations of all are given. The amount of labour and correspondence in collecting so much information must be patent to everyone. The editor has not merely contented himself with this task of compilation, but he enters in detail into the schemes which his types represent. To take an example, "The Lirico" Theatre, Milan, which was opened about three years ago. No architect was employed, but a "master builder" (one Achille Sfondrini), a specialist, who travels from town to town erecting theatres and other places of amusement. "He is certainly quite an extraordinary character, and one cannot but be struck on the one hand by his remarkable ability in directing his men and managing his work, and on the other by his ignorance of the most elementary principles of design and the necessities of modern theatre construction." "To erect a playhouse of this size under considerable difficulties, without any of the facilities of draughtsmanship, and without even the knowledge afforded by ordinary school education or elementary technical instruction is no mean achievement in the annals of this age of progress." The theatre thus alluded to is one of the best of its class, and the façades are executed in plaster in a style quite above the average for work of this description. The Paris Opera House and the Court Opera House, Vienna, take the lead in Continental theatre building, and these are followed closely by the Municipal Theatre at Palermo and the Hofburg Theatre, the most architecturally meritorious of them all in the opinion of the editor. Although small, none for picturesqueness surpassed Mr. Unsworth's theatre at Stratford-on-Avon. To institute a comparason, however, between such diverse buildings as those gathered together in Mr. Sachs's monumental volume, would prove a task beyond our limitations of space, and little practical utility would result from such a brief inquiry in so restricted a notice as this, wherein the pleasurable duty of informing the reader in general terms of what he can obtain from the book itself has mainly to be kept in view. The plans alone, without sections, would be scarcely understandable where levels change at almost every few inches, and where in no instance does the same plane extend over the whole area. On limited sites, with often other requirements to consider apart from the sole business of a theatre, the complication of planning is often most intricate and ingenious. Awkward sites not infrequently result in extremely clever arrangements, especially in the contrivance of the entrance lobbies and staircases to various parts of the house. Herein nearly always, of course, consists one of the chief essential merits, or otherwise, of a theatre plan. To obtain an unobstructed view of the stage from all parts of the house, too, presents a problem which is met in a variety of ways, with, of course, varying degrees of success, as a reference to Mr. Sachs's comprehensive volume will show.

THE ENGINEERS' DIRECTORY.

MESSRS. KELLY AND CO. (Kelly's Directories, Ltd.), of 182, High Holborn, W.C., have just issued the eighth edition of their indispensable "Engineers' and Iron and Metal Trades Directory," a work which, during the past 27 years, has been the standard work of reference for all concerned. It is gratifying to note that the depression which afflicted these great industries at the time of the issue of the last edition has passed away. Last year was indeed a record one, as far as the production and working of pig-iron and steel were concerned. The total make of pig-iron in 1896 was 8,563,209 tons, while the output of British steel reached nearly four million tons. As the trades represented grow, so this bulky but admirably arranged Directory increases, and it is hardly possible to eulogise too highly the painstaking care which is exercised by its compilers to secure comprehensiveness and accuracy.

CHIPS.

The trustees of the Edinburgh Orphan Hospital have adopted plans by Mr. Allan Carter, C.E., for improving the lavatory and sanitary arrangements at the hospital at an estimated cost of £1,500.

Mr. W. O. E. Meade-King, M.I.C.E., has held a Local Government Board inquiry at Knaresborough with reference to an application by the rural district council for sanction to a loan of £3,550 for sewage and sewage-disposal works for the township of Bilton.

The will of Mr. George Thomas Robinson, F.S.A., the well-known authority on plaster work and decoration, of 20, Earl's-terrace, Kensington, who died on May 6th, was proved on July 2 by Mrs. Frances Robinson, the widow and sole executrix, the value of the personal estate being £10,500 4s. 11d. The testator leaves everything he died possessed of to his wife absolutely.

A stained-glass memorial window has been placed in the parish church of Moffat, N B. The window, which is one of two lights, has been filled with an illustration of the text, "Be thou faithful unto death, and I will give thee a crown of life." The window has been executed by Messrs. Ballantine and Gardiner, Edinburgh.

A new Wesleyan chapel is being built in Marlborough-road, St. Alban's, at a cost of about £4,000. The building will be of red bricks with stone dressings, and the style will be Gothic, a tower being placed between the chapel and the adjoining schoolroom.

The memorial to be erected at Freemantle Church, near Southampton, as a Diamond Jubilee celebration, namely, new oak choir stalls, to replace the present communion rails with brass, and to renovate the flooring in the chancel, is now well in hand. The cost of the work will be £350.

The enlargement of St. George's parish church, Gravesend, is now in progress at an estimated cost of £2,000. A new north aisle is being provided and the galleries, except that at the west end, are being done away with, but the new arrangement will provide 680 seats on the ground floor instead of 400 as formerly. The removal of the organ to a small gallery in the south-east corner of the church, over the Joynes' memorial window, is also contemplated.

Building Intelligence.

CRANBROOK.—The Passmore Edwards Convalescent Home at Cranbrook, near Staplehurst, was opened on Tuesday afternoon by Princess Louise, Marchioness of Lorne. The home, which is provided in connection with the Metropolitan Hospital, Kingsland-road, N.E., and which was illustrated in our pages on October 16, 1896, stands on Starvenden Farm, Cranbrook, the site having been presented by Mr. F. S. W. Cornwallis, formerly M.P. for Maidstone. To enable the hospital committee to avail themselves of a legacy of £10,500 left by the late Mr. Henry Spicer, who stipulated that the interest only was to be used, and that for Samaritan purposes, Mr. Passmore Edwards, immediately on being appealed to, gave £3,000 wherewith to build the home, which will accommodate six male, six female, and six child patients, and has been so designed as to allow of future extension. The ground floor contains lobby, hall, dining-room, day room, rooms for the matron and nurses, baths, and the usual domestic offices. On the upper floor, over the principal entrance, is the matron's and nurses' bedrooms, with inspection windows looking into the men's and women's wards respectively. There is also a private bath-room for the matron and nurse. The children's dormitory is over the dining-hall, with a nurses' bedroom adjoining. The back stairs lead to a mending and ironing room and servants' bedrooms. At the end there is a male attendant's bedroom, reached by a private stair over the outer offices. The building is faced with hard local red bricks. The walls of the upper floor are covered with hanging tiles, and the roofs with red roofing tiles. The exterior is homely and simple in design, greater attention being given to internal comfort rather than to external effect. The site is sheltered from the North and N.W. by the rising land at the back and the wood at the side. The builders were Messrs. Jas. Wood and Son, Boughton Monchelsea, near Maidstone, Kent. Mr. Charles Grieve was the architect. Mr. Passmore Edwards has promised to erect a cottage hospital for Cranbrook, provided the ground is given.

HARROGATE.—The new Royal Baths will be opened by the Duke of Cambridge to-day (Friday). They have been built at a cost of about £100,000, from plans by Messrs. Baggallay and Bristowe, of London, selected in open competition. The buildings face Montpelier-road, are Renaissance in style, and are fronted with stone. The central dome rises to the height of 100ft. The institute consists of a central pump-room, a water-garden 220ft. by 42ft. covered in with glass, suites of baths and dressing-rooms, accommodating 140 bathers at once, special and sulphur baths, Turkish baths, and rooms for massage, inhalation of vapour, &c. In connection with the central hall are cooling, reading, and refreshment rooms, and the manager's rooms. The basement contains accommodation for attendants, laundry, bathing machinery, pumps, boilers and pipe subways. The whole of the bath-room floors are laid with marble tiles, and the floor of the large dressing-room is laid with polished oak parquet.

HOLLOWAY ROAD, N.—On Thursday afternoon in last week the Lord Mayor formally opened the Great Hall of the Northern Polytechnic Institute in the Holloway-road. This institute was founded under a scheme of the City Parochial Charities Act, and towards the cost of construction the Clothworkers' Company subscribed £17,500, whilst other City guilds made grants amounting to £2,500. We illustrated the architect's design as selected in competition in our issue of August 24, 1894. The educational buildings at present erected consist of two blocks—one with a frontage on the Holloway-road, and the other roughly parallel with it some 200ft. away. These two blocks are connected by a corridor, on the north side of which is the great hall; while on the south side is a plot of ground, covering nearly twice the area of the hall, on which are afterwards to be erected the remaining buildings of the institute. Each of the main blocks consists of three floors. In front the ground-floor is taken up by the entrance hall, the principal's room, and the secretary's offices. Above are the drawing office, the engineering department, and the physical lecture theatre and laboratory. The second block contains the brickwork shop, the smithy, the carpenters' shop, and the mechanical and chemical laboratories. On the ground-floor, beside the hall, are the gymnasium and a common room. The great hall is approached from the Holloway-road by means of a vestibule. It measures some 100ft. by 55ft., will seat over 1,200 persons, and is fitted with an orchestral platform. The roof is elliptical shaped, and is covered with fibrous plaster divided into panels with ornamental centres, every alternate panel containing an electric light. In the daytime the hall is lighted by circular-headed windows supported by stone columns, each bay containing three windows inclosed in a setting of moulded bricks, whilst the floor is of solid cubes, and has a gradual slope from the entrance to the front of the platform. The gallery has a separate entrance from the Holloway-road, and an emergency exit to the rear. In the front there are three doorways, with three on the north side as exits, leading into a corridor connecting the body of the hall with the orchestra platform. Beneath the platform is a retiring-room, with other rooms for artists, speakers, &c., whilst lavatories are also provided close by. The heating is by steam, conveyed in pipes along channels each side of the hall. The ventilation is so arranged that fresh air enters the steam-heated channels from the outside, passes warmed into the building, and is drawn away through the ceiling openings to exhaust ventilators on the roof of the hall, whilst an additional supply of fresh air is also obtained by openings the full width of the side windows, forming a sill made of iron. The architect was Mr. Charles Bell, F.R.I.B.A., 3, Salters' Hall-court, Cannon-street, and the work has been carried out by Messrs. Macfarlane Brothers, of Holloway.

HYDE.—The foundation-stone of the new Technical School and Free Library was laid last week in Union-street. The style is a free treatment of English Renaissance. The building is divided in two sections, a public free library in the one, and a science, art, and technical school in the other. The public library is central, so as to provide supervision of the adjacent rooms. The lending department is both top and side lighted, and will provide accommodation for 14,000 volumes. A public reading room with bays and recessed fireplace ingle is also provided, together with news room, librarian's office, general store room for periodicals and newspapers, cataloguing and repairing room, a separate room for specifications of patents, as well as lavatory accommodation and conveniences for the staff. The technical school portion of the structure comprises on the basement floor provisian for the teaching of cookery, dressmaking, laundry work, and art modelling, store room for cycles, together with cloak and lavatory accommodation, and space for heating-boilers, coal, coke, &c. On the ground floor classrooms are obtained for the teaching of commercial subjects, committee room, secretary's room, together with lavatory and other accommodation. The building is approached by two main entrances from this floor, with a vestibule to each, one facing Union-street and one a new street, communicating with corridors by wide fire-proof staircases to every floor. On the first floor are elementary art room, advanced art room, art master's own room, elementary drawing room, physical laboratory, chemical laboratory for forty students, together with sulph. hydro. room, balance and re-agent rooms, combustion room, master's room, and a large lecture theatre provided with a raised gallery to seat 100 students; also preparation room, store-room, lavatories, &c. The chemical laboratory, as well as the lecture theatre, will each have open timbered roofs, and are lighted by mullioned and transomed windows. The art rooms are principally north lighted, with windows as free as possible from divisional bars. The building throughout will be warmed with hot water on the low pressure system, the vitiated air being extracted by means of trunks in the ceiling, connected with exhaust ventilators on the roofs and in the main turret. All exposed internal joinery is to be executed in selected pitch-pine, slightly stained and varnished, the floors of corridors, passages, &c., being wood blocks laid on concrete, while the entrance halls will be paved with ceramic mosaic of simple design. The principal elevations will be faced with machine-made red Ruabon bricks, having all dressings and enriched work carried out in Doulton's Rowley Regis biscuit-coloured terrcotta, the enriched panels, borough arms over principal entrance, doorway, &c., being modelled from cartoons supplied by the architects, and executed under their personal supervision. The roofs are to be covered with Westmorland sea-green slates. The contractors are Messrs. S. Robinson and Son, of Hyde, and the work will be carried out from the designs and under the supervision of Messrs. Woodhouse and Willoughby, FF.R.I.B.A., of Manchester and Stockport; the clerk of works is Mr. Samuel Mellor. The structure will take about fifteen months to complete, at a total cost of about £12,000, including equipment.

LEITH.—At the Dean of Guild Court on Monday Messrs. Pattisons (Limited) were granted a warrant to erect a warehouse nine stories in height at Bonnington. Messrs. Pattisons have recently acquired the old sugar refinery at Bonnington for the purpose of extending their storage accommodation. The old buildings are being partly demolished, and partly converted into bonded stores. In addition to the existing buildings, the firm are erecting a new bonded warehouse, which, it is asserted, will be the largest in the kingdom. The new building stands on the banks of the Water of Leith, and has a railway siding running into it from the Leith branch of the North British Railway. The new building is 190ft. long the one way by 180ft. the other, and is nine stories high. The height from the foundations is close upon 100ft. The floorage area is 6¾ acres. It is entirely built of brick, and there will be about one million and a half of bricks used in its construction. The interior, having to bear great weights, is entirely constructed with steel standards and steel beams, the old cast-iron construction of bonded warehouses being abandoned. By this means greater strength and greater economy are secured. There are upwards of two miles of steel standards in the new warehouse, and five and a half miles of steel beams. The building will accommodate over 22,000 casks of whisky. There are three mechanical lifts in the new building for taking in and discharging the casks, and these can be raised direct from the carts and from the railway trucks without intermediate handling. The lowest floor, which is to be used as a duty-paid and bottling department, will be entirely fire-proof. The architects for the new building are Messrs. George Beattie and Son, 136, George-street, Edinburgh.

RHOSROBIN.—St. Peter's Church, Rhosrobin, in the parish of Rhosddu, Wrexham, the contract for which is just let, is to be built on the west side of the road leading from Wrexham to Bradley Mills. It consists of a single-span nave, 50ft. by 25ft., with chancel, 25ft. by 17ft. 6in., vestry, vestry porch, surmounted by a small octagonal bell-turret, and south porch to nave, and is designed to seat 224. It is to be built of bricks from the neighbouring brickworks, with terra-cotta dressings also made by the same firm, open-timbered and boarded roof, slated with Bangor slates; all the interior woodwork, including the seating, is of pine. The contract has been let to Messrs. Rogers and Son, of Brymbo, at £845, the building committee finding the bricks, terracotta tiles, sand, and carting of these; and the work is being executed from the designs and under the superintendence of Mr. J. H. Swainson, architect and surveyor, Wrexham, whose plans were selected in a recent limited competition.

The watching and lighting committee of Aberdeen Town Council approved on Friday of amended plans for the erection of a central fire-brigade station in King-street. The estimated cost is £12,200.

We learn that the Carpenters' Company have appointed Mr. H. Phillips Fletcher, F.S.I., A.R.I.B.A., as their surveyor, in the place of Professor T. Roger Smith, who had held the appointment for many years, and who has now joined the Court of the Company.

Another permanent addition to the seaside attractions of Great Yarmouth was made on Monday by the opening of a revolving observation tower erected on the North Beach near the Royal Aquarium. The structure is 125ft. in height, and is built entirely of steel on concrete foundations. Including the machinery, it weighs about 125 tons. A circular platform built round the tower, and constructed to accommodate about 160 passengers, is raised to the summit, and lowered by means of steam-power. As it ascends, the platform revolves by means of electric power at the rate of one revolution in three minutes. There is another platform at the summit, to which access is obtained from the revolving apparatus, and which is hoisted to an additional height of about 20ft. At night the structure is illuminated by 50 incandescent electric lights and by three arc lights. At the base of the tower are bars and dining-rooms. The cost of the structure has been £6,000.

LEGAL INTELLIGENCE.

DISPUTE AS TO ROAD REPAIRS.—THE MAYOR AND CORPORATION OF LEEDS v. LORD HAWKE.—In this action, tried at Leeds last year, judgment was reserved and was delivered by Mr. Justice Vaughan Williams on Friday. It was an action brought by the Corporation of Leeds, the plaintiffs, against the defendant, as trustee of the estate of John Miles Dawson, to recover the expenses of paving a certain street in Leeds. The action turned on the interpretation of the Leeds Improvement Act, 1842 (5 and 6 Vict., c. 104), sections 135 and 136, and on section 50 of the Leeds Improvement Act, 1869. Mr. Dawson was the owner of houses abutting on a street called Club-terrace, Leeds. In May, 1891, the plaintiffs gave him notice to pave the street, and on his neglect to comply with the notice the plaintiffs did the work themselves. Mr. Dawson refused to pay the expenses, and proceedings were threatened against him in May, 1892. Mr. Dawson died in 1896, and the proceedings were now taken against his trustee. The principal question in the case was whether the street in question was a highway that had been repaired by the district in which it was situated. On behalf of the plaintiffs it was contended that the onus of proving that the road was repaired by the district lay on the owner. On behalf of the defendant it was contended that the onus lay on the plaintiffs. Mr. Justice Vaughan Williams gave judgment for the plaintiffs. He said he was of opinion that the affirmative onus imposed by section 50 of the Act of 1869 was thrown on the plaintiffs as the road authority; but he came to the conclusion, in fact, that there was some evidence in support of the negative which the statute had so inconveniently thrown upon the road authority. His Lordship doubted whether the framer of the Act intended to throw the onus on the road authority; but he seemed, nevertheless, to have done so. But, taking the whole of the evidence, and considering the state of the road at and after March 20, 1836, it had been proved that the road had not, prior to that date, been repaired by the surveyor.

INTERPRETATION OF THE PRIVATE STREETS WORKS ACT.—HESTON AND ISLEWORTH URBAN DISTRICT COUNCIL v. GROUT.—This was an appeal from a decision of Mr. Justice North, and was recently heard by Lords Justices Lindley, Lopes, and Rigby. On October 30, 1891, the Heston and Isleworth Local Board, the predecessors of the plaintiff authority, served notices, under section 150 of the Public Health Act, 1875, on the frontagers of Prince Regent-road, Hounslow, to sewer and make up the road, in accordance with deposited plans and sections, within three months. The frontagers not having done the work within the prescribed time, the local authority became entitled to do the work themselves, and charge the frontagers with the expenses in proportion to their frontage, but it was not until November 12, 1894, that the authority, who were then the district council, obtained the necessary sanction. The work was completed in October, 1895. A sum of £157 14s. 10d. was apportioned as the share of the defendant in respect of frontage to property in the road owned by him. In the mean time—namely, on June 12, 1894—the local authority had passed a resolution adopting the Private Streets Works Act, 1892. The defendant refused to pay on the ground that the effect of the adoption of the Private Streets Works Act, 1892, was to render abortive the notice given by the authority to sewer and make-up the road. The plaintiffs accordingly took out this summons for a declaration that the apportioned sum was a charge on the defendant's premises and to have the charge realised. The Private Streets Works Act contains new provisions as to the making of the streets, and and gives a power to apportion expenses by less rigid rules than those of the Act of 1875, and it also gives the frontagers different rights of contesting their liability from those previously in force. Section 24 provides that the powers given by the Act are in addition to other powers, and section 25 provides that sections 150, 151, and 152 of the Public Health Act, 1875 (the sections under which the local authority were acting), shall not apply to any district in which the Act of 1892 is in force. It was contended, on the part of the plaintiffs, that section 38 of the Interpretation Act, 1889, kept alive the right of the district authority to proceed under their notice, notwithstanding their adoption of the Act of 1892. Mr. Justice North adopted the view of the Act contended for by the plaintiffs, and gave judgment for them accordingly. The defendant appealed. The Court dismissed the appeal. Lord Justice Lindley was of opinion that the learned Judge had arrived at a right conclusion. When the notice under the Act of 1875 was given, it was a perfectly valid notice; and it was in force for nearly three years before the Private Streets Works Act was applied to the plaintiffs' district. It would be a forced construction of sections 24 and 25 of the Act of 1892 to say that everything done under the notice given under the Act of 1875 would have to be done over again. Even if there were any doubt as to the true effect of those sections, that doubt was removed by section 38 of the Interpretation Act, 1889. The true effect of these enactments was merely that, after the Act of 1892, no fresh notice could be given under the Act of 1875. The appeal failed. Lord Justices Lopes and Rigby concurred.

SURVEYOR'S ACTION TO RECOVER COMMISSION.—In the Queen's Bench Division, an action was recently heard by Mr. Justice Wills, in which Mr. A. Church, an architect and surveyor, sought to recover £600 commission from the Hotel Provence Company, Ltd., in respect of the sale of the Hotel Provence, Leicester-square. Defendants denied liability. It seems that in July last the Hotel Provence was for sale, and the plaintiff was communicated with, and the company forwarded him a commission note to the effect that, in the event of his selling the house for £50,000, he should receive a commission of £1,000. Eventually, plaintiff saw Mr. Morley, of the firm of Morley and Letts, auctioneers and valuers, of Earl's Court, who told him he was prepared to find a customer if he would share the commission with him. To this the plaintiff agreed, and Mr. Morley introduced a Mr. Kirk, who purchased the house for £42,000. The suggestion made by the defendants was that Mr. Vaughan, one of the directors, really introduced Mr. Kirk; that he had put forward the plaintiff as a kind of nominee to obtain the commission which he, as a director, could not get himself; and that he would eventually share the commission. Evidence was heard, among the witnesses called being Mr. Morley, who said that Mr. Kirk told him he could make an offer of £42,000 for the hotel, and that the offer was afterwards made. It was submitted for defendants that what the plaintiff and Mr. Morley did had no influence in inducing Mr. Kirk to buy the house. Mr. Justice Wills said he thought plaintiff had done quite enough to entitle him to his commission, and judgment for £600, and costs, was given accordingly.

WHAT IS A "PRIVATE DRAIN"?—SEAL v. MERTHYR TYDVIL, &C., DISTRICT COUNCIL.—In the Queen's Bench Division, Mr. Justice Cave and Mr. Justice Ridley have given judgment in this case, stated by magistrates raising a question as to the meaning of a "private drain" in section 19 of the Public Health Act, 1890 (53 and 54 Vic., c. 59). The section in question is as follows:—"19 (1) Where two or more houses belonging to different owners are connected with a public sewer by a single private drain, an application may be made under section 41 of the Public Health Act, 1875." "(3) For the purpose of this section the expression 'drain' includes a drain used for the drainage of more than one building." The 41st section referred to authorises the local authority to charge the expenses of abating a nuisance on the owner of the premises. The case was stated by two justices for Glamorgan upon the complaint against Mr. T. F. Seal, that he, being the owner of certain premises, Nos. 23, 30 to 36, and 38, Cromwell-street, Merthyr Tydvil, upon which a nuisance existed, had not abated the nuisance. The nuisance alleged was that a certain drain was in a defective condition. The proceedings were taken under section 41 of the Public Health Act, 1875, as extended by section 19 of the Public Health Act, 1890. Within the Merthyr Tydvil Urban District a number of houses have been erected by the Tydvil's Well Building Club, of which the appellant is the secretary and receiver of the rents, upon both sides of a new street called Cromwell-street. A drain was made running at the back of the houses through the gardens. This drain joined the sewer of the district council. A connection from each house with the drain at the back was made by a branch drain. The drain commenced at the back of No. 40 and extended at the back of the houses to the sewer, and it could not be used by other houses. The district council have adopted the Act of 1890. The respondents contended that the drain running at the back of the houses 21 to 40 was a private drain under the definition in section 19 (3) of the Public Health Act, 1890, and that, it being out of order, the appellant must abate the nuisance. The appellant contended that the drain was a drain into which two or more houses belonging to different owners were drained, and that, therefore, it came within the definition of a sewer contained in section 4 of the Public Health Act, 1875. The magistrates found that the drain was a drain used by two or more houses belonging to different owners, and that it was a drain for the particular houses Nos. 21 to 40, and for no other premises. They decided that the respondents had a right to proceed under section 41 of the Act of 1875. They therefore made an order on the appellant to abate the nuisance. Mr. Macmorran said the question was, What was the meaning of private drain in the Public Health Act, 1890, section 19? By section 2 of that Act the other Public Health Acts were incorporated. By section 11 (3) the meaning of "drain and sewer" given in the Public Health Act of 1875 were made applicable. He cited the following cases, and pointed out that the decisions had not been uniform:—"Travis v. Uttley" (1894), "Self v. Hove Commissioners" (1895), "Hill v. Hare" (1895), "Bradford v. Mayor of Eastbourne" (1896). This was a case which told against him, but he contended that it was inconsistent with "Hill v. Hare," and not, therefore, binding on the Court. He also cited "R. v. Mayor of Hastings" (1897). The Court upheld the decision of the magistrates, and dismissed the appeal, without calling on the counsel for the other side. Mr. Justice Cave said, by the Public Health Acts, 1848 and 1875, all sewers were vested in the local authority, and sewers were defined as drains draining more than one house. This was found to create some difficulty, for when one man built two houses on his own land and drained them, the drain became vested in the local authority and had to be paid for by them. That was one difficulty, but it was got over by holding that the Act did not apply to houses in the same curtilage, and that the drain, until it came out of the private property into public property, could not be said to be a sewer. Then there came another difficulty. When houses belonging to different owners drained into a sewer, whereby they connected with the public sewers, in that case it was hard that the public should have to pay for what was in fact a private drain. The 19th section of the Act of 1890 was, therefore, passed. By that section, when two or more houses belonging to different owners are connected with a public sewer by a single private drain, certain consequences followed. The definition of "private drain" included a drain used for the drainage of more than one building. What, then, was a "private drain"? In the opinion of the learned Judge the term applied to a drain constructed in private grounds to which the public had no access. The intention was that the public were to be relieved from paying for that which they were not allowed to use. In this case it was found that there was no power to drain other houses into this drain. The rational view of a private drain was that this was one. It was said that this view was not in accordance with "Hill v. Hare." If, however, in that case the drain was, properly speaking, a private drain that case was wrongly decided, and, at any rate, it only determined the *status* of the particular drain in question. The magistrates were quite right in their decision, as they found, in fact, that the drain was only for certain houses, and not one into which any other could drain. Mr. Justice Ridley concurred.

LIGHT AND AIR CASE.—TUCKER AND OTHERS v. TAUNTON MANUFACTURING COMPANY.—This case was heard before Mr. Justice Day without a jury at the Bristol Assizes. Dr. Hodges, Q.C., and Mr. Duke (instructed by Mr. Poole, Taunton) were for the plaintiffs, and Sir Walter Phillimore, Q.C., and Mr. Foote (instructed by Mr. Shearman, of London) were for the defendants. The case arose in consequence of the erection by the defendants of a stock room immediately opposite, and 7ft. 6in. away from the windows of classrooms used in connection with the school belonging to the plaintiffs. The plaintiffs contended that this erection rendered the rooms absolutely unsuitable for classrooms, and claimed that the height of the building should be reduced. Mr. Basil Cottam, of Bridgwater, was called on behalf of the plaintiffs, and he produced various plans and sections and a model showing the position of the plaintiffs' and defendants' properties, both before and after the erection of the stock-room. The other professional witnesses were Mr. William Eve, of Union-court, Old Broad-street, E.C., and Mr. Williams, of Bristol. The defendants called Mr. H. H. Collins, of Old Broad-street, London, and Mr. W. Gibbs Bartleet, of New Broad-street, E.C., both of whom contended that in considering the matter the angle should be taken from the centre of the window, which was 6ft. 9in. from the floor, the height of the room being less than 10ft., and that such line should be taken to the eaves, disregarding the roof, which was hipped. The Judge viewed the property, and the hearing of the case occupied the whole of one day and part of two others. The Judge complied with the request of the plaintiffs, and granted a mandatory injunction ordering the defendants to pull down the building to the line laid down by Mr. Eve, and gave the plaintiffs their costs.

DREDGING GRAVEL FROM THE LOWER THAMES.—In the Appeal Court on Monday, before the Master of the Rolls and Lords Justices A. L. Smith and Chitty, the case of the Conservators of the Thames v. Smeed, Dean, and Co. came on for hearing. This was an appeal by the Conservators of the River Thames from the decision of Mr. Justice Bruce refusing to grant an injunction against the defendants, a well-known firm of brickmakers, to restrain them from continuing to dredge or raise gravel, sand, and ballast from a part of the lower river known as Hadleigh Ray, without having first obtained a license from the Conservators to do so, on the ground that the spot in question was part of the "bed" of the river within the meaning of the word "bed" as used in section 87 of the Thames Conservancy Act, 1894. The Conservancy contended that the question was one of very great importance. It was a part of their duty to keep the river navigable, and they would be hindered in the exercise of their duty if the riparian owners

of the Lower Thames were at liberty to dredge as they thought fit. The contention of the respondents was that they were not raising gravel from the bed of the river at all, the barges having taken the sand from a part of the river which was foreshore. Lord Justice Smith, in the course of his considered judgment, said in his opinion the Conservators' power to require a license being first obtained from them was cut down to those cases where the removal of sand might, if carried too far, interfere with the navigation, and also that the board was not entitled to make a profit out of the sand so raised. The appeal, therefore, would be allowed, and a declaration granted that the place in question was part of the bed of the river, and that the respondents were not entitled to take gravel and the like from the bed of the river at Hadleigh Ray without a license from the board. After some discussion leave to appeal was given.

LIABILITY OF AN ARCHITECT ON HIS ESTIMATES.—W. J. ROGERS AND CO., LIMITED, V. WATKINS.—This case was heard before Mr. Justice Day at the Bristol Assizes on Monday. Mr. Bullen and Mr. Beverley Vachell were for plaintiffs, and Mr. Foote, with Mr. F. E. Weatherly, was for defendant. Counsel for plaintiffs informed his lordship, who took the case without the aid of a jury, that Messrs. W. J. Rogers and Co. Limited, were brewers at Bristol, with a branch at Newport, Monmouthshire. Defendant was an architect practising at the latter place, and plaintiffs sought to recover from him in respect of negligence in advising as to the cost of a building to be erected on the Power Estate, Newport. Defendant advised that the cost would be between £600 and £700, whereas in the end plaintiffs had to pay £1,163 17s., and the action was brought to recover the difference. There was a counter-claim by defendant for £56 for commission on the work executed. Plaintiffs were anxious to extend their business at Newport, and a large building estate known as the Power estate, being developed, they decided to acquire premises thereon. It was in respect of the cost of the house so erected that the action was brought. Mr. Charles Henry Reed, builder, of Newport, said he agreed to build a house at schedule prices for plaintiffs, the defendant being the architect. As the premises now stood he would not give more than £500, and the outside rent was £29, the landlord paying all the taxes. The rents of the houses on the estate generally ran from 5s. 6d. to 8s. 6d. a week. Mr. Garland, plaintiffs' manager, said he would not have consented to the erection of the house had he known that the estimate was to be materially increased. For instance, he was not prepared to expend £900. He was dumbfounded at the bill. Mr. Foote contended that, the schedule prices having been agreed to by plaintiffs, there was nothing for them to do but to pay for the work executed. Mr. Bullen relied on the explicit understanding between the parties that the price was not to exceed £700. The defendant Watkins said he made a mistake in his rough estimate of 5d. per cubic foot, which amounted to £674; it should have been 7d. per foot, which would have worked out to £900. By Mr. Bullen: He discovered the first mistake of £200 before the work was actually in hand. He could not admit that he again made a mistake to the extent of a similar amount; but the second increase of £200 was due to "extras." Did you ever inform plaintiffs of extras? Mr. Garland knew. By the Judge: Did you let Garland know before the contract was signed that your estimate was utterly wrong? In effect, my lord. His Lordship: In effect! Why not clearly and in detail? It certainly was important. Re-examined: The only contract was to erect a house according to schedule prices. Mr. Henry Williams, architect, of Bristol, said the estimate by the cube was a rough one, and not to be relied upon. If the house obtained a license, it would be worth double what it cost. Mr. Foote having addressed the learned judge, Mr. Bullen replied on behalf of plaintiffs. His lordship said he was not satisfied that defendant had apprised plaintiffs of the increased expenditure, and that was negligence. The only question, therefore, was one of damages. The verdict was, therefore, for plaintiffs, damages £150. Mr. Foote said that they were entitled to something under the counterclaim for defendant's commission. Mr. Bullen objected, on the ground that defendant's service was valueless. His lordship awarded £35 to defendant, giving a verdict for plaintiffs at £115 and costs.

"NO SUCH UNSATISFACTORY MEN AS ARCHITECTS."—In the Nisi Prius Court, Nottingham, on Tuesday, before Mr. Justice Cave, the case of Charlotte Jalland v. Charles Tyler and Enoch Hind was tried. This was an action for damages brought by Mrs. Jalland, newsagent and stationer, of Bridlesmith-gate, Nottingham, against Charles Tyler, pork dealer, also of Bridlesmith-gate, and Enoch Hind, builder, for improperly removing certain old buildings adjoining her premises, and for improperly conducting the operations. She also claimed damages for an obstruction to her ancient lights, and for an injunction to restrain the obstruction. Mr. W. H. Stevenson (instructed by Mr. Barlow) appeared for the plaintiff, and Mr. W. Graham and Mr. Hugo Young (instructed by Messrs. Wells and Hind) represented the defendants. At the outset Mr. Young applied that the jury should be allowed to visit the premises, but his lordship did not think that it was necessary for them to do so. In the absence of Mr. H. Y. Stanger, Q.C., who was instructed along with him, Mr. Stevenson opened the case. He said that Mrs. Jalland had carried on business for a great many years in Bridlesmith-gate, and for the last 14 years she had been the owner of the freehold, which she purchased for £700 or £800. The defendant Tyler was in a large way of business close to. Some years ago he rebuilt his shop, and becoming the owner of the premises adjoining those of the plaintiff in 1896, he decided to pull them down and erect new buildings. The property was some of the oldest in Nottingham, having come into existence 200 years ago or more, and from one point of view one regretted that such ancient landmarks of Nottingham were disappearing. Still, Mr. Tyler was quite entitled to erect new premises, provided he took care not to injure those of the plaintiff or deprive them of the support they were entitled to, and which they had enjoyed since they were erected. Anyone who had premises which had received support from those adjoining for a number of years could claim that those buildings should not be pulled down, or the land excavated to the injury of theirs. Tyley employed Mr. Enoch Hind to pull down his buildings and erect new ones, and there might be a question as to liability of the defendants. Supposing a man employed a builder, and he was negligent, the employer was not liable, but if all care was taken in executing dangerous work, such as the removal of ancient buildings, and the removal of old foundations, he was equally liable with the builder. Both the defendants in that case were men of substance and means, and he did not suppose any question would arise as to their respective liability. After the removal of Tyler's property Mrs. Jalland was startled one morning in May, 1896, by hearing her house crack as if it had been shaken by an earthquake, and a pane of glass broke and fell out. Next day the same thing occurred, and she consulted Mr. Sidney Stevenson, architect. He visited the premises, and he soon found that it was evident that the defendants were practically ruining the plaintiff's building. She carried on a considerable business, her turnover being about £100 a week, and she resided in the upper portion of the place; but by his advice she went to live elsewhere. The cellar arch on which the building depended was so damaged that sooner or later it would collapse. There had been a giving way, some portions of the floor had sunk, none of the shutters would fit, the windows could not be opened or shut, there were large cracks in the walls and roof, and the building was unsafe. It could not be repaired, and it would have to be pulled down and rebuilt. The cost of doing that would be £630, and the jury must not lose sight of the fact that since May, 1896, the plaintiff had had to take other premises to live in. She had also had to pay a woman to look after her premises, and £40 or £50 would be adequate for that. Whilst the repairs or rebuilding operations were going on she would have to take other premises and pay rent, she would have to remove her stock, and it was inevitable that her business would suffer. Mr. Gilbert, builder, had made an estimate of the cost of carrying out the repairs, and he put the sum at £300. He (Mr. Stevenson) submitted that if the defendants' building operations had injured the plaintiff's premises, which had a right of support, without there being any question of negligence they were liable for damages. Mrs. Jalland gave evidence confirming counsel's statement, and in cross-examination she said she did not notice that a heavy waggon was passing when the window-pane dropped out. Mr. S. Stevenson, surveyor and architect, said that the defects in the premises now could not be repaired, and they were unsafe. It had been shored up on three sides, and there was a house on the other, but it might collapse on its own site. Mr. G. S. Doughty, architect, said that the cellar-arch could not be repaired, except at danger to life, and the building would never be really safe. Mr. Herbert Walker, architect, and Mr. H. C. Gilbert, builder, also gave evidence, the latter stating that assuming that the work of repair could be done, it would cost £307. This was the plaintiff's case, and Mr. Graham then addressed the jury on behalf of the defendants. He said that it was admitted that where a house had enjoyed the support of another for twenty years it was entitled to have that support continued; but where they had a rickety old house of that sort nobody could be asked to keep it in position as if it were new and strongly built. His clients were not responsible for the infirmity of the house itself, but they were responsible for the damage they caused. Mr. Tyler rebuilt his premises, and Mr. Stevenson seemed to have had the bright idea that it was a good opportunity to make him rebuild the plaintiff's shop as well. He (Mr. Graham) submitted that the damage had been grossly exaggerated. The shop was very lightly built, it had only 11ft. frontage, including the thickness of the wall, and it was only 20ft. or 30ft. deep. It now stood between two perfectly solid well-built houses. It had a rock foundation, and it was absolute nonsense to say that the arch which supported it could not be made good. The arch had got out of shape, but there was nothing to show how much of that was due to their operations. The jury were asked to say that nothing could be done except to pull down the house and rebuild it. He had no doubt that that was the best thing to be done, and any prudent owner would have carried out the work before. Anyone could see what a trumpery place it was, and for years it had been allowed to go without repair. Why the plaintiff should turn out during the night time and carry on business there during the day at the risk of her life he could not tell. The case for the plaintiff was that she wanted £600 for a new house, and his case was that every possible care was taken in pulling Tyler's property down. The removal of support must have been extremely trifling. Underpinning was resorted to, and three sides were shored up as strongly as possible. No one could demolish erections adjoining old property without doing some damage, but the plaintiff's house was really far better supported now than it was before. The witnesses for the defendants would tell them that there was no danger whatever, and in order to make it as safe as it was before, a trifling expenditure of about £30 was necessary. What he suggested as the measure of damages was the difference in the value of the house now and what its worth would have been had his clients not done any damage to it. Anyone buying the house would not attribute any value to the bricks and mortar. It was a grossly exaggerated claim, got up with the object of getting a cheap job for Mr. Stevenson and getting a new house built at the expense of Mr. Tyler, who had done everything he could to avoid damage. The old house was practically worn out, and it was impossible to avoid doing some damage to it, but it could easily be placed in the same condition as it was before at trifling cost. Mr. Arthur E. Heazell, architect and surveyor, said that, in his opinion, the house was safe to live in. Mr. W. A. Heazell, architect and surveyor, said that the repairs would cost £41 15s. Thomas Slater, manager to Mr. Enoch Hind, said that he had charge of the pulling down and rebuilding of 45 and 47, Bridlesmith-gate. Witness, who had had 25 years' experience, employed a staff of skilled men. His instructions were to avoid any possible damage, and he did his best. Mrs. Jalland complained since about a pane of glass falling out, and he sent a man down to see to the matter. Arthur Richard Calvert, architect and surveyor, said that his estimate for doing everything necessary would be £40 8s. That would make the house as good for an old house as ever it was. It was perfectly safe since the new building was put up. By Mr. Stevenson: He did not think it was safe before. Alfred V. Bromley, surveyor, also gave evidence. W. D. Pratt, architect and surveyor, and H. Gill, architect and surveyor, gave evidence expressive of the opinion that no real danger had been incurred to the plaintiff's house by the building operations of the defendants.—Mr. Graham then addressed the jury on behalf of the defendants, and Mr. Stevenson followed on the other side.—The learned Judge, in summing up, said that this was one of those unfortunate cases in which they had to listen to what architects came and told them. There were no such unsatisfactory men as architects, for they were always at the opposite poles to one another. All other scientific men tried to come to some sort of an agreement; but architects, on the other hand, tried to contradict each other entirely. That might be due to three causes, and three causes only. Which of these causes was the correct one was not for him to say. It might be that architecture had no science whatever about it. Secondly, there might be science in architecture, but the witnesses who had been called knew nothing about it. Thirdly, there might be science in architecture, and these men might possess that science, but not have the honesty to tell them truly what it was. One or other of these things must be true, or the architects would not be found differing so widely as they always did, and as they had done that day. In point of fact they helped the jury very little indeed, and they had, so far as they could, to come to a decision with as little regard to the architects as possible. The jury were absent half an hour, at the expiration of which time they returned into court with a verdict for the plaintiff, the award being £175.

The Right Hon. G. H. Reid, Premier of New South Wales, visited Port Sunlight, near Birkenhead, on Wednesday, and performed the ceremony of opening a new bridge erected by Messrs. Lever Brothers (Limited). The new bridge, consisting of one arch of 100ft. span, has been designated the Victoria Bridge, and it has been erected across a tidal arm of what is known as Bromborough Pool, the object being to connect one portion of Port Sunlight village with the high road running from Birkenhead to Chester.

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ILLUSTRATIONS.

THE GUILDHALL SCHOOL OF MUSIC EXTENSION.—DESIGN FOR THE PROPOSED BELFAST CITY HALL.—THE GRUUTHUUSE PEW, NOTRE DAME, BRUGES.—REDECORATION OF SITTING AND DINING ROOMS OF THE PALACE AT DARMSTADT, FOR THE DUKE OF HESSE.—WESLEYAN CHAPEL AND SCHOOLS, BEBINGTON.—PLANS OF THE NEW PARLIAMENTARY BUILDINGS, SYDNEY, N.S.W.

Our Illustrations.

THE GUILDHALL SCHOOL OF MUSIC.

THE foundation-stone of this building was laid on Wednesday, the 21st inst. Owing to the continually increasing number of students at this school, the Corporation has found it necessary to provide more accommodation. When the present school was opened in 1886, a site for extension was reserved on the north side, and this now is about to be utilised; the area is about 3,700ft., with a frontage to John Carpenter-street of 72ft. 6in. The accommodation to be provided consists of an orchestral saloon, which, with a stage, occupies the entire area of the site, the floor being at the level of the street pavement. The saloon will extend in height to the second-floor level, and will have a gallery facing the stage. On the second, third, and fourth floors there will be on each 10 classrooms, the walls of which will be carried on girders over the saloon. The basement will be utilised for dressing-rooms, &c., in connection with stage, with which there will be direct communication. The new building will be connected with the present school at the various floor-levels of the latter. An hydraulic elevator will be provided for the use of the students and professors. The lighting will be almost entirely electric, and the heating of the various classrooms will be effected by hot-water radiators, through which fresh air will pass; no open fireplaces will be provided. Emergency exits in case of fire will be contrived on each floor. In connection with the orchestral saloon there are six exits, three being direct into John Carpenter-street, as shown in the elevation. The style of architecture adopted by the architect, Mr. Andrew Murray, the City Surveyor, is somewhat on the same lines as the present edifice, with greater freedom in the detail of the cornices, &c.

BELFAST CITY HALL.

THIS design, over and above its architectural qualities, has a special interest, because it was the one, we understand, which the local authorities at one time selected to take its place among the three chosen by the referees for the final contest, and there was no little controversy and correspondence concerning the matter. The authors of this design are Messrs. Graeme Watt and Tulloch, of Belfast, and they withdrew their plans from the competition, honourably determining the occasion of the dispute, to which we have thus impartially made a brief reference. Having published the selected design, and also one of the two placed next to it in the concluding award, we thought the illustration of this particular design, owing to the circumstances alluded to, would prove of no little interest, particularly to those who were acquainted with the facts.

THE GRUUTHUUSE PEW, NOTRE DAME, BRUGES.

THIS drawing is one of the series for which a Medal of Merit was awarded by the Royal Institute of British Architects to Mr. James A. Swan. In the Cathedral, Notre Dame, Bruges, this richly carved pew of light oak is situated overlooking the chancel, and it was erected in 1474 for the family of Van der Gruuthuuse, whose house lies at the back, and is connected by a passage. Entrance from the cathedral is gained by the door shown; the portion below the pew is in stone, and the openings are glazed, as also the sashes to the upper part. The Gruuthuuse Palace has now been turned into a museum. The accompanying drawing gives several details and sections which add value to Mr. Swan's clever delineations of this florid piece of ecclesiastical design.

THE PALAIS, DARMSTADT, GERMANY: SITTING ROOM AND DINING ROOM REDECORATIONS.

THE two interiors, of which we give illustrations to-day by Mr. M. H. Baillie Scott, have been designed for H.R.H. the Grand Duke of Hesse. The drawings show the scheme adopted by their author in a very clear way, and as we have not been favoured with any description of the work, we are unable to give any further particulars concerning it.

WESLEYAN CHAPEL AND SCHOOLS, BEBINGTON.

THESE buildings are from the designs of Mr. T. Taliesin Rees, architect, Birkenhead, and were won by him in a limited competition. The schools and classrooms have been recently built, and are now used for chapel purposes until the latter is erected. The schoolroom is capable of accommodating 300 persons, and the classrooms about 30 scholars each. The materials are of red Ruabon bricks, with Storeton stone dressings and slated roofs. The contract was carried out by the late Mr. W. H. Bleakley, contractor, Birkenhead.

NEW PARLIAMENT BUILDINGS, SYDNEY, N.S.W.

WE give this week a double-page plan of the first floor of the new Parliament buildings, Sydney, N.S.W., of which we gave a perspective view and ground-floor plan last week.

The partnership hitherto subsisting between C. T. Marshall and R. B. Dick, under the style of Marshall and Dick, of Newcastle-on-Tyne, architects and surveyors, has been dissolved.

The dedication of a Jubilee memorial pulpit at Christ Church, Downend, Bristol, took place on Sunday. The pulpit, which was designed by Mr. H. M. Bennett, and executed by Messrs. Edwards Bros., is of oak, octagonal in shape, with solid moulded base, on which stands a pedestal of open panel work. The head is of similar design, having sunk and moulded buttresses. The top panels are uniformly traced, and the under panels carved and embossed. A heavy moulding fringes the top, while immediately underneath is a rail with carved vine-leaf design.

A Local Government Board inquiry was held at Tonbridge, on Thursday in last week, into an application for sanction to borrow £2,500 for water-supply and waterworks construction for Tonbridge, before Mr. Walter E. Ducat, C.E., from the Local Government Board. Mr. Horne, clerk to the Burnley Guardians, stated that the houses had increased from 877 in 1891 to 1,260. Trade was extending, dwelling-houses were being erected, and something must be done to increase the water-supply. The yield was 12,600 gallons per day, and they purposed constructing a reservoir which should have a holding capacity for 135,200 gallons. There was no opposition to the application.

The ceremony of opening a new railway in the Isle of Wight took place on Monday. The line is single, and at present is 5½ miles long. It begins at Merston Junction on the Newport and Sandown system, and proceeds by an upward gradient through Godshill and the picturesque village of Whitwell, at each of which places there is a station, to St. Lawrence, a village to the west of Ventnor. At the summit of the line near Whitwell Station the train enters a tunnel 620 yards long, which pierces the Down. It is intended to extend the line through the Steephill estate, and to connect it with Ventnor by a station within a short distance of the Royal Hotel and on a level with the centre of the town. Messrs. C. J. Westwood and Co., of Clement's-lane, London, have been the contractors. By the new railway the rail distance between Cowes and Ventnor has been shortened by six miles.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—During the winter session of this association, Mr. Thomas Gibson, of Eglinton Crescent, put at the disposal of the council a sum of £30, to be given in prizes for the best design for a fireproof dwelling, taking as the basis of the design a house similar to those in the west end of Edinburgh. The council appointed Mr. W. W. Robertson, of H.M. Board of Works; Mr. Westland, C.E.; and the then president of the Association, Dr. Rowand Anderson, to examine and decide on the relative merits of the designs submitted. In response to the invitation of the council, five sets of designs were submitted. After their examination, the design submitted by Mr. James Cairns was placed first; that by Messrs. J. Gordon Smart and Louis Blanc, second; and the one by Mr. Alexander Arnot, third—£15, £10, and £5 being awarded to them. Mr. Gibson, in addition to giving this money for prizes, defrayed the expenses incurred by the Association for printing, &c., amounting to £12. The first and second successful competitors are assistant and pupils in the office of Mr. Hippolyte J. Blanc, R.S.A.; and the third prizeman is of the office of Messrs. J. D. Peddie and Washington Browne.

CHIPS.

The members of the Hampshire Field Club visited Whitchurch, Litchfield, and Burghlere on Tuesday week, under the leadership of Mr. T. W. Shore.

On Saturday evening Mr. Ferrand, of Bingley, set going a set of Cambridge chimes in connection with the Bingley parish church clock. The work has been done by Messrs W. Potts and Sons, of Leeds, and the cost has been raised by public subscription.

The City Court of Common Council adopted at their last meeting plans for adding a new block, containing accommodation for males and females, to the City of London Lunatic Asylum at Stone, North Kent, at an estimated cost of £46,700. The asylum was opened in 1866, and has been many times enlarged. It has cost from first to last up till now £123,000.

Messrs. Weatherall and Green sold by auction, at the Mart, Tokenhouse-yard, on Friday, a freehold building site having frontages to Piccadilly and Old Bond-street, and a superficial area of 3,210ft., with areas of vaults of nearly 1,965ft. in addition, at present let for £2,410 per annum under leases expiring together in 1904. The price realised was £115,000.

The Kaiser Wilhelm Railway Bridge, between Solingen (Rhenish Prussia) and Remscheid, the largest structure of the kind on the European Continent, was formally opened on Thursday in last week by Prince Frederick Leopold of Prussia, representing the Emperor. The total length of the bridge is 1,033ft., and that of its central span 561ft. It crosses the River Wupper at a height of 353ft. above the water level, and is thus the highest bridge in the world.

Christ Church (Methodist New Connexion) in High-street, Cradley Heath, was reopened for worship on Sunday, after renovation. The total cost of the work is about £200. The work has been executed by Messrs. Viner and Son, of Cradley Heath and Dudley, under the direction of Mr. A. S. Butler, architect, of Cradley Heath.

Lord Morley's Committee of the House of Lords passed on Monday as an unopposed measure the Bill authorising the New River Company to raise £1,000,000 additional debenture stock. This Bill has already been sanctioned by the House of Commons. The money raised by this issue will be spent upon providing the company with an independent line of pipes from the authorised Staines reservoirs.

Mr. William Farmiloe, of the firm of T. and W. Farmiloe, of Westminster, died on Sunday, after a long illness, at his residence, 15, Cedars-road, Clapham Common. Mr. Farmiloe was in his 70th year.

At the Guildhall, Walsall, on Thursday in last week, Mr. R. H. Bicknell, on behalf of the Local Government Board, conducted an inquiry with reference to applications by the town council to borrow £640 for the purchase of buildings and conversion of them into police barracks, and £1,850 for electric lighting.

The partnership hitherto subsisting between W. F. Unsworth and J. E. Newberry, architects, of Dean's Yard, Westminster, under the style of Unsworth and Newberry, has been dissolved.

In the case of Charles Carter, of Bedford, builder, the discharge from bankruptcy has been suspended for two years, ending June 14, 1899.

New Parliamentary Buildings Sydney

Verandah
Library
Writing Rm
Smoking Rm
Lounge Rm
Dining Rm
Reception Rm
President's Quarters
Store
Service Rm
Messengers
Staircase
Members' Corridor
Office
Area
Lavatory
Public Lobby
Private Corridor
Galleries
Leg. Council Chamber
Vice-President
Reception Room
Corridor
Minister
Post Office
Public Rooms
Ladies' Cloak Rm
Vestibule
Verandah
Members' Entrance
Orderlies
Governor
A.D.C.
Reception Room
Staircase

Floor Plan

Engineering Notes.

BUENOS AYRES.—The new docks at this port, the largest and best-equipped on the American Continent, have just been completed, and have been constructed by English engineers and contractors. These works were authorised, says Mr. R. W. Perks, M.P., in 1882. Preliminary plans were prepared by Sir John Hawkshaw's firm, and in 1884 a concession for the works was granted to the late Mr. Madero. The work chiefly consisted in the conversion of the flat, muddy banks of the River Plate for a distance of three miles in front of the city of Buenos Ayres into a succession of basins, locks, and docks, the whole of the works being inclosed in long, massive stone walls, reclaiming a large area of valuable building land. The docks are approached by means of two newly-dredged channels, one to the south basin, the other to the north basin, these two channels converging in the River Plate some six or seven miles from the city. Upon the advice of the late Sir John Hawkshaw these important works were intrusted to the late Mr. Thomas A. Walker, who was then just completing the Severn Tunnel. Mr. Walker entered into a contract to construct the works in 1885, and after the preparation of the various detailed plans the works were started in the spring of 1887. The works were so designed that each basin or dock could be opened, and thus earn money, as finished. The South Basin, covering 35 acres of water space, was opened in January, 1889; Dock No. 1 in January, 1890; Dock No. 2 in September, 1890; the third dock in 1893, the fourth in 1896, and the North Basin last March. The docks and their equipment as originally designed were intended to cost £4,000,000. There have, however, been very great additions to the original scheme. Numerous warehouses of enormous dimensions, all of which are crowded with goods and produce, have been erected; two graving docks, now the largest in South America, have been built, for repairing warships and ordinary steamships; the hydraulic machinery has been increased, and many miles of additional railways laid. The result is that the works have cost upwards of £7,000,000. Mr. Walker died in November, 1889, and the works at Buenos Ayres have since been in charge of Mr. Charles Walker, the late Mr. Walker's nephew, who has resided at Buenos Ayres, to whom, as also to Mr. Dobson, the resident engineer and Messrs. Hawkshaw and Hayter's partner, the main share of the credit, so far as the construction is concerned, is due. The whole of the hydraulic machinery for the docks was supplied by Sir W. Armstrong, Mitchell, and Co., of Newcastle.

THE WIDENING OF THE SOUTH-EASTERN RAILWAY IN SOUTH-EAST LONDON.—The South-Eastern Railway Bill, which seeks power for the widening of the South-Eastern Railway by new lines in the parishes of Bermondsey and Horselydown, again came before the Select Committee of the House of Commons on Monday and Tuesday, the Marquis of Lorne presiding.—Sir F. Bramwell generally described the engineering features of the line and the method of spanning the 27 streets. He considered the line was laid out to provide the maximum advantage with the minimum of disadvantage.—Sir J. Whittaker Ellis, Mr. Green, and Mr. Alexander R. Stenning, surveyors and valuers, gave evidence to prove that no material damage could be done to St. Olave's Workhouse by the construction of the railway. This closed the case for the promoters, and the case was opened for the St. Olave's Union.—Mr. A. H. Newman, Mr. R. Price Williams, surveyors and valuers; Mr. S. R. Thompson, medical officer of the workhouse; and Mr. Augustus Shand, chairman of the board of guardians, gave evidence as to the damage the railway would do to the workhouse by passing within 6ft. of that building.—Mr. Rickards said the injury done to the workhouse could not be measured by the ordinary rules of compensation. He contended that the railway company should be obliged to purchase that part of the workhouse which abutted on the railway. They had spent a large sum in improving their building, and he urged that theirs was a special case for special consideration. For the Vestry of Bermondsey, Mr. E. Tewson and Mr. William Ede, surveyors; Mr. Andrew Young, valuer to the London County Council; the Rev. W. Lees Bell, vicar of Christ Church, Bermondsey; Mr. Tyler, chairman of the vestry; Rev. J. Scott Lidgate, warden of the Bermondsey settlement; and Mr. J. C. Macdona, M.P. for Rotherhithe, gave evidence as to the popular feeling on the question.—On Tuesday the chairman stated that the committee found the preamble proved, on condition that the railway company paid the whole of the rates on the property required for railway No. 1 (the loop-line) during the construction, the rateable value to be taken as on July 20, 1897.

BRITISH ASSOCIATION OF WATERWORKS ENGINEERS.—The second annual meeting of the members of this association was held on Wednesday and Thursday (yesterday), at the Town Hall, Westminster. The retiring president, Mr. G. M. F. Gaskin (Nottingham), in the course of a valedictory address, referred to the Nottingham and Newark Water Bill, and strongly advocated the election of water boards, concluding by moving that a sub-committee on this question be reappointed. This was seconded by Mr. H. Ashton Hill, and carried, the old sub-committee, with the addition of Messrs. W. Whitaker and W. Watts, being re-elected. Mr. H. Ashton Hill, engineer to the South Staffordshire Waterworks Company, was then elected president of the association for the ensuing year. In the course of his presidential address Mr. Hill said that the association had amply justified its existence even in these early days. It came into being only fifteen months ago, and in February last it had a roll of 110 members and 32 associates. After giving an epitome of the work of the association during the past year, Mr. Hill briefly described the works of the South Staffordshire Water Company. He also touched on various matters connected with the duties of a water engineer. After luncheon Mr. W. Whitaker, F.R.S., read a paper on "Some Middlesex Wells." Mr. L. N. Ritson contributed a paper on "The Removal of Internal Corrosion from the Mains of the Kendal Waterworks." In the evening the second annual dinner was held at the Star and Garter Hotel, Richmond. On the second day Mr. W. Ingham, water engineer, Torquay, contributed a paper on "The Water Supply of Torquay," and Mr. Alfred Towler, Leeds, read one on "Pumping Machinery," in which he described the pumping station at Everton, belonging to the Liverpool Corporation, the plant in which is capable of raising from 600 to 5,000 gallons of water per minute to a mean vertical height of 102·39ft. Mr. Walter G. Kent read a paper on "The 'Venturi' Meter for the Measurement of Water in large Mains," and the last paper discussed was one by Mr. L. Holme Lewis on "Hydraulic Power Supply," read by the secretary in the absence of the author.

CHIPS.

The foundation-stone of the new cancer wing to Middlesex Hospital, now in course of erection from plans by Mr. Keith D. Young, was laid by Princess Christian of Schleswig-Holstein on Thursday in last week. The new wing faces Nassau-street, and is estimated to cost £15,000.

At Whitley, near Tynemouth, on Wednesday week, William Alderson Law, a prominent builder and popular resident in the village, who had been in ill-health for some days, was found dead at the bottom of the cliffs opposite his residence. Deceased was 37 years old, and leaves a widow and young family. At an inquest, the medical evidence showed that the cause of death was concussion of the brain and fracture of the ribs. The jury found that the deceased had committed suicide by jumping over the cliffs while in a state of temporary insanity.

Mr. Reginald St. A. Roumieu has been selected as surveyor to the Girdlers' Company. He has recently also been appointed honorary architect and surveyor to the Indigent Blind Corporation, St. George's-fields, S.E., which was established by Royal Charter.

On the invitation of the Irwell Conservancy Committee of the Salford Corporation, a conference was held on the 15th inst. of local authorities in the watershed as to the treatment of sewage. The chief point discussed was the position taken up by the Local Government Board in insisting on land filtration. A resolution was passed declaring that the advancement of scientific knowledge no longer made it necessary or desirable that the Local Government Board should in all cases continue to insist upon the disposal of sewage by land treatment.

A new theatre is approaching completion in Stoke Newington-road, N., from designs by Mr. Frank Matcham. It is to seat 3,000 persons, will be lighted throughout by electricity, and the opening is fixed for November next.

The Mablethorpe Urban District Council have decided to spend the sum of £1,000 in making a new promenade and in carrying out other improvements on the sandhills facing the sea at Mablethorpe. The erection of a sea-wall is also contemplated, as well as the provision of suitable accommodation for visitors.

In his annual statement to the London School Board, Mr. Key, the chairman of the Finance Committee of that body, stated that the estimated sum required for the year 1897-8 was placed at £31,938. The sum for repairs to buildings and furniture was placed at £108,000, or £18,362 over the approximate expenditure of the past year. This large increase should, he thought, lead the board to look very closely into the system of the repairs to schools, for he found that each school passed into the hands of the contractors for repairs on an average eight times in twenty years.

The opening services in connection with a new Congregational chapel in Sheffield-road, Barnsley, were conducted on Tuesday week. It is erected on the disused burial-ground in front of the old chapel, which was erected in 1778, and is now to be used as a Sunday-school. The new building will seat 350 persons, and is estimated to cost £1,400.

A further and definite step towards the provision of more suitable and adequate municipal buildings for Douglas, Isle of Man, was taken at the close of last week, when the town council accepted the tender of Messrs. W. Gradwell and Co., of Barrow-in-Furness, at £10,358, for the erection in Ridgway-street of a town hall, municipal offices, free public library, and fire brigade station. The architect is Mr. Arthur Ardron, F.R.I.B.A., of Westminster, whose design selected in open competition we illustrated in our issue of Feb. 12 last. Eight tenders were received, four from builders living on the island and four from English contractors.

Lord Morley's committee of the House of Lords has passed, as an unopposed measure, the Bill for undertunnelling the District Railway. The Bill, which has now been sanctioned by both Houses, also confirms an agreement with the Ealing and South Harrow Railway Company, under which the District Company guarantee the capital of the Harrow Company.

On page 99 of our issue of last week reference was made to Brook House, Walbrook, and it was stated that the elevation has been carried out in Portland stone. We find this is incorrect, and that the whole of the elevation above the first cornice is in Corsham Down stone.

The Mersey Docks and Harbour Board decided on Friday, on the recommendation of the works committee, to cut down the haunches of the invert of the sills of the 100ft. entrance from the river to the Alfred Dock, Birkenhead, the cost being £2,500; to provide an annexe to the shed on the quay of the Brunswick Dock; to make a roadway on the western side of such annexe at the total cost of £8,000; and to rearrange and extend certain of the workshops in the dockyard of Coburg Dock, at a cost of £10,000.

Apropos of the recent abortive proposal on the part of the Dean and Chapter of St. Paul's to remove the monument to Captain Burges in order to provide space for the Leighton Memorial, it is interesting to note that Sir Elliot Lees introduced into the House of Commons on Friday night a Bill to prevent the removal of monuments which have been erected in cathedrals or churches out of public moneys in pursuance of a vote in Parliament. The Bill was brought in and read a first time; but we fear at this late period of the session there is no chance of its being passed this year.

A new chapel, erected by the Bible Christians of Launceston, was opened on Thursday in last week. It is in the Early English style. The seating accommodation is for 270. The contract price for the work was £1,227. Messrs. Wise and Wise, of Launceston, prepared the plans, the builders were Messrs. Broad and Warren, and the plumbing and heating apparatus was fixed by Mr. Wenmouth, ironmonger, Launceston.

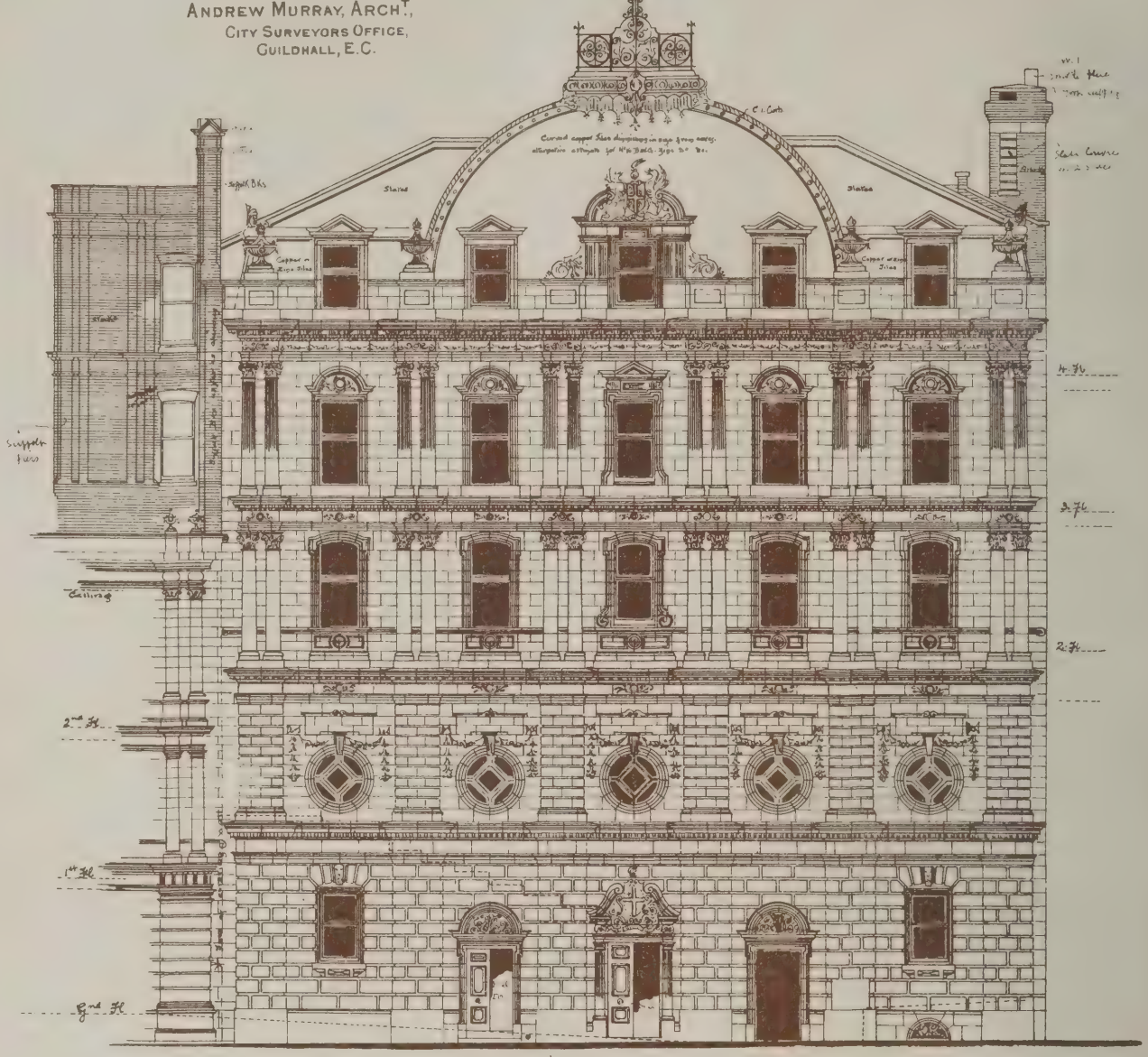
St. Michael's, Wood-street, one of Wren's City churches, is about to be demolished. The "front elevation and spire," masonry and fittings were sold by auction on Wednesday. Some of the memorial tablets have been removed for preservation to the adjoining church of St. Alban's, Wood-street.

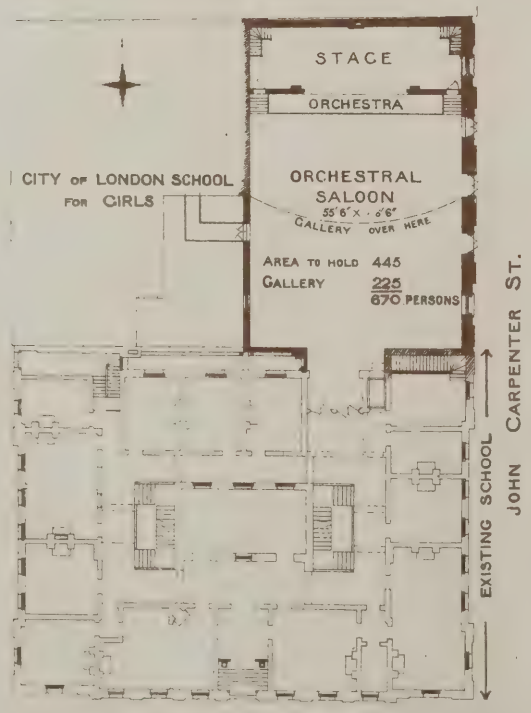
The borough surveyor of Great Yarmouth, Mr. J. W. Cockrill, recently prepared a scheme for the provision of electric tramways on the overhead system at a cost of £36,000, and submitted it to the lands committee, who rejected it by 8 to 5. The matter came before the town council at their last meeting, when a resolution was carried instructing the lands committee to further consider it.

Through the munificence of Lord Llangattock and others, the restoration of the ancient abbey church of Llanthony, Monmouthshire, is almost completed, and will very shortly be reopened by the Bishop of Llandaff.

THE GUILDHALL SCHOOL OF MUSIC EXTENSION

ANDREW MURRAY, ARCHT.,
CITY SURVEYORS OFFICE,
GUILDHALL, E.C.

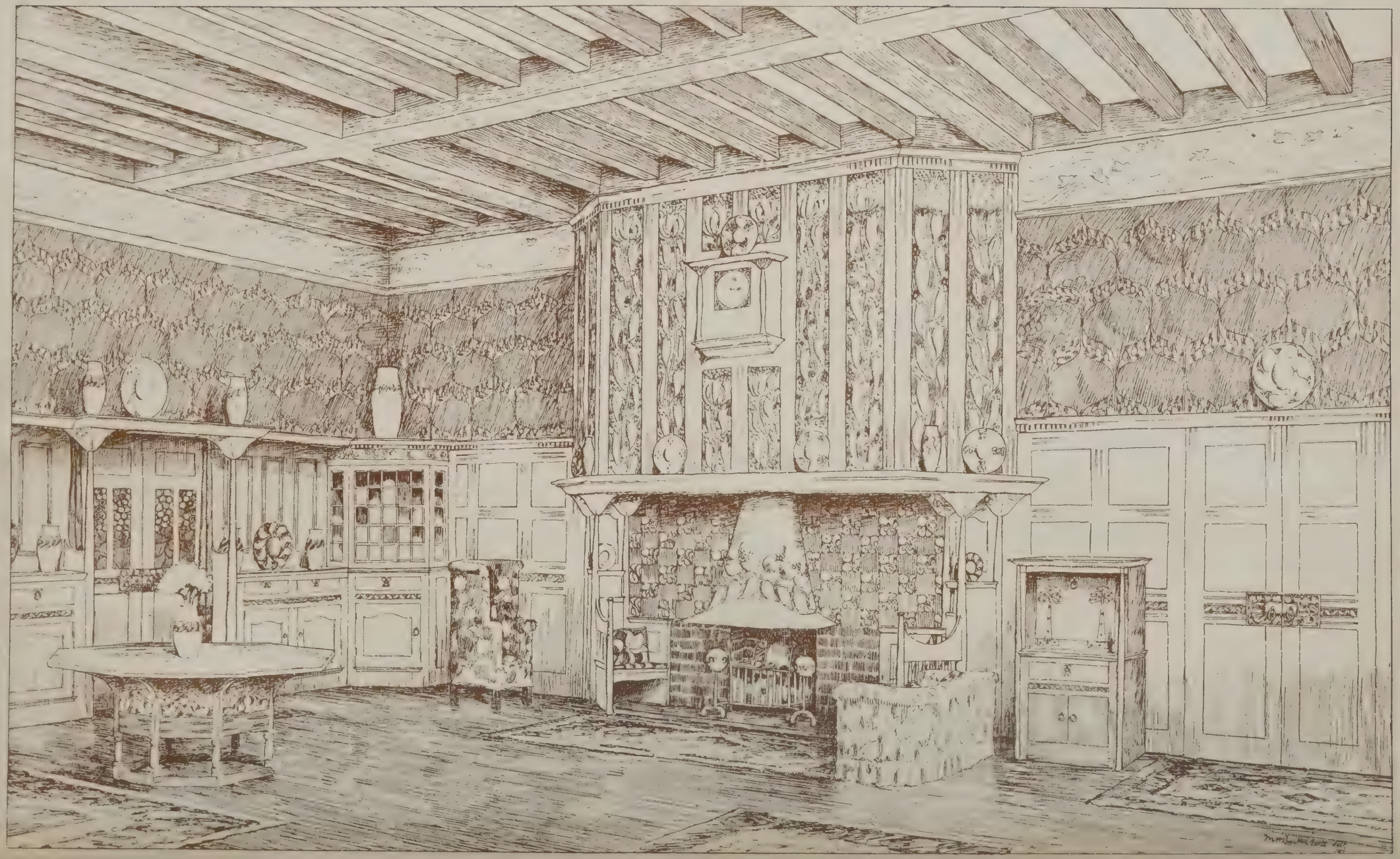




GROUND PLAN

PLAN OF CLASS ROOM FLOORS

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.



NOTRE·DAME·

BRUGES·

PRIVATE·PEW·

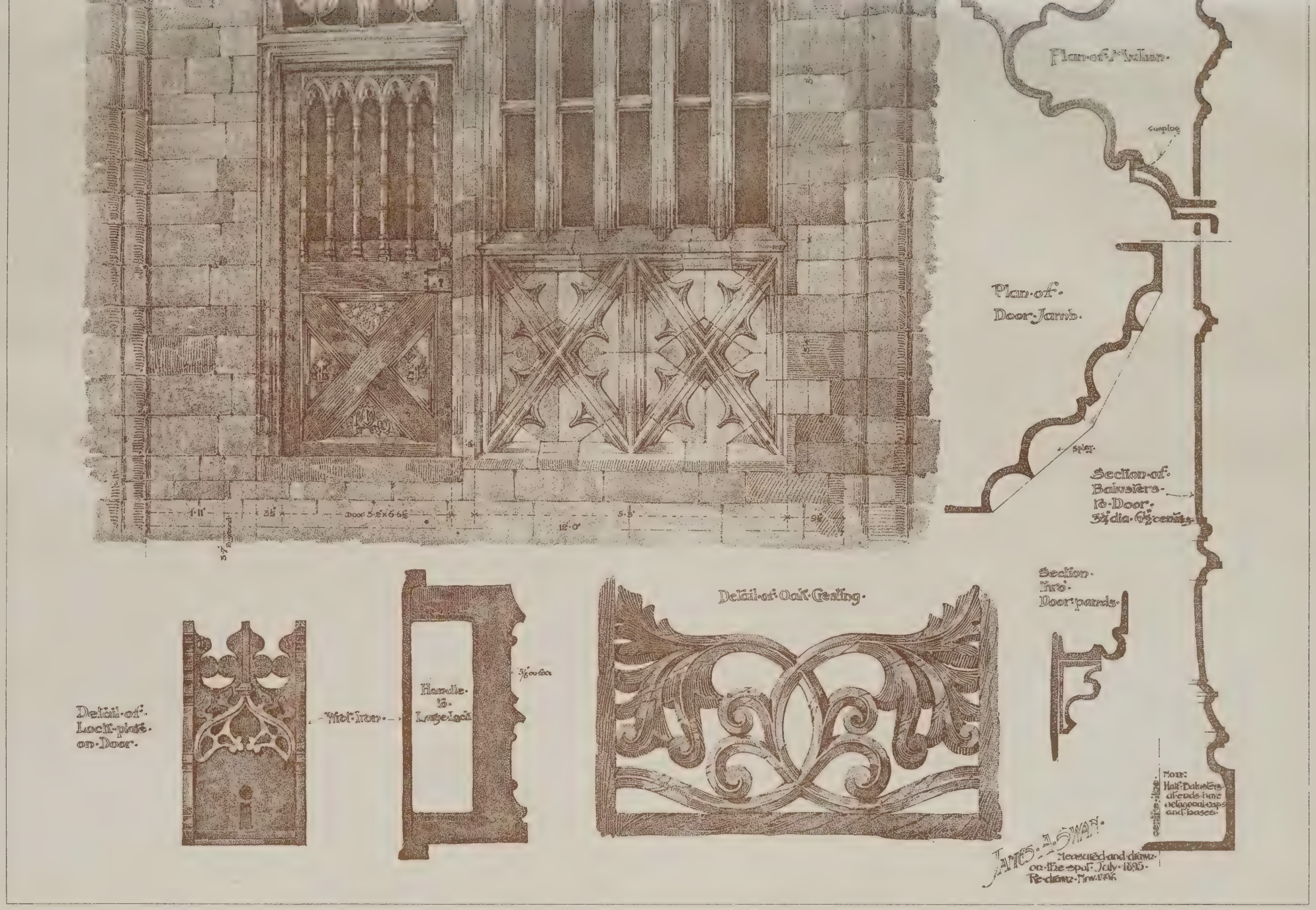
CONNECTED·WITH·

GRUUTHUUSE·

PALACE·

DATE·1474

NOTE –
Upper part
in oak.

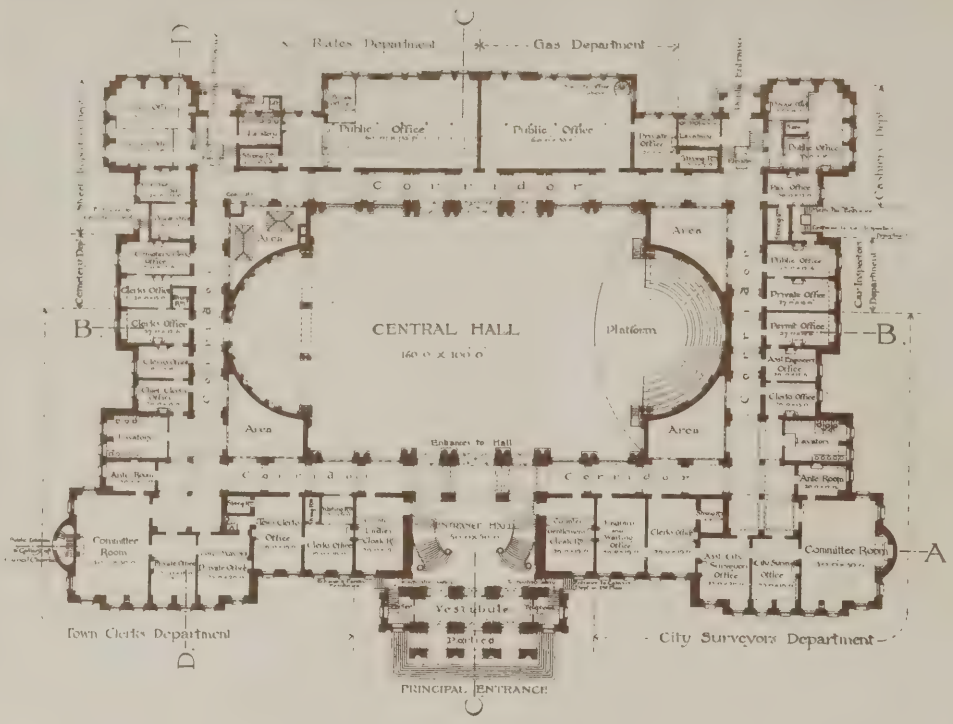


"PHOTO-TINT" by James Akerman, 6, Queen Square, London, W.C.

R.I.B.A. PUGIN STUDENTSHIP COMPETITION. MEDAL OF MERIT AWARDED J.A. SWAN.

BELFAST

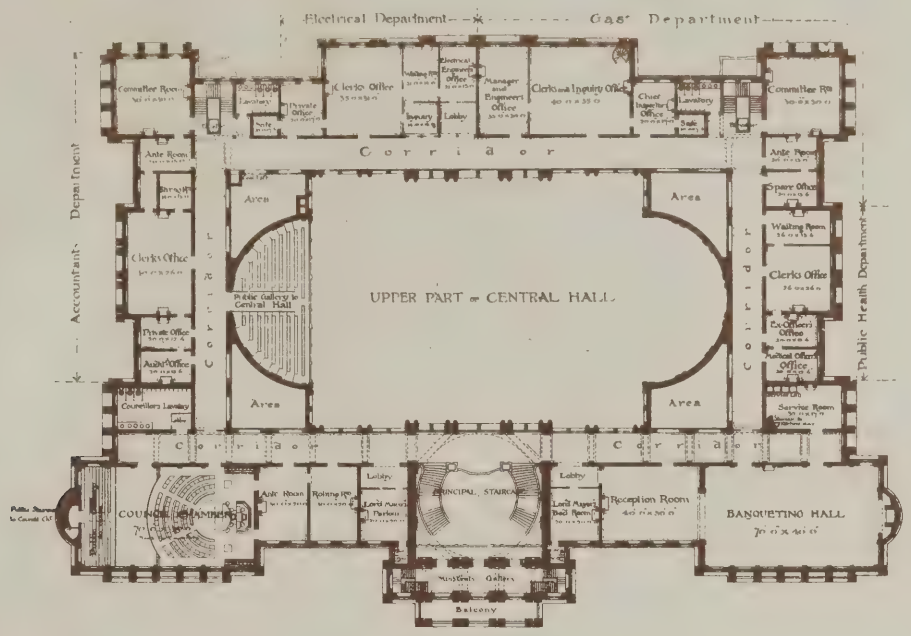
DESIGN BY MESSRS GRAEME



GROUND FLOOR PLAN

TY HALL.

TT & TULLOCH, ARCHITECTS.



PRINCIPAL OR FIRST FLOOR PLAN

"PHOTO-TINT" by James Akerman, 6, Queen Square, London, W.C.

"PHOTO-TINT" by James Akerman 6 Queen Square London W.C.

REDECORATION OF DINING ROOM PALAIS-DARMSTADT · GERMANY FOR H.R.H. THE GRAND DUKE OF HESSE M.H. BAILLIE SCOTT ARCHT

WESLEYAN · CHAPEL & SCHOOLS · BEBINGTON · CHESHIRE · T. TALIESIN REES · A.R.I.B.A. ARCHT.

"PHOTO-TINT" by James Akerman, 6, Queen Square, London, W.C.

COMPETITIONS.

ASTON.—The school board settled on Tuesday the conditions for the limited competition for the extension of the higher grade schools, and the provision of a pupil-teachers' centre and deaf school, &c. It was agreed that Messrs. Crouch and Butler, Mr. J. G. Dunn, Mr. W. Hale, Mr. E. Holmes, Mr. H. Reynolds, and Messrs. Ingall and Sons, all of Birmingham and its vicinity, be invited to compete; that the architect whose plans were considered best shall be employed to erect the schools, and that the second shall receive the sum of fifty guineas, and the third the sum of twenty-five guineas; and that Mr. E. R. Robson, the consulting architect to the Education Department, be employed to adjudicate upon the plans. His fee will not exceed sixty-five guineas, plus out-of-pocket expenses. The conditions under which the competition will be conducted stipulate that the buildings are to be constructed of brick, the frontage to be relieved with red terracotta, and the total cost must not exceed £12,000 in all.

MORECAMBE. — Messrs. Harrison, Hall, and Moore, of Lancaster, acting as referees, have reported on the plans submitted for the Hotel Metropole, Morecambe, and have awarded the first prize to Messrs. Mangnall and Littlewoods, Manchester. The selected design was marked by the motto "Experience." The conditions issued to competitors request accommodation for a first-class hotel containing 150 bedrooms, and an arcade of shops. To cost £30,000. The site of the hotel is situated at the extremity of the West-End Promenade, and surrounded by four frontages, viz.:—The Marine Drive, The Promenade, Heysham-road, Sefton-road. The two principal façades of the hotel face the Marine Drive and the Promenade with an entrance from each; the other two frontages to Heysham and Sefton-roads being appropriated by the arcade and shops; the two corners to Heysham-road being utilised for restaurants and refreshment-rooms connected with the hotel, but so arranged as to be practically separated, and in no way to detract from the high-class character of the hotel. The building shown by the selected plan is to be four stories high, exclusive of basement, and is designed in a rendering of the English 17th-century Renaissance, the material used being buff brick, terracotta, and stone. The accommodation provides for a first-class hotel, every attention being paid to the general cuisine department and the comfort of visitors, including a spacious recreation-room and winter-gardens. The following are the authors of the remaining premiated designs. The adjudicators add: "We need only say that we consider 'Experience's' designs far ahead of the second award, which is likewise in advance of the three following sets." "1897," Messrs. Essex, Nichol, and Goodman, Newhall Chambers, Newall-street, Birmingham. "Pro Bono Publico," Messrs. H. and E. Marten, 5 and 7, Charles-street, Bradford. "Dividend," Messrs. Chorley, Connon, and Chorley, 15, Park-row, Leeds. "Merlin," first of the unpremiated designs is by Messrs. Butterworth, Duncan, and Marshall, of Rochdale and Morecambe.

NEW YORK.—The National Sculpture Society announces that, through the generosity of Mr. T. Kelly, of New York, it will offer a prize for the best and second-best design for a sundial, to be competed for under its direction, the designs to be exhibited in the society's exhibition in 1898, and the award to be made at that time. The prizes are 500.00dol. for the best design, and 250.00dol. for the second-best, the competition to be open to sculptors only. The sundial is to be placed out of doors, on a lawn, free from buildings or other objects, and no restrictions are made as to cost, the prizes being for the models alone. The designs shall be submitted in plaster models, uncoloured, executed to a scale of 3in. to the foot. All models must be delivered free of expense to the society and at the owner's risk, addressed to the secretary of the National Sculpture Society, 215, West 57th Street, New York, any time during the months of January and February, 1898. The models shall bear no signature or other mark by which they may be identified, but each shall be accompanied with a plain white unmarked envelope containing the designer's name and address. Designs will be numbered in order of receipt. The competition will be judged by a committee to be appointed by the council of the society for that purpose; but the right is maintained to withhold the prizes in case no sufficiently meritorious design be submitted. It is stipulated that the prize designs shall become the property of Mr. Kelly, who will in no case have either of them reproduced save by the sculptor designing it; and Mr. Kelly further agrees to place the prize designs at the service of the artists for reproduction for others than himself if it is desired.

TONBRIDGE.—At a special meeting of the urban district council of Tonbridge, it has been decided to finally adopt the plans submitted in competition by Mr. J. H. Phillips, of Cardiff, for the proposed technical institute and free library. Mr. Phillips's design was placed first, among 27 sent in, by the assessor, Mr. Frederick W. Hunt, of London. Some objection was taken to the plainness of the adopted elevations, and two members supported the suggestion that the committee expend another £200 or £300 to render the frontage more creditable to the town.

CHIPS.

The West Riding County Council have instructed a committee to inquire as to a suitable site for a new lunatic asylum, and report back on the subject.

Mr. R. H. Bicknell, from the Local Government Board, held an inquiry at Chasetown, Staffs, last week, as to an application by the Lichfield Rural District Council for sanction to borrow £2,600 for works of sewerage and sewage disposal. Mr. E. W. Ives, the engineer, explained the details of the scheme.

The City Court of Common Council have accepted with thanks, as a gift from Mr. Edwin Lawrence, M.A., a portrait in oils of his father, the late Alderman William Lawrence, the well-known builder and contractor. The portrait will probably be added to the permanent collection at the Guildhall Art Gallery.

On Thursday afternoon in last week memorial stones were laid for a new Primitive Methodist chapel which is in course of erection in the Hannington-road, Pokesdown, near Bournemouth. Mr. Corbin Harris is the architect, and Mr. F. Elcock the builder.

Sir Francis Marindin, K.C.B., R.E., has completed the inspection of the new railway line from Aviemore, on the Highland trunk line, to Daviot, which is six miles south of Inverness, and the work having been passed, it was opened for traffic on Monday. The stations north of Carrbridge are Tomatin, Moy, and Daviot. It is expected that the whole deviation from Aviemore to Inverness will be completed early next year.

At the last meeting of the Lichfield Board of Guardians, the visiting committee recommended the appointment of Mr. W. H. Woodroffe, architect and surveyor, of Great Dover-street, London, to advise the board as to the best method of increasing the accommodation at the workhouse, and the resolution was confirmed.

Mr. Lewis H. Isaacs and Mr. Henry L. Florence have been appointed architects for the completion of the Carlton Hotel, now in course of erection from the drawings prepared by the late Mr. C. J. Phipps. The design for the exterior will be carried out with but little alteration; but the plans of the interior have undergone considerable modification.

Mr. Walter Emden, J.P., L.C.C., V.P. Society of Architects (the chairman), and a deputation of the members of the Strand District Board of Works waited upon the Prince of Wales at Marlborough House on Wednesday to present an address of congratulation from that board to Her Majesty.

The Princess Louise (Marchioness of Lorne) opened on Wednesday the Grosvenor Hospital for Women and Children, in Vincent-square, Westminster, which has been built at a cost of upwards of £12,000, of which sum Lady Kortwright, of Grosvenor-crescent, has contributed £8,000. The buildings have been erected from designs prepared by the honorary architects, Messrs. Roumieu and Aitchison.

While bathing a short distance from the new pier which is being erected at Talmine, Tongue, Sutherlandshire, on Friday, George Wilderspoon, the inspector of the pier works, was drowned. His wife and family live in New England-street, Brighton.

An organ, built in memory of Susan, Lady Dacre, who died August 18th, 1896, was opened at Kimpton Church, Herts, on Saturday. The new organ, in which was incorporated a portion of an older organ presented to Kimpton Church by Lord Dacre in 1863, is built by Messrs. Foster and Andrews, of Hull, at a cost of £290. It was placed in an organ-chamber erected by Lady Dacre to the memory of her husband, so the organ and chamber form a joint memorial of Lord and Lady Dacre, who worshipped at Kimpton Church for more than fifty years.

Intercommunication.

QUESTIONS.

[11708.]—**Timber Buildings.**—Can any reader give a list of buildings constructed wholly or principally of wood in Lancs, Cheshire, and Dublin? Also, any book on timber construction?—G. Y.

[11709.]—**Slates.**—Where are the light-green slates to be obtained? I should like to be informed of the name of quarry, the firm, and other particulars. Builders whom I have asked seem to know very little about them.—IN DOUBT.

[11710.]—**Lead Over Window Frames.**—During heavy rains, moisture makes its appearance over a window, and has damaged the wall-paper. Is it not a good plan to insert a sheet of lead in the joint of the brickwork in the inner thickness of the wall some courses above the window head, so as to prevent the percolation of water that finds its way through the outside bricks? Any information will oblige.—INEXPERIENCED.

[11711.]—**Lightning Rod.**—How should a conductor be fixed on a house having two gables front and back, with two large chimney stalks?—E.

[11712.]—**Trigonometry.**—The elevation of a tower standing on a horizontal plane is observed; a feet nearer it is found to be 45°; b feet nearer still the complement of what it was at the first station, show that the height of the tower is $\frac{a\ b}{a-b}$ ft.—B. W. L.

[11713.]—**Cement.**—Would someone having a practical experience of the matter inform me which is best for reducing materials for cement—stones or machine? If machine, what kind is considered best for the purpose? The cement is made by the dry process.—A. B. D.

REPLIES.

[11702.]—**Drainage.**—The down pipes should be made to discharge over gullies, if possible, so as to disconnect the two systems. The other plan—to connect with drain—would do if a disconnecting trap be put in; but the former method practically cuts off the down pipes from the drains, and is more independent of them.—DISCONNECTION.

[11703.]—**Eaves of Adjoining Building.**—The eaves of A, as shown by sketch, is certainly an encroachment on adjoining owner's land B, and there is no doubt, from the fact that the rain-water pipes are let into chases in the wall, that B has an acknowledged right to build. Of course, B must serve a notice on A. Were it illegal to cut away an adjoining owner's eaves, a building owner could be prevented from raising his building—a very unreasonable assumption.—FAIR PLAY.

[11706.]—**Levelling Instruments.**—Consult any book on surveying instruments for information about testing and adjusting a surveyor's level.—G.

The Plans Committee of the Aberdeen Town Council had under consideration on Friday over 20 plans of new buildings. The total value of the property is estimated at £17,000.

There was a great revival of activity at the Auction Mart last week, and properties of very varied descriptions sold with considerable freedom and at very satisfactory prices. The aggregate realisation was £320,005, about £60,000 in advance of the returns for the corresponding week in 1896. London freeholds were greatly in favour; but land, building and agricultural, has also furnished a considerable quota to the total, the tone of the market being very firm all round.

At their last meeting, the Chapel-en-le-Frith Board of Guardians approved of plans for the erection of a new board-room and alterations to the workhouse, to be carried out at an estimated cost of £4,000. Mr. Frank Osborne, of Mansfield, was appointed at the same meeting as clerk of works from among 32 candidates.

On the eve of St. Barnabas, an addition to Christ Church, Chester, was dedicated by Archdeacon Barber. It consists of a side chapel, stone pulpit, and porch. The chapel, which is built of old sandstone, from the designs of Mr. J. Douglas, is in style rather Late Perpendicular, and is enriched with windows by Mr. Kempe, given by Mrs. T. Hughes in memory of the late Judge Hughes. The windows represent—in the east window, the resurrection of our Lord, with figures on either side of St. Thomas and St. Peter; and in the two south windows St. Margaret of Scotland, St. Werburgh of Chester, St. Hilda of Whitby, and St. Winefred of Holywell. The reredos, which is also the work of Mr. Kempe, presents in carved design the Annunciation.

The rector of Millbrook, near Southampton, has decided to take down the old church (saving the tower), which, in its present condition, is a standing disgrace to the place, and to erect a small building on the site that will be decent for funerals and of use for occasional services.

There is now a sum of upwards of £15,000 available for the new chair of Public Health at Edinburgh University, and the universities commissioners have ordained that "there shall be a Professorship of Public Health and Sanitary Science in the University of Edinburgh, to be called the Bruce and John Usher Chair of Public Health," the patronage being vested in the University Court.

WATER SUPPLY AND SANITARY MATTERS.

BILTON, HARROGATE.—A Local Government Board inquiry was held by Mr. W. O. Meade-King, M.Inst.C.E., as to sanction to a scheme of main sewerage and sewage disposal for Bilton, Harrogate, for the Knaresboro' Rural District Council. There was no opposition to the scheme, which has been designed by Mr. D. Balfour, M.Inst.C.E., F.G.S., of Newcastle-on-Tyne, and consists of main sewer to provide for the development of the district, which will all converge to nine acres of land laid out on the broad irrigation principle, the sewage being first precipitated with alumino-ferric in large tanks. The effluent is to discharge into the River Nidd.

LONG BUCKBY WATER SUPPLY.—The Daventry District Council, having received seventeen schemes for the above, selected four for submission to Mr. John Eunson, C.E., of Northampton, who advised the acceptance of the project of Messrs. Usill, Browne, and Usill as "being the best and most practicable."

CHIPS.

A new Roman Catholic Church, built from designs by Mr. Edmund Kirby, of Liverpool, was opened at Hoylake, in the Hundred of Wirral, on Sunday.

The Lord-Lieutenant of Kent (Earl Stanhope) visited Folkestone on the 12th inst., and formally opened some large new schools which have been built under the direction of the Folkestone School Board by Mr. G. W. Prebble, the architects being the late Mr. Joseph Gardener and Mr. E. Wilks. The new school, which is situated in Sydney-street, will accommodate 780 children—viz., 330 infants, 200 girls, and 250 boys.

The memorial-stone of a new infirmary which is being added to the South Metropolitan School at Witham, Essex, was laid last week. Mr. Frank Whitmore is the architect, and Mr. Ernest West the builder.

Lord Meath, on behalf of the Metropolitan Public Gardens Association, performed on Tuesday the ceremony of opening to the public the old churchyard and burial-ground, three acres in extent, of the parish church of St. Matthew, Bethnal Green.

The new higher grade schools erected by the Bradford School Board in Byron-street, and named the Hanson Schools, were formally opened on Monday. The building, inclusive of special science and art fittings, has cost £15,000.

The London County Council decided on Tuesday, on the recommendation of the highways committee, to seek power next session for the construction of a tramway from the existing termini of the London and South London Tramways Companies at Westminster Bridge-road, along the centre of Westminster Bridge and the whole of the Victoria Embankment to Blackfriars Bridge.

Mr. Robert H. Bicknell, one of the inspectors of the Local Government Board, held an inquiry at Castle Bromwich on Friday last with respect to an application by the rural district council for the sanction to a loan of £2,000 for works of sewerage. Mr. J. E. Willcox, C.E., of Birmingham, attended, and explained the scheme, which provided for the complete sewering of the village, the sewage being dealt with on land recently acquired by the Birmingham Tame and Rea Drainage Board. After the inquiry the inspector proceeded to view the locality. No opposition was offered to the scheme.

The Staffordshire County Council having made application to the Local Government Board for sanction to borrow £30,300 for the purposes of carrying out necessary extensions, alterations, and improvements at Burntwood Asylum, a public inquiry was held at that institution on Tuesday week by Mr. Robt. H. Bicknell, one of the inspectors of the department. Mr. G. H. Stanger, the architect, produced the plans, and stated that his original approximate estimate for the buildings was £27,700, based on the cubing of the work, but that in drawing out the quantities he had come to the conclusion that a larger sum might be required. Dr. Spence said that, in addition to the money required for the buildings, he estimated that about £4,000 more would be necessary for clothing and furniture. Tenders for the works had been received, but had not yet been opened.

The Queen, on Thursday evening in last week, accompanied by Princess Henry of Battenberg and the Countess Feodore Gleichen, drove to the parish church of Holy Trinity, Windsor, and was there received by the rector, the Rev. Arthur Robins, who showed her Majesty the clock that has been erected on the tower of the church in commemoration of the Diamond Jubilee. The clock, which has four dials and is illuminated, chimes the quarters and strikes the hours. It has been manufactured by Messrs. Potts, of Leeds and Newcastle. By her Majesty's command, Mr. Potts, the maker, was presented to her by Sir Arthur Bigge.

Our Office Table.

THE select committee on the appropriation of sites for Government Offices practically agreed on Wednesday upon the draft report submitted by Mr. Akers-Douglas as chairman. They confirm the interim report of last year in favour of appropriating the site of Carrington House in Whitehall, opposite the Horse Guards, for the new War Office; they support the proposed widening of Parliament-street to a line parallel with the front of the Home Office, and they recommend an opening from the Mall to Charing-cross.

BY a codicil to his will, Sir Augustus Wollaston Franks, late Keeper of British and Mediæval Antiquities in the British Museum, who died on May 21, aged 70, has left to the trustees of the British Museum all collections lent by him to the said museum or to any other museum or exhibition, his collection of finger rings and personal ornaments of olden times, and any curiosities or works of art in his possession at the time of his death, which the trustees may please to select, excepting oil and water-colour paintings, prints, and books and manuscripts not specifically bequeathed to them. He has also bequeathed to the said trustees for preservation in the Print Department his collection of book plates (*ex libris*), trade cards, and tickets, together with his catalogues of the same, and certain books belonging to the collection of book plates. He further bequeathed to the trustees such of his books on pottery and porcelain as are not already in the library of the department of British and Mediæval Antiquities to be added to the said library. Sir Augustus Franks bequeathed to the Society of Antiquaries of London, of which he was president, such of his printed books on antiquities, art, history, and genealogy as are not already in the library of the said society, together with his heraldic manuscripts and any of his drawings and engravings of ancient seals which the society may desire to possess.

UNDER this will the museum trustees become possessed of the finest and most extensive series of book-plates in existence, of a superb collection of Continental and Oriental porcelain and faïence, and a number of the choicest examples of Mediæval and Renaissance art. The bequest also comprises the unique collection of drinking-vessels formed by the testator. Among the most remarkable of the objects are a silver dish, from Central Asia, with a figure of the Sassanian King Sapor II., a gold head, jug, bowls, and other objects found in the river Oxus; a silver bowl found in Lancashire full of coins of Canute, and a treasure-hoard of Carthaginian silver bowls and spoons, found in the hill of St. Louis at Carthage. The drinking-vessels include five mazar bowls, four of them English; among them the one given by Robert Pechum to the refectory at Rochester in 1532. The fifth, in its ancient leather case, is that of Louis, the last Count of Flanders, whose devices and arms are upon the foot. There are also an Arab crystal cup of the 13th century, in a Flemish mount of the 14th century; the Goodricke cup and the Aston tankard, the former of which was, like the latter, originally formed of an ostrich egg; a globe cup dated 1569, with a map of the world; and a small tankard of clear glass with the arms of the great Lord Burleigh in enamel; a fine morse of translucent enamel representing the birth of John the Baptist—a piece of Sienese work of the 14th century of unusual excellence; while the jewelry contains a series of finger-rings, principally Anglo-Saxon, among others the ring of Ethelwulf's daughter, Ethelswitha, Queen of Mercia, found in Yorkshire.

THE Highgate Woods Preservation Bill came before the committee of the Earl of Morley on Monday. This scheme is the outcome of the efforts of the Commons Preservation Society, Kyrle Society, the Metropolitan Public Gardens Association, and the National Trust for Places of Historic Interest and Natural Beauty. The object is to preserve the Churchyard Bottom Wood, 52 acres in extent, which is reputed to be part of the primeval forest of Middlesex. It covers ground that rises in a gentle slope from Crouch-end up to Muswell-hill-road, and is the property of the Ecclesiastical Commissioners, who are willing to part with it as an open space for the sum of £25,000. Towards the amount required the Hornsey Urban District Council will contribute £10,000, the Islington Vestry £2,000, and the trustees of the London Parochial Charities have promised £1,000. St. Pancras will contribute £1,000, Middlesex County Council £5,000, whilst private subscriptions amount to £5,500, leaving about £4,000 still to be provided. The Bill, which was unopposed, was passed, and ordered to be reported to their lordships' house.

ACCORDING to a report submitted to the House of Commons on Wednesday, concerning the work of the Public Record Office in 1896, the systematic calendaring of the patent rolls from the reign of Edward I. to that of Henry VIII. inclusive is making steady progress. The work was begun at five points, and the position of affairs at the end of last year may thus be summarised:—Edward I., 34 sheets, comprising the whole text of a volume covering the period between the 30th and 35th years of reign, completed at press. Edward II., 33 sheets of second volume completed for press. Edward III., 20 sheets of fourth volume completed for press. Richard II., 39 sheets, comprising the whole text of the two volumes for this reign, completed at press. Edward IV., 36 sheets, comprising the whole text of the first volume for this reign, completed at press. One volume for each of these five reigns will be ready for publication in the course of the present year. It is further announced that Mr. W. H. Stevenson has been engaged upon a general introduction to the Close Rolls of the reign of Edwards II., which will be prefixed to volume four of the calendar for that period; that the text for the first volume of the Calendar of Inquisitiones Post Mortem of the reign of Henry VII. was ready for press at the end of 1896, and that considerable progress had been made with the index thereto; that a similar calendar for the reign of Edward II. had been begun; that 48 sheets dealing with the State papers (domestic series), reign Charles I., were ready for press; that the period covered by the reign of Charles II. had been dealt with down to May, 1672; that further materials had been collected for a volume relating to the Irish administration of the Earl of Essex (reign of Queen Elizabeth); and that Mr. R. P. Mahaffy had begun calendaring the Irish papers of Charles I., the Commonwealth, and part of Charles II.

DURING the process of excavations incidental to the rebuilding of a shop in Northgate (or Shoemaker's) Row, near the centre of Chester, the workmen recently came upon the base of a large Roman column *in situ*. The fact that this relic occupies the exact spot in which it was placed by Roman workmen 16 centuries ago adds largely to the interest which the discovery has excited. It is of native red sandstone, and rests upon the natural rock, some 2ft. below the level of the present street, and almost in a line with the west side of Northgate-street, which some archæologists have contended follows the line of one of the ancient Roman *viæ*. The block is 4ft. 6in. square, with a base moulding 15in. thick worked upon it, and is in a good state of preservation. The diameter of the column is shown to have been 2ft. 10½in., or three Roman feet, of 11·6 English inches to the foot. A day or two after the base was discovered a column, if not the identical column belonging to this base, certainly one of the series, was partially unearthed. It is lying in a horizontal position, a few feet from the base, with a modern party-wall built across it. A few Roman coins, also in a good state of preservation, have been found upon the site. The columns which stood upon this and similar bases must have been equal to eight, if not nine diameters, or 24ft. or 27ft. in height, and there must have been at least two, but more probably four or even six, of them if, as appears likely, they formed the front of a Roman basilica or temple, and the building generally must have been of very imposing proportions. At present it is impossible to say whether these columns formed the east or west front of such an edifice, but further discoveries may help us to come to a conclusion. The owner of the property, Alderman Charles Brown, has already decided that this very interesting evidence of the importance of the ancient Roman city of Deva shall remain *in situ*.

THE annual meeting of the general committee of the Palestine Exploration Fund was held on Tuesday afternoon at 24, Hanover-square, under the presidency of Mr. James Glaisher, F.R.S. The report drew attention to important results of the

excavations at Jerusalem by Dr. Bliss, and the meeting was afterwards addressed by Dr. Bliss himself, who is on a visit to this country. The limits of the Pool of Siloam have been determined, and portions of the rock-hewn steps which led down to it have been found. The church which was known to have existed at Siloam has been discovered, and its plan, which presents many features of interest, has been ascertained. The paved street, which has been followed a long distance up the Tyropœon Valley, is apparently that by which the pilgrim Antoninus (570 A.D.) descended from the "Double Gate" or "Triple Gate" of the Haram to Siloam.

FOLLOWING the example of Germany and Italy, our Post Office authorities are forming a museum illustrating the evolution and progress of the post. A very good nucleus for an interesting collection has already been obtained, and a room set aside for it at St. Martin's-le-Grand. Here will be preserved the historic records relating to the early history of the Post Office, warrants, notices, old cables, official literature, and models of mail coaches of past days, uniforms, and a very valuable collection of postage stamps, which is to include an example of every stamp issued by the British Post Office. In order to make this collection as complete as possible, recourse has been had to Somerset House, where the old dies are kept, in those instances where no specimens of particular issues could be found at the General Post Office itself.

THE Improvement and Public Works Committee of the Birmingham City Corporation have come to an understanding concerning the proposed widening of Steelhouse-lane, in that city, which involves not only the giving up of land by the Improvement Committee, but certain compensation to occupiers of property affected—among them the Children's Hospital out-patient department, for which a new frontage will have to be constructed. The Public Works Committee have agreed to carry out the street works and to contribute £2,570 towards the cost falling on the improvement scheme. The upper portion of the thoroughfare is now but 30ft. wide. This will be increased to a minimum of 43ft., and an average throughout the whole street of about 45ft. The street line has already been set back between Ebenezer Chapel and the Victoria Courts Lock-up, involving the giving up by the Improvement Committee of about 900 square yards of land. The widening of the upper part involves the giving up of about 700 square yards additional. The Improvement Committee also intend to set back the line of frontage opposite the new General Hospital.

THE South Shields Corporation are pushing on with their town improvements, and mean to exercise the powers conferred upon them by their recent Parliamentary Bill, which has now been passed. Various schemes are at present under consideration for the widening of certain main streets. The first work in connection with these improvements to be proceeded with will be the widening of Church Way, the necessity of which was first pointed out some years ago, and put off from time to time until it was inserted in the Parliamentary Bill. In order to accomplish this improvement, a large slice of ground will be taken from St. Hilda's churchyard, running from the entrance gates, and cutting off the west end corner of the churchyard. This new piece of road will go over the top of a number of graves, and these it is proposed to cover with a solid bed of concrete of 2ft. in thickness. The final inquiries with respect to the improvements are now being made by the Home Office; and as soon as the medical officer of health's report has been sent in approving of these alterations from a sanitary point of view, the work will be put in hand. With regard to the widening and straightening of Ocean-road, the committee who have had the matter under their consideration have resolved, subject to the approval of the council, to acquire the abutting property opposite the Congregational Church. The owners have offered it to the corporation for the sum of £10,000, but that proposal has been refused, and the committee have decided to recommend the council to offer the sum of £5,250 or proceed to arbitration at once. A number of premises in King-street have been scheduled in the Bill, as well as the property running up Mile End-road, and all the premises in Fowler-street between King-street and Keppel-street.

THE City Commissioners of Sewers will further consider at their meeting on Tuesday an important scheme for the establishment of a refuse farm recently brought forward by the Streets Committee. The proposal is to follow the example of Glasgow in the matter of cleansing. The refuse would be conveyed by barge down the river to a site at Hornchurch Marshes, near Barking, comprising about 160 acres of agricultural land, and the Romford Canal, comprising about 35 acres. Here the refuse would be sifted, and that portion suitable for use would be used for agricultural purposes. The price named for the site was £25,590. The Commissioners have referred the matter back to the committee until next Tuesday to allow of the circulation of further information as to the methods of the Glasgow Corporation in dealing with this important matter.

IN a Harben lecture, delivered at King's College on Wednesday week, Dr. Sims Woodhead discussed "Biological Filtration" with reference to sewage disposal. After giving a short account of the manner in which the teeming micro-organisms of the soil break up and decompose any organic matter placed in the earth, he said the aim of biological filtration was the artificial production of similar conditions and results. He proceeded to describe the Exeter process of sewage disposal. The sewage was first passed slowly through a preliminary fermentation tank, where it was acted upon by various anaërobic organisms; it was then oxygenated by exposure to the air; and, lastly, run into filter beds. The effluent from these was usually bright, with little or no smell. The filters were composed of layers of coke in various states of subdivision, and the coke was only active by virtue of being coated with micro-organisms, without which it merely operated to a very limited extent as a mechanical filter, and not at all as a biological one. Dr. Woodhead exhibited a series of tables showing the numbers of micro-organisms, both aërobic and anaërobic, which were found to be present at the various stages of the process, and also the chemical changes taking place as a consequence of their activity. He remarked that both intermittent filtration and land filtration were only imperfect ways of carrying out biological filtration, and expressed his belief that the process would become of great importance in the future, and would be found capable of yielding very good results.

THE question of providing for the public architecture of the United States is likely, the *American Architect* ventures to predict, to find a tolerably satisfactory answer under the administration of the present Secretary of the Treasury, who has issued an order putting in force the provisions of the Tarsney Bill. It is understood, too, that the new supervising architect is to be chosen by competitive examination, and that the American Institute of Architects will be represented in the examining board. The new supervising architect will hereafter, it is understood, devote himself mainly to the conduct of the business of the office, while the designing of new buildings for the Government will be, so far as existing laws permit, intrusted to private architects, selected by some form of competition. What that form will be remains to be seen, but Secretary Gage apparently appreciates the value of good architecture.

The new Victoria Pavilion in connection with the Winter Gardens at Morecambe was opened on Monday last. This place has been erected by Messrs. S. Whitehead and Sons, from designs by Messrs. Magnall and Littlewood, architects, Manchester. The facade is built of terracotta from Ruabon, and is constructed with two large balconies facing Morecambe Bay. The stage is 72ft. wide by 35ft. deep and 60ft. in height, and the span of the main roof is 118ft. from wall to wall.

The half-yearly report of the City and South London Railway Company, published on Wednesday, states that considerable progress has been made with the works of the extension to Finsbury-pavement. The shafts at London Bridge and Moorgate-street stations have been sunk to the full depth, and the driving of the tunnels commenced. The difficulty experienced as to the settlement with the rector and churchwardens of St. Mary Woolnoth for the acquisition of the church for the construction of the station underneath compelled the directors to apply to the Board of Trade in order to obtain possession in accordance with the Act of Parliament. By direction of the valuer appointed by the Board of Trade, a large sum having been deposited with the Paymaster-General as security, possession of the site was at length obtained in May last, and the works are now being proceeded with.

MEETINGS FOR THE ENSUING WEEK.

SATURDAY (TO-MORROW).—Society of Architects. Day Visit to Canterbury. Train from Victoria 11 a.m.

CHIPS.

The bust of the Queen as Empress of India, by the eminent Italian sculptor Norfini, has been placed in the Oriental Institute, Woking, by Dr. Leitner. It is supposed to be the only bust which represents her Majesty in that character.

A new bonded warehouse has just been built in Great Patrick-street, Belfast, from designs by Messrs. Græme Watt and Tulloch. The premises occupy an isolated site of 78ft. by 68ft., and bounded on all sides by streets, and are five stories in height.

There was inaugurated at Bagillt, near Holywell, on Monday, an enterprise which should, in the near future, lead to a considerable development in the lead and coal-mining industry in Northern Flintshire. This was the cutting of the first sod at the entrance to the tunnel about to be driven from Bagillt to Halkin, primarily for the purpose of unwatering the Milwr lead-mines, and thence on to Halkin, as a result of which it is expected that it will become practicable to work a large number of lead and coal-mines which are now closed on account of the water.

The members of the Bristol Association of Clerks of Works and Builders' Foremen paid a visit on Saturday to Combe Down Quarries of the Bath Stone Firms, Limited. They were conducted by the manager, Mr. George Hancock, who took them through the present workings, and explained the geological formation and the qualities and methods of obtaining and working the stone, and rendered the outing both very interesting and instructive. The company, which numbered over 30, then adjourned to the Mechanics' Institute, Corsham, where a substantial dinner was provided.

The Grove Academy at Broughty Ferry has just been enlarged by the addition of an eastern wing from designs by Messrs. James Maclaren and Sons.

The new fire station in Carmelite-street, Whitefriars, was officially opened on Wednesday afternoon. The chairman of the Fire Brigade Committee, in declaring the station open, said that this was the largest station in London except the headquarters in Southwark. It has been built from plans by Mr. Thomas Blashill, superintending architect to the London County Council. It is eight stories in height, and above it an octagonal and pinnacled look-out tower rises to a height of 120ft. from the pavement. The outlay has been £21,000, besides £16,000 expended on the site.

The excursion of the Essex Archæological Society took place last week, when the members met at Southminster railway station and visited the waterworks and church at Asheldham and the ruins of St. Peter's Chapel and the adjacent Roman camp at Bradwell-juxta-Mare. Papers were read by Dr. Laver, of Colchester, and Mr. G. F. Beaumont, of Coggeshall.

A select committee of the House of Lords passed on Monday the preamble of the Watford, Edgware, and London Railway Bill. This railway is meant to connect the towns of Edgware and Watford, the line to Mill-hill connecting with the Midland line having been abandoned. The capital of the company is fixed at £300,000.

The first section of St. Teilo's Church in Woodville-road, Cardiff, was opened last week. It consists of nave and aisles, and accommodates 1,750 persons. It is Perpendicular in style, and is built of Sweldon stone with freestone dressings. A chancel, morning chapel, vestries, and organ-chamber, and tower 130ft. in height have yet to be built. Mr. George E. Halliday, of Cardiff, is the architect, and Messrs. S. Shepton and Sons, of Cardiff, were the builders.

A county police station has just been built at Seaforth, near Bootle, from designs by Mr. F. Holme, of Liverpool. The building is two stories in height, covers an area of 160ft. by 150ft., and is faced with red bricks and red sandstone dressings. A court-room is provided, as well as accommodation for a superintendent, inspector, sergeant, and nine constables. Mr. Walter Musker, of Bootle, was the contractor, and Mr. Grocott, the clerk of works.

On Saturday, the Horsham Museum Society inaugurated the fifth year of its existence by a joint excursion with the London Toynbee Antiquarian Society to the parish churches of Steyning, Bramber, and Shoreham, under the guidance of Mr. J. L. André, F.S.A., of Horsham, a member of both societies.

A police-station and sessions-hall are about to be built at Broadstairs, for the Kent County Council. The buildings will include two cottages, single men's quarters, four cells, and a magistrate's court, and will be erected from plans by Mr. Frederick W. Ruck, county surveyor, of Week-street, Maidstone.

Trade News.

WAGES MOVEMENTS.

IPSWICH.—The four gentlemen appointed to arbitrate in the matter in dispute between the master builders of Ipswich and the Amalgamated Society of Carpenters and Joiners—Mr. G. F. Josselyn (who presided), Lord John Hervey, Mr. F. H. Fosdick, and the Rev. E. J. Gilchrist—sat at the town hall on Wednesday week for nearly five hours, and issued their award on Friday. They decided that all work done after the completion of a ten hours' working day or any other day than Saturday, and a 6½ hours' working day on Saturday, shall be considered as overtime. This overtime shall be paid at the rates of one penny per hour for the first and second hours, twopence per hour for the third and fourth, and for all subsequent hours at the rate of fourpence per hour. All work done on Sunday and Christmas Day shall be paid for at the rate of double time. The ordinary pay per hour is 7d.

LIVERPOOL.—The plasterers' dispute in Liverpool still remains unsettled, and the largest building operations are delayed, notably the Post-office, School Board Offices, University Buildings, Fire Police Offices, Cook-street, White Star Offices, Toxteth Infirmary, Teachers' Training College, &c., owing to the attitude assumed by the men. On the 1st of May the men put forward their demands for an increase of wages and alteration of rules. Meetings were held and the matters discussed, with the result that the employers agreed to the advance of wages at the rate of ½d. per hour, but could not agree to the alteration of rules as suggested by the men. The employers suggested arbitration, but to this the men could not agree, and went out on strike.

CHIPS.

There is a fair probability that the Locomotives on Highways Bill will be passed this session. It deals with heavy traction engines, and while removing the vexatious nature of the present restrictions, gives improved powers to local authorities. It has been drawn on the recommendations of last year's Select Committee. The Bill has been before the Standing Committee on Trade, and after a long discussion and some opposition was passed.

At a meeting of the Birmingham Baths and Parks Committee on Monday it was decided to recommend the city council to proceed at once with the erection of the promised baths for Small Heath, at an estimated cost of £25,000. The site of the baths adjoins the free library in Little Green-lane. It is intended to provide first and second class swimming baths, private baths, &c.

The Wrenthorpe Schools, near Wakefield, are being ventilated by means of Shorland's patent exhaust roof ventilators and special inlet panels, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

The House of Lords affirmed on Monday a judgment of the Court of Appeal, holding that the London County Council were not liable to be rated by the churchwardens of Lambeth in respect of Brockwell Park. The Queen's Bench Division decided that the estate was beneficially occupied by the Council, but the Court of Appeal took a different view, declaring that no part of the property could be a source of pecuniary profit to the respondents.

The Government of India have approved of approximate estimates, totalling £72,500 sterling, for the reconstruction, on their present site, of barrack and hospital buildings for the British Infantry at Benares.

Mr. Phillips held an inquest at Wolverhampton, on Tuesday, with regard to the death of Thomas Harry Lander (33), painter, of Stockwell End, Tettenhall, who died in the General Hospital. The deceased was engaged in painting some houses at Church Hill, Tettenhall. On Friday morning he was standing on a ladder, which slipped, owing to some spouting giving way, and a man named Thomas Taylor, who was working at the top of the ladder, fell on to the deceased, knocking him off. Both dropped on to the back of a man named Joseph Foster. The deceased struck the ground and seriously injured his spine, but Taylor escaped with a few bruises. A verdict of "Accidental death" was returned, and the coroner congratulated Taylor on his marvellous escape after a fall of 33ft.

On Saturday last Mr. Thomas Fielden, M.P., opened a new Conservative Club at Whitworth. It is a substantial structure, chiefly composed of Yorkshire stone, and contains a large assembly-room, billiard-room (in which there are two large tables), committee-room, reading-room, conversation-room, bar, and ante-rooms. Mr. Joseph Law, of Whitworth, was the builder, and Mr. Norcliffe Mills, of Rochdale, the architect. The total cost is about £1,200.

LATEST PRICES.

IRON, &c.

	Per ton.		Per ton.
Rolled-Iron Joists, Belgian	£5 15 0	to	£6 0 0
Rolled-Steel Joists, English	6 0 0	,,	6 10 0
Wrought-Iron Girder Plates	5 15 0	,,	6 10 0
Bar Iron, good Staffs	7 0 0	,,	8 0 0
Do., Lowmoor, Flat, Round, or Square	17 0 0	,,	17 0 0
Do., Welsh	5 15 0	,,	5 17 6
Boiler Plates, Iron—			
South Staffs	7 17 6	,	8 5 0
Best Snedshill	10 0 0	,,	10 10 0

Angles 10s., Tees 20s. per ton extra.

Builders' Hoop Iron, for bonding, &c., £6 15s. 0d. per ton.

Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.

Galvanised Corrugated Sheet Iron—

	No. 18 to 20. Per ton.		No. 22 to 24. Per ton.
6ft. to 8ft. long, inclusive gauge	£10 15 0	...	£11 0 0
Best ditto	11 5 0	...	11 10 0

	Per ton.		Per ton.
Cast-Iron Columns	£6 0 0	to	£8 10 0
Cast-Iron Stanchions	6 0 0	,,	8 10 0
Cast-Iron Sash Weights	—	,,	4 2 6
Cast-Iron Socket Pipes—			
3in. diameter	5 10 0	,,	5 15 0
4in. to 6in.	5 5 0	,,	5 10 0
7in. to 24in. (all sizes)	4 15 0	,,	5 0 0

[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]

Pig Iron—	Per ton.		
Cold Blast, Lilleshall	105s. to 110s.		
Hot Blast, ditto	57s. 6d. to 62s. 6d.		

Wrought-Iron Tubes—Discount off Standard Lists f.o.b.

Gas-Tubes	75p.c.	Fittings	77½p.c.
Water-Tubes	70	,,	72½
Steam-Tubes	62½	,,	65
Galvanised Gas-Tubes	60	,,	62½
Galvanised Water-Tubes	55	,,	57½
Galvanised Steam-Tubes	45	,,	47½

	10cwt. casks. Per ton.		5cwt. casks. Per ton.
Sheet Zinc, for roofing and working up	£22 10 0	to	£23 10 0
Sheet Lead, 3lb. per sq. ft. super.	14 0 0	,,	15 0 0
Pig Lead, in 1cwt. pigs	13 10 0	,,	14 10 0
Lead Shot, in 28lb. bags	16 10 0	,,	17 10 0
Copper Sheets, sheathing and rods	60 0 0	,,	61 0 0
Copper, British Cake and Ingot	51 15 0	,,	52 15 0
Tin, Straits	63 10 0	,,	64 10 0
Do., English Ingots	66 15 0	,,	67 15 0
Spelter, Silesian	17 10 0	,,	19 10 0
	Per ton.		Per ton.
Cut Clasp Nails, 3in. to 6in.	£8 15 0	,,	£9 15 0
Cut Floor Brads	8 10 0	,,	9 10 0

Wire Nails (Points de Paris)—

0 to 7	8	9	10	11	12	13	14	15	B.W.G.
8/6	9/0	9/6	10/3	11/0	12/0	13/0	14/9	16/9	per cwt.

TIMBER.

Teak, Burmah	per load	£14 5 0	to	£16 10 0
,, Bangkok	,, ...	11 10 0	,,	15 10 0
Quebec pine, pitch	,, ...	—	,,	—
,, yellow	,, ...	2 0 0	,,	4 0 0
,, Oak	,, ...	5 10 0	,,	6 10 0
,, Birch	,, ...	4 5 0	,,	6 0 0
,, Elm	,, ...	4 0 0	,,	5 5 0
,, Ash	,, ...	3 5 0	,,	4 10 0
Dantsic and Memel Oak	,, ...	2 10 0	,,	3 10 0
Fir	,, ...	2 15 0	,,	4 5 0
Wainscot, Riga p. log	,, ...	2 0 0	,,	4 5 0
Lath, Dantsic, p.f.	,, ...	4 10 0	,,	5 10 0
St. Petersburg	,, ...	5 0 0	,,	6 10 0
Greenheart	,, ...	8 0 0	,,	9 0 0
Box	,, ...	4 0 0	,,	15 0 0
Sequoia, U.S.A.	per cube foot	0 1 9	,,	0 1 10
Mahogany, Cuba, per super foot 1in. thick		0 0 4½	,,	0 0 6
,, Honduras	,, ...	0 0 5	,,	0 0 6½
,, Mexican	,, ...	0 0 4	,,	0 0 5
Cedar, Cuba	,, ...	0 0 4½	,,	0 0 5
,, Honduras	,, ...	0 0 4	,,	0 0 5
Satinwood	,, ...	0 0 7	,,	0 1 0
Walnut, Italian	,, ...	0 0 3½	,,	0 0 7

Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 11in.:—

Quebec, Pine, 1st	£19 10 0	to	£25 10 0
,, 2nd	14 0 0	,,	16 10 0
,, 3rd	6 10 0	,,	10 0 0
Canada Spruce, 1st	10 10 0	,,	12 0 0
,, 2nd and 3rd	8 0 0	,,	9 5 0
New Brunswick	7 15 0	,,	8 5 0
Riga	7 10 0	,,	8 10 0
St. Petersburg	9 10 0	,,	13 0 0
Swedish	9 0 0	,,	16 10 0
Finland	8 0 0	,,	8 10 0
White Sea	9 10 0	,,	16 0 0
Battens, all sorts	5 0 0	,,	20 0 0
Flooring Boards, per square of 1in.:—			
1st prepared	0 8 6	,,	0 15 6
2nd ditto	0 7 0	,,	0 12 0
Other qualities	0 5 0	,,	0 6 6
Staves, per standard M:—			
Quebec pipe	—		—
U.S. ditto	35 0 0	,,	42 10 0
Memel, cr. pipe	230 0 0	,,	240 0 0
Memel, brack	200 0 0	,,	210 0 0

OILS.

Linseed	per ton	£14 5 0	to	£14 15 0
Rapeseed, English pale	,, ...	26 10 0	,,	27 5 0
Do., brown	,, ...	23 10 0	,,	25 10 0
Cottonseed, refined	,, ...	14 10 0	,,	15 10 0
Olive, Spanish	,, ...	27 0 0	,,	28 0 0
Seal, pale	,, ...	23 0 0	,,	24 0 0
Cocoanut, Cochin	,, ...	26 10 0	,,	27 0 0
Do., Ceylon	,, ...	23 5 0	,,	23 10 0
Palm, Lagos	,, ...	20 15 0	,,	22 10 0
Oleine	,, ...	19 0 0	,,	20 0 0
Lubricating U.S.	per gal.	0 6 3	,,	0 7 6
Petroleum, refined	,, ...	0 0 4¾	,,	0 0 4⅞
Tar, Stockholm	per barrel	1 2 0	,,	1 5 0
Archangel	,, ...	0 12 6	,,	0 15 0
Turpentine, American	per ton	21 0 0	,,	21 10 0

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TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

BOLSOVER.—For rebuilding the parish church, recently destroyed by fire:—

Shillitoe & Son, Bury St. Edmund's	£8,302 0 0

(Accepted.)
(Lowest tender received; highest above £12,000.)

CLINTON MAINS, N.B.—For the erection of general offices and staff quarters and scarlet fever pavilions for the new City Fever Hospital at Colinton Mains, for the Edinburgh City Council:—

Macandraw, Colin, Edinburgh	£93,317 0 0

(Accepted.)

CONWAY.—For new town hall, Conway, N.W. Mr. T. B. Farrington, C.E., borough surveyor, architect:—

Thorp, E., and Sons, Lloyd-street, Llandudno, N.W. (accepted.)	

DALSTON.—For factory at Dalston-lane, N.E. Mr. A. E. Hughes, architect:—

Holloway, H. L.	£12,100 0 0
Adamson	11,449 0 0
Lawrence, E., and Son	11,250 0 0
Faulkner	11,137 0 0
Williams	10,986 0 0
Downs, W.	10,983 0 0
Dabbs, W.	10,524 0 0
Chessum and Son	9,936 0 0
Shurmur, W.	9,889 0 0

DERBY.—For the erection of 45 cottages and shops, and the construction of two new streets on the Nottingham-road estate, for the Trustees of Liversage's Charity:—

Chattle, H., Empress-road, Derby (accepted).	

DOUGLAS, ISLE OF MAN.—For the erection of a block of artisans' dwellings in King-street, for the town council:—

Fargher, W. J. (accepted)	£3,960 0 0

(*Continued on page XV.*)

THE BUILDING NEWS
AND ENGINEERING JOURNAL.
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FRIDAY, JULY 30, 1897.

THE HOUSE AND THE GARDEN.

HAPPY is the architect who can set his house on an uneven site! Happier still is he who can plant it on a rocky one, and happiest of all the man who has irregular masses of stone to build on, cropping out amongst turf and soil. From such sites, indeed, the architectural tradesman will pray to be delivered. He can see no possibilities in them, and only one certainty—the certainty of extra trouble to himself. His stock house plans will not "work in"; an uneven site calls upon him for invention and adaptation, and, if he ever had any power of inventing and adapting, it has long ago perished through disuse. The only course he can advise is to have the space levelled before he begins. He will then have a horizontal platform to start with, and this being provided for him at indefinite expense to his client, he can go on the beaten track again and do once more what he has done a hundred times. Enough of the architectural tradesman—twin brother to the jerry-builder, and spoiler of all the beauties of our land from Cumberland to Cornwall.

The real architect, on the other hand, will feel that now at last he has got a chance. How, with skill and infinite care, he will so shape structure to the ups and downs of the place it stands on, that it looks almost from the first like a part of nature. Nineteen buildings out of twenty have no vital relation whatever to the sites they occupy. They might be moved, in American fashion, to the next piece of ground, or even to the next town or village, and they would be no worse and no better fitted to their new surroundings than to their old ones. With a flat, characterless site it is difficult to prevent this, but there is no excuse for it on uneven ground. Even a few grassy mounds, with the walls artistically fitted to them, will give a house the priceless individuality which no outlay on materials or decoration can ever confer. But the fitting must be of that highest type in which art conceals art. If it is well done, people will not say "How architectural," but "How natural!"

There is some modern, and a great deal of ancient, work, in which this result is atained. Amongst the former, Lord Armstrong's house at Craigside, by Mr. Norman Shaw, will inevitably suggest itself. It is rare to get such opportunities in the way of surroundings, and rarer still to use them so well. Amongst old buildings look at Harlech Castle, so moulded to the place it is planted on that one can hardly tell where man's doings begin, and where Nature's end. Look at Conway and Carnarvon, and Pembroke, look at St. Michael's Mount, at Dartmouth Castle, at Durham Cathedral; or abroad at that of Limburg. All these structures seem inseparable from their sites. They appear to have grown rather than to have been made. There is no sharp line between them and the rocks they rise out of; it is as if the solid strata for once had shot up and flowered, with turrets for stems, and gables and tracery for blossoms.

An architect may work for a lifetime and not get such chances as these. But he often fails to make the best of such chances as there are. The failure may be due to himself, or it may be caused by the conditions under which he works. The building owner naturally thinks, "I will have an architect to design the house, and a gardener to design the garden." Well and good, if the house and the garden were not going to be seen together; but since they are, the building owner is simply arranging for a duet in which each performer will select his own music and sing in his own key. This is one way in which modern houses jar painfully with their surroundings. It is nobody's business to see that they do not, and if the architect tries to make them agree, in comes the gardener, or the layer-out of gardens, and upsets him. It is no wonder if, after a series of such experiences, he gives up hope, or only trusts that time and chance may do for his building what he has not been allowed to do for it himself. Sometimes they do wonders for it. First of all, they obliterate the hard, hateful line where the walls meet the ground. The rain splashes them, and the dust sticks to them, and the moss grows on them just at their junction with the ground, and soon, for the first foot or two in height, the transition from the natural to the artificial grows almost imperceptible. Then the line is further broken, perhaps, by flowers, or grass, or shrubs, till the house looks less like a box set down for the carrier to remove, and more like a thing belonging to this beautiful earth. We are luckier in these points than our neighbours across the Atlantic. Mr. Burroughs, the American naturalist, found himself constantly wondering at the way in which everything here gets grown over. It was a novelty to him that grass should cover the wall-tops in England, that weeds should soon hide every patch of bare soil, and that a brilliant cluster of crimson flowers (red valerian, perhaps) should push out from between the stones of a cathedral tower, 80ft. or 100ft. from the ground. It is clear that we do not make the most of our advantages.

A small school of modern architects, some of them clever, have been trying to bring the house and the garden into harmony by making the latter extremely formal. Yews and cypresses, box trees and cedar-trees, clipped hedges and "topiary-work," are amongst the things that most attract them. Parapets and balustrades, formal walks and leaden images, too, are dear to their hearts, and for the latter fancy in particular they were severely taken to task two or three weeks ago in *Gardening Illustrated*, by a writer with the well-known initials of "W. R." All statuary, whether in lead, stone, or marble, is, in our view, a thing that can very well be spared from the English garden, not simply for "W. R.'s" reason, that it is likely to be bad in art, but still more because, whether bad or good, it is art out of place. In the English climate statues are best under cover, and even if he had the pick of those in the British Museum, no sensible man would want to set them up in his garden. The universal veil of green, which Mr. Burrough speaks of so lovingly, soon falls on statuary as on other things; but while it makes most things more beautiful, it only renders Classic sculpture ridiculous. For the rest, we may leave yew-trees and "topiary-work" to those who want them. An able man can make something worth looking at out of anything that takes his fancy. The world is wide, and this sombre style of gardening is not likely to overspread it. Its origin, of course, is that modernest of modern feelings, which hates the times it belongs to, and is never happy unless it can imagine itself in the company of its great-great-grandfathers. This is the malady of the age—a malady which the periods when art flourished never dreamt of—and it affects society all round. The newspapers announced, only the other day, that a brisk trade in spiders is now carried on, and that they are sold by the dozen to spin cobwebs over new port-wine bottles, that they may pass for old. The "topiary-work" and the lead figures are, to some architects, what the spiders are to some wine-merchants.

Yet there is an excuse for these dismal experiments in gardening. Those who make them feel by instinct that the site and the surroundings of a house should in every case have a character of their own, and that the house used should accentuate and emphasize this character. The average building site has no character. It is a mere geometrical figure on a plane surface: an oblong, perhaps, of 60 yards by 20, indistinguishable in appearance from scores or hundreds of similar oblongs in its neighbourhood. The "topiary" and lead-figure and balustrade architect wants to make it distinguishable, and brings in the fashions of two centuries ago to do it. But there are other and better ways. The architect should feel that not only the house, but the site pertains to him to deal with, and he should qualify himself for dealing with it well. If he finds it flat, he need not always leave it so. The innumerable loads of sod which the builder carts away from the foundations would often be invaluable near the house, if wisely placed. The brick areas which he builds to keep the basement dry might often be omitted with advantage, and sunk walks with slopes of turf or flowers formed in their stead. Such things could be managed at little cost, and sometimes even with a saving of money. It is only an architect here and there who has much horticultural knowledge; but most of us, with taste and skill, might learn to form the groundwork of a beautiful garden.

ARCHITECTURAL OUTBREAKS.

EVERY style has had its exaggerators; those who have taken some leading characteristic and made it conspicuous. The early revivalists were in a manner caricaturists. One took the towers and pinnacles and gables of the Mediæval fortress or church or conventual group of buildings, and reproduced them in picturesque medley, like Beckford did at Fonthill and Walpole at Strawberry Hill. There was a touch of romance in thus picking out salient features and presenting them in a chaotic disorder in keeping with the landscape painter and landscape gardener, who had both studied the elements of the picturesque. Look how the Gothic window was caricatured, how the pointed arch was attenuated by arcs of enormous radii till their sharpness destroyed the beauty and grace of the arched form, and became exceedingly restless and irritating. Again, the pinnacle and the spire suffered from the same epidemic. The angles blossomed out into crockets of prodigious size. Turning to the other phase—the Classic style—the craze for porticoes and columns and windowless exteriors defied every sense of moderation, and poets and satirists ridiculed in verse the bombastic erections of the day. One can now scarcely seriously think that St. Pancras Church in the Euston-road was not a joke for a Christian Church, or that it was necessary to build a huge peristyle to a building for any civic or municipal purpose, or to perpetrate such a solecism of the Doric Order as that which forms the entrance to the Euston Station. In both instances the revivalists of these styles seized certain features and satirised them. Heathen uses or local material were immaterial. Of course, they never intended to bring into ridicule features which they valued so highly and admired so ardently; but the result has been nothing short of a burlesquing of the Mediæval and Greek styles. We find the same architectural phenomena presented in later years. The devotees of Æstheticism, Queen Anne, and Japanese, by their fantastical developments and extravagances, ridiculed and travestied those styles. And the same can be said of Ruskinism, the influences of Rossetti, Burne Jones, William Morris, and other leaders of art decoration. Each had something peculiar and exaggerated, with much that was beautiful. We all remember the time when our woodwork

and dadoes were painted in sombre dull green of a bluish shade, when sad and weird-faced maidens peered out from our furniture panels and tiles and plaques, and when sunflowers and daisies adorned everything from wall panels to coal-scuttles. These artistic eccentricities have had their day, but they have left their influence for good upon our decoration and buildings, and our work of to-day is all the better for these epidemics of style.

We can look back through half a century and smile at the earlier of these extravagances. But are we not guilty of the same thing to-day, though in a less flagrant manner? We do not exaggerate the peculiarities of styles so much, but there is the same tendency to imitate types of building and the eccentricities of individual men. It is less offensive, because we recognise buildings more as a whole—their arrangements and structure, not merely details peculiar to the style. For example, we build a house after the style of an old manor house or a "Queen Anne" or Georgian house, but keep more to the sense and spirit of the style than our forefathers did. Our copying is more intelligent and patient. We see some merit in every style, and it is in this spirit that our modern buildings are designed. The same cosmopolitanism of taste which has prevailed here has been at work in the United States. Since the Civil War waves of English Gothicism, Æstheticism, the styles of Louis XIV., Louis XV., Louis XVI., and the Empire have passed over the land, each leaving its mark in some extravagant degree. Now a more refined Renaissance is taking the place of those over-elaborated styles, and all these revivals of taste have been educative. But, although this eclecticism is more intelligent than it was and less addicted to fasten on one or two features, like the Classic column or the Gothic window, there is still a tendency to exaggeration and extravagance. Travelling facilities and the sketch-book have had something to do with it. The young architect goes to, say, Belgium, and brings home certain features and treatments which he henceforth uses in all his buildings; it may be a feature from the Hôtel de Ville, a storied pinnacle or a traceried window from Louvain; it may be a carved wood-framed story from Rouen, or a cusped traceried doorway from Valladolid. It appears in the latest new front, or in the last villa, and it lords over all the rest of the work or assumes an exaggerated importance in the design. We have had epidemical outbreaks of porches, pediments, oriels, roofs, gables, in all of which one of these features has been exaggerated at the expense of others. Many are excellent treatments, no doubt; but this is due to the author's artistic sense of harmony. But just as Ouida or Marie Corelli introduces the element of exaggeration for effect in the romance of "The Massarenes," or in "Wormwood," so the modern architect delights to give us startling contrasts by the introduction of features or treatments borrowed from very opposite sources, intended to surprise or shock the eye accustomed to the ordinary rules or platitudes of the art moralist. It is rather the overpowering sense of the inconsistency or exaggeration which is painted in too glaring colours that we deprecate. It may be too shocking, or "writ too large,"—the effect is to at once make us sensible of the imposition. Thus, in a crowded commercial street we see replicas of buildings intended for convents and retreats, quiet and broad or massive; on the other side a flaunting display of shop-front and plate glass. Both surprise us by their apparent insincerity. In a locality where stone is abundant, we are startled by a building in which ornamental brick and timber-work has been introduced which defy all sense of congruity. Or we see a building crowded with a profusion of ornament for some very ordinary use, a palatial warehouse or shop, while the municial building over the way is bare and meagre in the extreme. Exaggeration in architecture is really the loss of proportion between one part and another; the bringing into notice of a feature that has no proper meaning or conformity with the rest, a want of proportion between the ornamental and the plain, and a giving a prominence to any feature or quality which has little meaning or connection, are all illustrations. We see a design with all gables, or one with "bits" of details copied from sketch-books which has been called the "bib and tucker" stage of design, another rejoicing in pediments of ogee shape, a circular canopy porch on corbels, another revelling in colonnettes.

But of all kinds of exaggerations, few are more ridiculous than those which imitate the whims of leading designers. The "personal equation" is particularly powerful in these days. For example, the tastes of such men as Norman Shaw, George and Peto, Collcutt, Belcher, and many others have become strongly contagious. A brick detail from Norman Shaw, a piece of Free Renaissance from Collcutt, assumes an exaggerated position and meaning in Mr. Brown's or Mr. Jones's work, and the feature, in fact, becomes infectious. We get what is called "Collcuttica," or a superficial veneer of gable and pilaster work without the redeeming qualities of the master; or it is a version Shaw, or the red-brick and white-sash fever; or the inevitable pediment of another leader of architectural fashion. The eccentricity is marked: it obtrudes itself where it is least expected; it is the hall-mark of Mr. So and So's design, just as we know the marginal signatures of engravers. There are certain very vulgar and significant examples of exaggerations or eccentricities. One is the flaunting, self-advertising shop-front, in which all the exaggerations of individual designers may be said to run riot at the expense of every moderation and virtue. There is the prodigious restaurant front, with its iron pillars and plate-glass, decorative adjuncts of stained glass, wrought-iron grilles, ornamental woodwork, and a host of fancy lamps, to which every modern decorative artist may be said to contribute. It is the polished granite or mahogany or glazed faïence which is overdone, or the leaded window with its coloured glass designs or the brilliant cut plate that seems to obtrude itself, at the cost of everything else. Exaggeration seems one of the attractions of this class of buildings in the eyes of the public; but, like all unhealthy stimulants, it grows wearisome. Thus, the great vestibule with its ornamental painted faïence, tile pavement, embossed ceiling, gilded metal work, and stained glass palls upon the imagination; the well-balanced and moderate design in keeping with the rest of the building is more satisfying. The elaborately modelled terracotta façade can be carried to an extreme, so can the polished and carved mahogany front and fittings. The gable epidemic is another instance of exaggeration. Go up Oxford-street, Charing Cross-road, or any of the new streets and roads that have been given over to the speculative builder, and one sees how this feature has been developed. Cadogan-square, Hans-place, the houses and "mansions" facing Battersea Park, are localities specially favoured. In many of the houses the gable is large and prominent, and has been made the chief feature. The most elaborate outline has been adopted, with every sort of scroll device and terminal. An importance has been given to the gable far in excess of the structural demand. The most elaborate examples have been imported from Germany and Belgium to surmount the most ordinary houses, and with the least pretence. The chimney-stack, with its mass of plain brickwork, is often exaggerated more for artistic effect than for any use. Breaking through a roof of tile, it certainly gives a picturesque and homely appearance; but when we see it assuming the dimensions of a tower and overpowering the building, we naturally regard it as a whim. Another modern exaggeration is "half-timber" work—a kind of Speke Hall construction "gone mad"; the style, indeed, without the construction. At Folkestone and Eastbourne, at Broadstairs, along the Thames, above Richmond or Twickenham, we see this sort of exaggerated "stud" architecture. pretty and suggestive in its way, but only skin deep. We can learn what we mean by exaggeration when we compare this kind of excessive imitation with the real timber frame-work of Lancashire, Warwickshire, or Cheshire. Whether it is a piece of Palladianism, a *réchauffé* of Mediævalism, Tudor or "Queen Anne," or a peculiarity of an architectural *raconteur*, the practice we speak of has a baneful effect on our architecture, the more so as it departs from the motive of commonsense construction.

LIABILITY FOR ESTIMATES.

WHETHER an architect is liable for deficiency of his estimate has long been a disputed question. A case just decided at the Bristol Assizes, and reported in our last issue, appears to answer this question in the affirmative. Some brewers at Bristol wished to extend their premises at Newport, Mon., and engaged an architect of that town, who advised them as to the cost of a building to be erected at that place, which he estimated would be between £600 and £700, whereas the plaintiffs had to pay £1,163 17s. The plaintiff brewers sought to recover the difference. The defendant architect had a counter-claim for £56 for commission on the work. The builder agreed to build the house at a schedule of prices, and it was contended by the defendant's council that the schedule having been agreed to by the plaintiffs, they had simply to pay for the work actually executed. It was acknowledged by the defendant that he had made a mistake in pricing his rough estimate at 5d. per cubic foot instead of 7d. per foot, which would have worked out at £900, and he discovered the first mistake of £200 before the work was actually in hand; but as to the second mistake of the same amount, he did not admit it, as it was due to "extras." The defendant pleaded the only contract was to erect a house according to schedule prices. In the end his lordship awarded £35 to defendant, giving a verdict for plaintiffs at £115 and costs, and he thought that the defendant was negligent in not informing the plaintiffs of the increased expenditure. So far the facts as reported.

The question that most concerns the profession is whether the estimate of an architect should be reasonably near the actual cost, and whether it is his duty to inform his client of any deficiency in his estimate, or mistake in the estimate he had made. The first point appears of little doubt; but the ruling of the Court has not decided any distinct issue from which we may infer anything definite. In one of the recorded cases ("Nelson v. Spooner"), an architect brought an action against his client for not carrying out his design which had been rejected on the ground that the work could not be done for the estimate. The judge before whom the case was tried laid down certain questions or points. (1) Was it an express condition that the work should be completed for the estimated sum? If not (2), Whether there is an implied condition that the work should be capable of being executed for a sum reasonably near the estimated sum? And if so (3), Whether plaintiff's estimate was so reasonably near, that the defendant ought to have employed him? No decision was come to. When there is no express condition

under the first head—and there seldom is—there does appear to be an implied condition that the architect's estimate should not exceed his figures by a certain limit. It is reasonable that when an architect gives an approximate estimate, it should be within a certain percentage of the actual cost, and this approximation should be made known. Thus, as to the third point—namely, what should be considered "reasonably near"—it ought not to be difficult to name a certain limit; in fact, if the client makes known his intention of holding the architect strictly to his estimate, these disagreements could not arise. But the real fact is no such definite estimate is ever given by an experienced architect, or made a matter of agreement between building owner and architect;—a sum is roughly guessed at, and the architect thinks no more about it; a tender is sent in which generally exceeds the sum stated by perhaps from 10 to 30 per cent., and the work is commenced. Until the quantities are taken off, it is impossible to give an estimate, and no architect should bind himself to any sum arrived at by cubing, as a mistake of 1d. or 2d. a foot may seriously affect the amount. From the report of the case decided the other day, nothing very definite has been arrived at. The evidence is not very clear as to whether the estimate was to be an express condition; but it would certainly not appear so, as the builder's price was to be according to a schedule. It is impossible to say what the owner expected, or what the architect thought to be his duty in the matter, and any decision must depend on these circumstances. The question of negligence in not informing the employer of any mistake in the estimate may certainly arise. Anyhow, if an architect has express instructions about cost, and he is careless in the estimate, or fails to tell his client of any mistake or discrepancy, he is to blame; though we do not see the use of a schedule if a certain sum is to be made binding. If the contract was to build according to a schedule agreed to by the plaintiffs, then they were simply paying for the amount of work actually put in the building, and cannot complain. After all, the architect's liability for any deficiency in his estimate can only arise when there is an express condition that the building is to be completed for the estimated sum. And it seems to us if there is no such agreement, and the architect gives a rough estimate by cubing, the client can hardly make him responsible, unless the actual cost far exceeds the reasonable anticipation of the employer. When will architects learn the wisdom of not binding themselves down to a rough estimate of cost?

A professional man who is sensible of his own reputation and correctness of judgement will very seldom commit himself to any estimate that is not based on quantities; and if these are prepared, we fail to see why any architect should state a sum as at all binding, or lead his client to suppose that he ought to obtain a tender within a reasonable limit. Sometimes, we know, these rough estimates are given and accepted with an amount of credulity that is astonishing; but they generally lead to trouble or disappointment. More independent is the architect who refuses to guarantee any amount, and will only advise after the tenders are submitted on properly prepared data.

WROUGHT-IRON AND STEEL IN CONSTRUCTIONAL WORK.—XXV.

THE building up of booms, struts, and ties into lattice girders requires details of jointing as diversified as the forms of the elementary parts themselves; it is often more difficult to decide on the best form of joint than on that of the elements. From this point of view the American pin-connected trusses would appear to possess an element of simplicity lacking in ours, because the shearing strength of a single pin is more readily estimated than the strains on a number of rivets distributed over a large area, in respect of which much uncertainty exists and on which practice is not uniform. But ample margin of strength can be, and is, generally provided in large riveted joints as a compensation against possible indifferent work and corrosion, so that fracture of such joints is rare.

The lap joints used by boilermakers are rarely employed in girder work, the butt joint, with

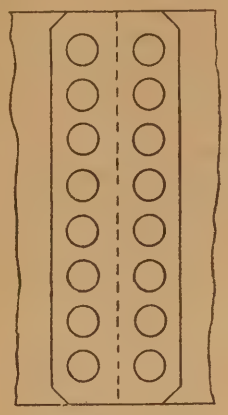

FIG. 146.

single or double covering strips, being more convenient and safer; double strips are generally used, except in cases in which two webs are adjacent, when a single cover on each often suffices. The objection to the use of a single cover is that the plates and cover are liable to bend sideways at the joint, because of the unsymmetrical arrangement, and because the rivets are only in single shear—that is, they can be shorn off in one plane only. When double cover-strips are used the strain occurs only along the central axis of the plate, and no bending can take place, while the rivets, if shorn at all, must be shorn in two planes, and must possess in theory just twice the strength of rivets in single shear only. The thickness of single covering plates is usually the same as that of the plates, that of double covering plates not less than half, and, preferably, two-thirds; the width of a covering plate is equal to that of the width of the plates to be united.

The strength of a butt joint is represented by that of one-half only of the total number of rivets and plate-section—that is, the rivets and plate on one side of the joint must be taken, and not the total number of rivets as in a lap joint.

The net plate section is, for purposes of

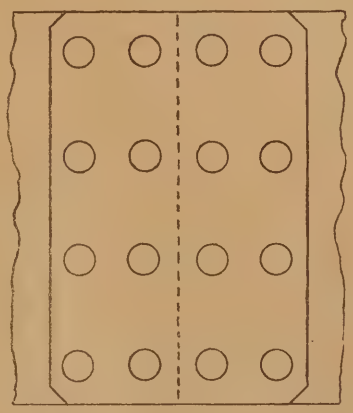

FIG. 147.

strength, that which is left between and outside the rivets in one row only. The effective rivet section is that of the whole of the rivets on one-half of a joint, provided the strain is distributed equally between them all, as is assumed to be the case; rivet section is equal to the diameter of a rivet, plus thickness of plate, plus total number of rivets in a lap joint, or on one side of the joint in a butt joint.

The strength of a joint to resist compression is taken as that of the strength of the rivets to resist shearing stress, taking no account of the abutment of the end of the strut; it is considered that the fitting of the latter may not be good, so throwing all the strain upon the rivets. The strength of a joint to resist tension is according to the sectional area of the net thickness of plate across the centre of a single row of rivets, or as the shearing strength of all the rivets on one side of the joint in the case of a butt joint, or of all the rivets in the case of a lap joint; net thickness of plate does not include the thickness of covering plates, which are not reckoned. In a properly proportioned joint the aim is to preserve with some approximation equal strength in net plate section and in total rivet section.

The best arrangement of rivets in a joint depends on many conditions, such as on the width of bar and cover-plate available; the nature of the joint, whether with single or double covering plates, and the relative strength of plate and rivet section. When a number of rivets have to be used, a wide distribution over a large area in two or three, or even more rows, is generally preferable to their location in a single row; it diminishes risk of bending of plates when single covers only are used; it permits the use of narrow covering plates when narrow bars are in question and conduces to rigidity. In Fig. 146, the rivets arranged in two rows only abstract so much from the plate section that it would be better to lengthen the cover plate, and double the number of rows as in Fig. 147; the total rivet section would then be retained as strong as in Fig. 146, while the plate section would be increased by the area of the four rivet sections removed to the hinder rows. Fig. 148 shows an arrangement in which a large plate section is retained with a large rivet section. The strength of the rivets in the lower single cover-joint A can further be doubled by using two covers, as at B; by such variations as these the conditions of strength

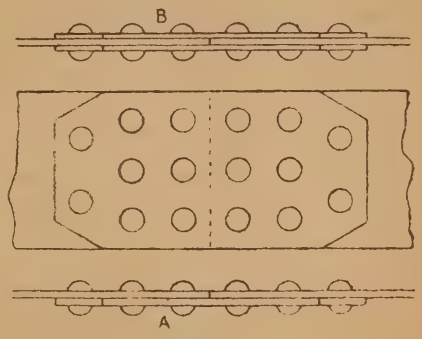

FIG. 148.

required in different types of joints can be obtained.

In reference to diameters of rivets and their centres proportions are fixed by long practice, in order mainly to guard against risk of shearing, and by some engineers against a crippling or crushing action which may occur between the rivets and plates. It is not necessary to discuss reasons for the fixing of these proportions of rivets to plates; the proportions of centres differ very widely. The only rule is that a pitch of centres between adjacent rows equal to two diameters of the rivets used is the minimum permissible; the distance to the end of a cover-plate is not less than about 1·2 diameters, the distance to the side edges of a plate not less than half the clear distance between two holes; this prevents risk of the plate fracturing outside the rivets, and confines the stresses to simple shearing of the rivets or tension of the plate, according as each is calculated for. The pitch of rivets in line will vary from about 2½in. to 6in., the diameters averaging from ⅝in. to 1in.; roughly speaking, for plates under ½in. thick the diameter of the rivets equals twice the thickness, for plates over ½in. about 1½ times the thickness.

The frictional resistance of riveted plates, due to the grip of the rivets, is not generally reckoned on as an element of strength, notwithstanding that it is high in new and good work. It is considered that, though of some permanent value in quiescent loading, the frictional resistance is liable to become impaired by the long-continued vibration of high loads. As a set-off against any gain due to friction is the frequent injury done to the plates by the punching of rivet-holes, which is often of a serious character, and which may not be wholly removed by reamering if the latter is not equal all round and sufficient in quantity. There is also the cutting action of

the sharp edges of drilled holes when the arris is not sufficiently removed. The whole subject is one which is involved in considerable obscurity, experiments not having given very uniform results, and the sound practice of leading engineers is therefore the best guide.

Specifications are often, and properly, stringent

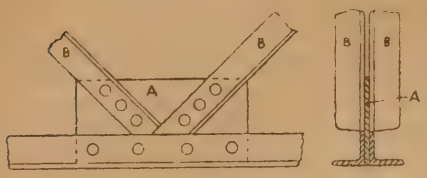

FIG. 149.

about the way in which riveting is to be performed; loose-fitting rivets, and rivets with cracked heads or tails, must be cut out and replaced by others. It is necessary to allow some slight clearance between the rivet and its hole, because of the expansion of the former at a white heat; this cannot be less than about $\frac{1}{32}$in., and should not be more than $\frac{1}{16}$in. in a large rivet; the limit is sometimes fixed at $\frac{1}{32}$in. This slackness is made up in work properly performed by the end pressure of the rivet swelling it out to fill the hole. Machine riveting exercises this pressure more efficiently than hand riveting, and therefore many specifications now insist on riveting being done by machine; obviously, when a rivet-tail is closed by hand-hammers, the closing action

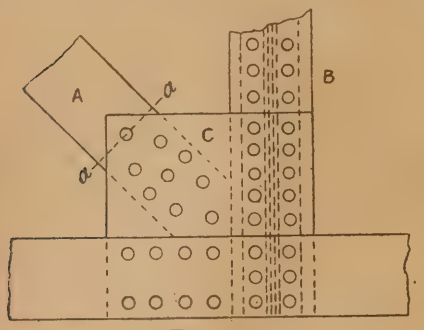

FIG. 150.

cannot extend far from the tail; but, when a machine is used, the endlong pressure acts throughout the whole length, forcing the rivet to fill the hole completely.

The question of drilling or of punching is often settled by specifications; but it is frequently left open to the contractor's discretion, provided that the holes, however formed, are satisfactory to the inspector; there is much more made of the superiority of drilling over punching than is borne out by experience. It is the fashion to drill now; but, unless holes are drilled in place, and the keen edges removed before the insertion of the rivets, drilling has no advantage over punched

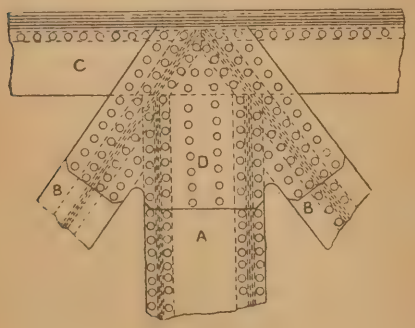

FIG. 151.

and reamered holes: it is just a question of workmanship. Holes drilled separately may have to be pulled into line by drifting, so distressing the material locally, and edges left keen are liable to injure the rivets; on the contrary, if a hole is punched, the metal is distressed only for $\frac{1}{32}$in., or $\frac{1}{16}$in. in the intermediate vicinity, and when this is reamered out the net plate section is left uninjured. Another point on which inspection is keen is the preservation of the specified width between the outer rivet-holes and the edges of the plate; if these dimensions are reduced, the risk of opening-out of the plate from the rivets to the edge is seriously increased.

Gussets are used to give large shearing and bearing area for the rivets; and also in order to avoid the increasing the depth of the flange-webs along the entire length when large rivet sections are required. Gussets are sometimes doubled, embracing a tie or strut on opposite faces to put rivets into double shear; they are used as covering strips when two or more joints are adjacent; and they render connections rigid. When a girder is of long span, the booms have to be made so deep that there is often ample depth in the webs for the riveting without the addition of gussets; in those portions of a girder where

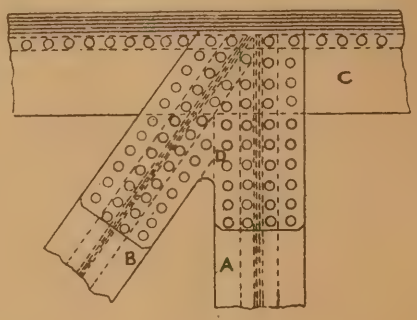

FIG. 152.

tensile stresses are greatest, as at the end ties, the gussets have to be increased in proportion to the increased strength of the ties, in order to permit of the insertion of a larger number of rivets.

Fig. 149 illustrates a typical joint, showing the use and value of a gusset A; this is riveted between two angles, which form the bottom flange of a braced girder. It is necessary, we suppose, to have a total rivet section of three rivets in each bracing; the width of the angle-bracings, B B, is not sufficient to allow of placing three rivets in line, because that would leave the plate section too weak in the tension members. Three rivets placed one behind another will leave sufficient net plate section, and the strain on the rivets may be assumed, with good workmanship, to be equally apportioned between the three; but the

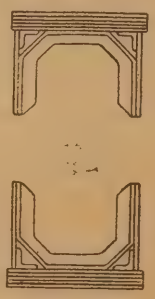

FIG. 153.

angle-iron flanges are not deep enough to receive the three rivets in series, though strong enough for their own proper duty. The gusset fulfils the required conditions, and in its absence the depth of the angles would have to be increased, or a continuous web would have to be riveted between the angles, of a depth equal to that of the gusset.

Fig. 150 illustrates a typical gusset-fastening for post and tension members to the bottom or tension boom of a girder; the latter is composed of flats, and the tension members A are flats, the posts B are of plate and angle to joist or H section. At *a a* the maximum net section of plate possible is secured, and the total rivet section is obtained without weakening the net-plate section on *a a*, and fracture of the plate would occur, if at all, at *a a*.

Figs. 151--153 illustrate rather elaborate and very strong gusseting, in which many of the rivets are in double shear. Fig. 151 shows the attachment of the centre or main post for one of the bow-string girders of a swing-bridge to the boom, and two ties, and Fig. 152 the attachment of a single tie and strut to the boom, while Fig. 153 shows in section the top and bottom booms, which are double-webbed, stiffened at intervals with angle-iron diaphragms.

In Fig. 151, A, the centre post, is a double-webbed box-pillar, built of plates and angles, : B B are ties, composed of plates and angles, arranged in a joist or H section. The widths of each, that is, perpendicular to the plane of the paper, are equal; the joint is made by abutting the post A bodily against the edges of the boom C, and by cutting the edges of the flange-plates of B B to abut against the edges of both A and C, leaving the webs and angles to pass within the web-plates of C; the single gusset-plate D then covers over the whole joint area, a single plate being riveted on each side of the girder. In Fig. 152 the same type of joint is used for the tie and vertical struts, the struts A abutting against the booms, and the flange-plates of the ties B being cut away, leaving the web and angles to pass between the webs of the boom, a cover-plate, D, making the joint on each side. Gusset joints of this type are typical of large numbers made. J. H.

MAYORAL CHAIN FOR ARUNDEL.

THE Duke of Norfolk has lately presented a gold chain to the Corporation of Arundel, to be worn by the Mayor in commemoration of the Diamond Jubilee of her Majesty the Queen. The chain is of 18-carat gold, and is adorned with alternate suns and white roses; in front is a large red rose, with a white one in the middle, and dependent therefrom a badge with the arms of the town of Arundel—argent, a swallow volant in bend sinister sable. The badge is surrounded by oak-leaves and acorns, a device of the Fitzalans, earls of Arundel. At intermediate intervals are four enamelled escutcheons, bearing the arms of England, Scotland, Wales, and Ireland. At the back is an enamelled quatrefoil, with the insignia of the noble donor of the mayoral chain, his Grace the Duke of Norfolk, E.M., K.G. It was designed by Mr. C. A. Buckler, Surrey Herald Extraordinary of the College of Arms, and executed by Messrs. Hardman, Powell, and Co., of London and Birmingham.

STEEL SKELETON BUILDINGS, NEW YORK.

AN article on "Architectural Relations of the Steel Skeleton Building," by F. H. Kimball, in the *Engineering Magazine*, traces the development of the tall building and the possibilities of the future. He says, "While the beauty of stone and brick in colour and texture is not to be questioned, conditions may arise which demand a radical departure from the traditions that dictate their use. In place of stone or brick, why not use iron or steel plates, or a composition plate, bolted or riveted to the steel frame? This could not be considered a return to the cast-iron imitation of stone masonry which prevailed 20 years ago. A more rational and natural use of metal might be devised which would not have the elements of a cast-iron front." As Mr. Kimball says, in the designing of one of these buildings the architect has more to think about than under the older systems. The external design and interior arrangement must be worked up together, the sources of lighting by courts in the centre or on one side, the position of the lifts or elevators. The location of the supports is another important point; any equidistant distribution may be impossible, if large halls and rooms are to be considered. Sometimes, as in the Manhattan Life Building, it is desirable to bury the columns in the divisional walls, and every story has to be considered through which they pass. Economy has also to be thought of in the spacing of the columns. If too far apart, increased weight of metal is required in the supporting girders and columns, and heavier floor-beams are necessary, besides greater concentrated loads at the foundations. Another important question is the location and depth of girders supporting the floors; also the position of outer-wall columns, which must be covered up in the piers or come in the wall spaces, and these have to be regulated by the elevation. The author illustrates an example of bracing in the first two stories of the Empire Building, Broadway. The author says: "In the placing of outside wall-supporting girders in the case of a stone front, it is desirable to locate them where cornices or band-courses occur, so that the heavy stone forming these features may run through the wall and be borne on the girders, thus acting as corbels on which the walls above may be carried up to the next horizontal line of girders. This system permits the erection of

MAYORAL CHAIN FOR THE BOROUGH OF ARUNDEL.

any part of a front independently of other parts if deemed advisable." The author refers to the protection of the structural frame imbedded in the outside walls. Some place the columns entirely within the wall, which involves heavy brackets from the columns to support the girders carrying the walls, besides eccentric loading. Generally the columns are placed so that they shall have the protection of from 8in. to 12in. of masonry between them and outer air, and the metal is treated with a moisture-resisting paint or composition. The best form of column is that which offers the minimum exposure to the direction of the moisture and wind. For example, an open column through which masonry may be built encasing the metal, the webs being placed at right angles to the walls, is the best method to prevent them from injury from without. The

author also refers to the importance of an adequate protection by burned-clay blocking of the skeleton framework to protect columns from fire, the requiremets of pipe lines carried up in the columns, which all add to the size of the sectional area of the supports, and to the difficulty of the architect. The author illustrates his paper by plans and views of the Manhattan Life Building, New York, the Corn Exchange Bank, the Bowling Green Building, the Comercial Cable Building, the Gillender Building, the St. Paul's Building, Empire Building now being erected, a colossal structure of 20 stories, with three exposed fronts.

THE NEW AMERICAN TARIFF.

THE following are the portions of the new American Tariff Act, which came into force on Saturday afternoon, affecting the brick, clay, cement, metal, and slate industries, and which are grouped together under schedules B and C. It will be noticed that the duties are largely increased on almost all items.

EARTHS, EARTHENWARE, AND GLASSWARE.—BRICK AND TILE.

Firebrick, weighing not more than 10lb. each, not glazed, enamelled, ornamented, or decorated in any manner, 1dol. 25c. per ton (against Magnesic firebrick 1dol. per ton), glazed, enamelled, ornamented, or decorated, 45 per cent. ad val. Brick, other than firebrick, not glazed, enamelled, painted, vitrified, ornamented, or decorated in any manner, 25 per cent. ad val. (against same); if glazed, enamelled, painted, vitrified, ornamented, or decorated in any manner, 45 per cent. ad val. (against 30 per cent.)

Tiles, plain, unglazed, floor, one colour, exceeding 2sq.in. in size, 4c. per square foot; glazed, encaustic, ceramic, mosaic, vitrified, semi-vitrified, flint, spar, embossed, enamelled, ornamented, hand-painted, gold decorated, and all other earthenware tiles, valued at not exceeding 40c. per square foot, 8c. per square foot; exceeding 40c. per square foot, 10c. per square foot, and 25 per cent. ad val. (against tiles, plain, not glazed, ornamented, painted, enamelled, vitrified, or decorated, 25 per cent. ad val.); ornamented, glazed, painted, enamelled, vitrified, or decorated, and encaustic, 40 per cent. ad val.

CEMENT, LIME, AND PLASTER.

Roman, Portland, and other hydraulic cement in barrels, sacks, or other packages, 8c. per 100lb., including weight of barrel or package (against same); in bulk 7c. per 100lb. (against same); other cement, 20 per cent. ad val. (against 10 per cent.)

Lime, 5c. per 100lb., including weight of barrel or package (against same).

Plaster, rock, or gypsum, crude, 50c. per ton, ground or calcined, 2dol. 25c. per ton; pearl hardening for paper-makers' use, 20 per cent. ad val. (against plaster of Paris or gypsum, ground, 1dol. per ton; calcined, 1dol. 25c.)

Pumice-stone, wholly or partially manufactured, 6dol. per ton; unmanufactured, 15 per cent. ad val. (against free).

CLAYS OR EARTHS.

Clays or earths, unwrought or unmanufactured, not specially provided for in this Act, 1dol. per ton (against same); wrought or manufactured, not specially provided for in this Act, 2dol. 50c. per ton (against 2dol.); China clay or kaolin, 3dol. per ton: limestone rock asphalte containing not more than 15 per cent. bitumen, 50c. per ton; asphaltum and bitumen not specially provided for in this Act, crude, if not dried, or otherwise advanced in any manner, 1dol. 50c. per ton (against free); if dried or otherwise advanced in any manner, 3dol. per ton; bauxite or beauxite, crude, not refined or otherwise advanced in condition from its natural state, 1dol. per ton (against beauxite free); fullers' earth, unwrought and unmanufactured, 1dol. 50c. per ton; wrought or manufactured, 3dol. per ton.

STONE.

Freestone, granite, sandstone, limestone, and other building or monumental stone, except marble and onyx, unmanufactured or undressed, not specially provided for in this Act, 14c. per cubic foot (agst 7c.)

Freestone, granite, sandstone, limestone, and other building or monumental stone, except marble and onyx, not specially provided for in this Act, hewn, dressed, or polished, 50 per cent. ad val. (against 30 per cent.)

SLATE.

Slates, slate chimneypieces, mantels, slabs for tables, roofing slates, and all other manufactures of slate, not specially provided for in this Act, 20 per cent. ad val. (against same).

PAINTS AND COLOURS.

All paints, colours, pigments, lakes, crayons, smalts, frostings, whether crude, or dry, or mixed, or ground with water or oil, or solutions other than oil not otherwise specially provided for in this Act, 30 per cent. ad val.; and all paints, colours, pigments, commonly known as artists' paints, colours, whether in tubes, pans, cakes, or other forms, 30 per cent. ad val. (against 25 per cent. ad val.)

IRON AND STEEL.

Bar iron, square iron, rolled or hammered, comprising flats, not less than 1in. wide nor less than $\frac{3}{8}$in. thick, round iron not less than $\frac{7}{16}$in. in diameter, 6-10c. per lb. (against same).

Round iron, in coils or rods, less than $\frac{7}{16}$in. in diameter, and bars or shapes of rolled or hammered iron not specially provided for in this Act, 8-10c. per lb. (against 8-10c.); provided that all iron in slabs, blooms, loops, or other forms less finished than iron in bars, and more advanced than pig-iron, except castings, shall be subject to a duty of 4-10c. per lb. Provided, further, that all iron bars, blooms, billets, or sizes or shapes of any kind, in the manufacture of which charcoal is used as fuel, shall be subject to a duty of not less than 12dol. per ton (against same).

Beams, girders, joists, angles, channels, car truck channels, T.T. columns and posts, or parts or sections of columns and posts, deck and bulk beams, and building forms, together with all other structural shapes of iron or steel, whether plain or punched, or fitted for use, 5-10c. per lb. (against 6-10c.)

Boiler or other plate iron or steel, not thinner than number 10 wire-gauge, sheared or unsheared, and skelp iron or steel sheared or rolled in grooves, valued at 1c. per pound or less, 5-10c. per pound (against same) valued above 1c. and not above 2c. per pound, 6-10c. per pound (against valued above 1c. and not above $1\frac{1}{2}$c., 6-10c. per pound), valued above 2c. and not above 4c. per pound, 1c. per pound (against valued above $1\frac{1}{2}$c. and not above 4c. per pound, 30 per cent. ad val.); valued at over 4c. per pound, 25 per cent. ad val. (against same). Provided that all sheets or plates of iron or steel thinner than number 10 wire-gauge shall pay duty as iron or steel sheets.

Hoop, band, or scroll iron or steel, not otherwise provided in this Act, valued at 3c. per pound or less, 8in. or less in width and less than $\frac{3}{16}$in. thick, and not than number 10-wire gauge, 5-10c. per pound; thinner than number 10 wire-gauge and not thinner than number 20 wire-gauge, 6-10c. per pound; thinner than number 20 wire-gauge, 8-10c. per pound (against 30 per cent. ad val.) Provided that barrel hoops of iron or steel, and hoop or band iron, or hoop or band steel, flared, splayed or punched, with or without buckles or fastenings, shall pay 1-10c. per pound more duty than that imposed on the hoop or band iron or steel from which they are made. Steel bands or strips, untempered, suitable for making band saws, 3c. per pound and 20 per cent. ad val.; if tempered, or tempered and polished, 6c. per pound, and 20 per cent. ad val.

Hoop or band iron or hoop or band steel cut to lengths or wholly or partly manufactured into hoops or ties, coated or not coated with paint or any other preparation with or without buckles, fastenings for baling cotton, or any other commodity, 5-10c. per pound.

Railway bars made of iron or steel, and railway bars made in part of steel, T rails, and punched iron or steel flat rails, 7-20c. per pound (against 7-20c.) Railway fish plates or splice bars, made of iron or steel, 4-10c. per pound.

Sheets of iron or steel, common or black, of whatever dimension, and skelp iron or steel, valued at 3c. per pound or less, thinner than No. 10 and not thinner than No. 20 wire-gauge, 7-10c. per pound; thinner than No. 20 wire gauge, and not thinner than No. 25 wire-gauge, 8-10c. per pound; thinner than No. 25 wire-gauge and not thinner than No. 32 wire-gauge, 1 1-10c. per pound (against same, up to and including inch 25 wire-gauge); thinner than No. 32 wire-gauge, 1 2-10c. per pound; corrugated or crimped, 1 1-10c. per pound (against same). Provided that all sheets of common or black iron or steel not thinner than No. 10 wire-gauge shall pay duty as plate iron or plate steel (against same).

Cast-iron pipe of every description, 4-10c. per pound (against 6-10c.)

WIRE.

Wire rods, rivet, screw, fence, and other iron or steel wire rods, whether round, oval, flat, or square, or in any other shape, and nail rods, in coils or otherwise, valued at 4c. or less per pound, 4-10c. per pound; valued over 4c. per pound, $\frac{3}{4}$c. per pound (against same). Provided, that all round iron or steel rods smaller than No. 6 wire gauge shall be classed and dutiable as wire (against same). Provided further, that all iron or steel wire rods which have been tempered or treated in any manner or partly manufactured, shall pay an additional duty of $\frac{1}{2}$c. per pound. Round iron or steel wire, not smaller than No. 13 wire gauge, $1\frac{1}{4}$c. per pound; smaller than No. 13 and not smaller than No. 16 wire-gauge $1\frac{3}{4}$c. per per pound (against same); smaller than No. 16 wire gauge 2c. per pound (against same); provided that all the foregoing valued at more than 5c. per pound, shall pay 40 per cent. ad. val.

NAILS, SPIKES, AND TACKS.

Cut nails and cut spikes of iron or steel, 6-10c. per pound (against $22\frac{1}{2}$ per cent. ad. val.).

Horseshoe nails, hob nails, and all other wrought iron or steel nails not specially provided for in this Act, $2\frac{1}{4}$c. per pound (against 30 per cent. ad. val.)

Wire nails maid of wrought iron or steel, not less than 1in. in length, and not lighter than No. 16 wire-gauge, $\frac{1}{2}$ cent per pound; less than 1in. in length, and lighter than No. 16 wire gauge, 1 cent per pound (against wire nails made of wrought iron or steel, 25 per cent. ad val.)

Spikes, nuts, and washers, and horse, mule, or of shoes of wrought iron or steel, 1c. per pound (against 25 per cent. ad val.)

Cut tacks, brads, or sprigs, not exceeding 16oz. to the 1,000, $1\frac{1}{4}$c. per 1,000; exceeding 16oz. to the 1,000, $1\frac{1}{2}$c. per pound (against all kinds 25 per cent. ad val.)

LEAD.

Lead-bearing ore of all kinds, $1\frac{1}{2}$c. per pound on the lead contained therein.

Lead dross, lead bullion, or base bullion, lead in pigs and bars, lead in any form not specially provided for in this Act, old refuse lead run into blocks and bars, and old scrap lead fit only to be remanufactured, all the foregoing, $2\frac{1}{8}$c. per pound; lead in sheets, pipe, shot, glaziers' lead, and lead wire, $2\frac{1}{2}$c. per pound (against lead ore and lead dross, $\frac{3}{4}$c. per pound; lead in pigs and bars, and old scrap lead fit only to be remanufactured, 1c. per pound; lead in sheets, pipes, &c., and lead wire, $1\frac{1}{4}$c. per pound.)

ZINC.

Zinc in blocks or pigs, $1\frac{1}{2}$c. per pound (against 1c. per pound); in sheets, 2c. per pound (against $1\frac{1}{4}$c.); old and worn outfit only to be remanufactured, 1c. per pound (against $\frac{3}{4}$c).

BUILDERS' BENEVOLENT INSTITUTION.

ANNUAL MEETING.

THE fiftieth annual meeting of the Builders' Benevolent Institution was held on Thursday, July 22, at the offices, 35, Southampton-row, Bloomsbury. Mr. W. Scrivener, vice-president, occupied the chair, supported by Messrs. Thos. Stirling, Thos. Hall, E. S. Rider, C. Ansell, F. Foxley, E. V. New, and others.

Major Brutton, the secretary, read the annual report, which stated that the income during the past year had been sufficient for the maintenance of the pensioners, and, believing it would meet with the approval of the subscribers, the committee admitted the whole of the thirteen eligible candidates to participate in the benefits of the Institution. Although the large increase in the number of the pensioners entailed much responsibility, the committee were of opinion that the necessary income would be forthcoming to meet the increased expenditure, particularly as the advanced age of the applicants required immediate relief. Much of the success of the year had been owing to the energy of the president, Mr. Henry Holloway, to whom the committee offered their hearty acknowledgments and gratitude. The subscribers were asked to kindly bear in mind that the present was the fiftieth year since the foundation of the charity—indeed, its jubilee—so that a largely increased contribution would be

hoped for on so special an event. The committee desired to offer their thanks to the stewards of the annual dinner, and to the hon. auditors. Much regret was felt at the loss by death of Sir Wm. Lawrence and Sir James Clarke Lawrence, Bart., both past-presidents of the Institution, the latter being also a trustee. The committee announced that Mr. Charles Wall would be the President for the ensuing year, and that the annual dinner would take place in Carpenters' Hall on Thursday, Nov. 25.

On the motion of Mr. New, seconded by Mr. Foxley, the receipts and balance sheet were unanimously agreed to.

Mr. T. Stirling next moved: "That the committee be empowered to give temporary relief in cases of urgency to selected, but unsuccessful, candidates for the charity to an amount of not exceeding £5 to any one candidate." At the close of the elections there had often been a good deal of disappointment among the unsuccessful candidates, and it had been considered that this would be a generous course to pursue.

Mr. New seconded the resolution, which was agreed to *nem com.*

On the motion of Mr. Hall, seconded by Mr. Stirling, a cordial vote of thanks was passed to Mr. Henry Holloway for his kind support and services during his year of office.

Thanks were also given to the trustees, to the treasurer, Mr. Geo. Plucknett, J.P., and to the committee, the retiring members being re-appointed with the addition of Mr. Henry Holloway. Thanks were also passed to the auditors.

Mr. Stirling proposed Mr. Charles Wall as president for the ensuing year, which was seconded by Mr. Hall, and carried by acclamation.

A vote of thanks to the Chairman closed the proceedings.

NOTES ON THE PAINTED GLASS IN CANTERBURY CATHEDRAL.*

VISITORS to Canterbury Cathedral will have often been puzzled over the old stained-glass windows, which contain some of the finest 13th-century glass. Many of these windows throw a side-light on the legends and beliefs of the Middle Ages, as, for example, they illustrate the miraculous interventions of Archbishop Becket. The Very Rev. F. W. Farrar, Dean of Canterbury, writes a preface to these Notes, prepared with considerable study and labour. The main object of the author of these Notes has been to give an account of the changes which have taken place in the arrangement of the scattered fragments of the old painted glass, and to show their continuity. There are twenty-seven plates and drawings in outline of the windows, by which means the whole series are recorded, and any individual subject can be found out. Beginning with the clerestory, thirty-three out of forty-nine windows are said to be copies by the late George Austin of the original glass. The subjects represent the ancestry of Our Lord, beginning on the north side of choir with the Almighty and Adam, passing round both transepts, and ending with Our Lord and the Blessed Virgin on the south side. Each window is subdivided into two subjects, one above the other. Mr. Westlake, who has overlooked these notes, thinks that these clerestory windows were the oldest in the cathedral, those still remaining being a little after 1200, and he points out a close resemblance of these windows to those in the lancet windows at Chartres and in the Abbey of St. Remi, Rheims, and thinks that the designs originated at Chartres. Detailed notes are given of each of these windows, derived from several sources, which are given. The north transept of choir contains subjects of the "Conversion of the Heathen," "The Church and Noe's Sons," "Marriage in Cana," and "The Calling of Nathaniel." Then follow descriptions of those in the north triforium, which include "The Siege of Canterbury," "The Taking of St. Alphege," and "The Murder of the Monks." The south triforium and the windows in Trinity Chapel are next described. The Latin inscriptions are given in large capitals, and the subjects are numbered and correspond with the "plans" in outline of each window, of which there are twenty-two given. It would be impossible to give in any detail the subjects of these windows, which occupy over 70 pages. Among the authorities quoted for the descriptions are "The Antiquities of Canterbury," by W. Somner, 1640; Culmer's "Cathedral Newes from Canterbury," 1644; Dart's "History and Antiquities of the Cathedral Church"; Edward Hasted's "History of Kent," 1788-1790; W. Gostling's "A Walk In and About the City of Canterbury," 1825; works by N. H. J. Westlake, F.S.A.; "Early Glass in Canterbury," by W. J. Loftie, B.A., &c. The proceeds of the sale of this interesting work are to be given to the Cathedral Restoration Fund.

* Notes on the Painted Glass in Canterbury Cathedral, with Plates. With Preface by Very Rev. F. W. FARRAR, D.D., F.R.S., Dean of Canterbury.

DAMS BUILT OF GRAVEL.

IT is a very common circumstance for contractors and builders, when carrying out drainage or works of a somewhat similar character, where more or less water has to be encountered, to be obliged to construct small temporary dams for the protection of their operations. Even when only of very moderate dimensions, these "false works," as our American friends term them, usually take the expensive form of main piles, sheeting piles, and 2in. or 3in. stout timber planking, according to the height of the dam, and that of the water or of the ground to be maintained at the proper level. When the location does not allow of wooden piles being driven into the substratum, then a greater expense must be incurred in the employment of some description of caisson. Both of these methods are costly and tedious, not merely in their construction, but equally so in their subsequent removal or demolition. A far more economical mode of building dams when the head of water is comparatively small has been successfully employed by an engineer of Les Ponts et Chaussées in the carrying out of certain works attending the canalisation of the river Meuse. The height of water to be retained at a constant level was about 10ft., and the dams were built of coarsely-rounded gravel, varying from 1¼in. to 4in. in diameter, obtained in the present instance from the bed of the Meuse by a very primitive and simple process of dredging. All that was required to be done was to tip the gravel carefully into the water over the site of the intended dam until it formed a bank, which generally assumed a side slope with a somewhat stiffer inclination than 45°. In a few days the dam, under the pressure of its own weight, comes down "to its bearings," and the slope on the external side is rendered thoroughly watertight, by spreading over it a tolerably thick layer of tan.

Many of the dams constructed in this novel manner were given a top width of 3ft. 3in. at a level of 3ft. above the surface of the water. The tan was laid on either from a boat or from barrows run along a temporary staging. Whichever plan was adopted, the great point aimed at was a perfectly uniform distribution of the staunching layer over the whole surface of the slope, for which purpose a particular kind of tool was invented. It is evident that a dam can be built in this manner both cheaply and expeditiously, and in situations which practically forbid the employment of any other but the most expensive sorts; it also possesses the advantage, by no means an unimportant one, of being very easily removed after having performed its duty. There are no piles to be drawn, or, what is always a troublesome operation, cut off level with the ground below water. Neither is there any raising or breaking up of iron caissons to be undertaken, attended with usually the abandonment of the lowest two or three rings in the bed of the water channel; again, the material itself can nearly always be obtained, either on the site of the dam or in its near neighbourhood. Earthy materials are not recommended for the construction of these dams, and, while they may be built quickly, they should not be built hurriedly.

T. C.

BASEMENT FLOORS FOR MACHINE SHOPS.*

By PROF. JOHN E. SWEET.

TO fix one's ideas in treating this topic, let it be assumed that the ground to be floored is both solid and damp. With the solid ground only such a depth of filling is necessary as that required to distribute a concentrated load over large enough area, so that a hole will not be punched through what constitutes the floor. Concrete, if of the best quality, may be as good as anything, and the necessary thickness would depend on the weight of the load which it had to support. In the writer's opinion a layer of thin flat stone, or two layers, bedded in concrete, and then a thin coating of concrete to give the full depth of, say, 6in., is better than 6in. of concrete, however good.

To cut off the moisture which is to be expected a coat of asphalte is best. Quicklime would be effectual, but with an unmatched floor the lime would sift through the cracks. The writer believes that a layer of 2in. plank is better than scantlings buried in the cement, as it better distributes the load, and joints in the top floor can come anywhere. We have determined by experience that the expected in this case does not happen; the floor does not spring up and down. The top flooring is best of only ⅞in. stuff, 5½in. or less in width. When the thin top floor is worn through in places and needs repairing, the hole or depression is only ⅞in. deep, whereas with thicker top flooring it is deeper.

Were we again to lay a floor we would cut all the top flooring into 4ft. lengths, to facilitate repairing, breaking joints every course.

At the works of John Lang and Son, of Johnstown, Scotland, their shop floor is wholly of iron chips, and is a solid, fairly good floor. Not as clean as a wood floor, but one that would answer well in a basement. The cost of such a floor would depend on the market value of chips. It is cheap to put down, and the night watchman can keep it in repair.

The above speculative consideration of the subject is presented for the express purpose of having those who have had experience give the facts, which, as usual, are more likely than not to upset the theory. What is the best construction for the basement floors of machine shops?

* From *Transactions* of the A.S.M.E.

POSSIBLE LEAD-POISONING.

A REMARKABLE series of cases is quoted by Mr. A. W. Blyth in his monthly sanitary report to the parish of Marylebone, which, according to the St. Mary's Hospital medical authorities suggest lead-poisoning. They have occurred in a house situated in a mews in the parish. The living rooms in question are situated over stables, and the drinking cistern is in a loft. On examination the water supply was found excessively foul; but the writer could only discover one-tenth of a grain of lead, with a trace of copper and some iron as mineral constituents of the water. Hence, if the cases were really produced by lead, the origin must be in some other article of food or drink. It is quite a common thing to find a tenth of a grain of lead per gallon in water passing through lead pipes, and such water does not appear to produce the acute poisoning such as these cases would indicate.

THE DENUDATION AND RECOVERY OF FARM LANDS.

ONE of the most useful of the farmers' bulletins issued under the administration of the present Secretary of the United States Department of Agriculture is that entitled "Washed Soils: How to Prevent and Reclaim Them." We reproduce in this impression three illustrations which accompany the paper, showing the effects of erosion and how to remedy them, which we think may afford useful hints to others besides farmers. The denudation or washing of lands in the higher levels of the earth's surface has been one of the most important factors in the geological changes which have so modified the surface of the earth. As a rule, this denundation is exceedingly slow, and the general level of large tracts of country is not lowered more than an inch or two in a hundred years: but, when it is excessive and more rapid than the natural decay of the subsoil material which is exposed, it may work serious injury to agricultural lands.

The excessive erosion of washing of lands may be prevented, the fields already cut up with gullies and watercourses may be recovered, and steep slopes may be held and prevented from washing, by chemical means, by cultivation and under-drainage, by reforestation, and by grass and similar vegetation.

I.—CHEMICAL RELATIONS OF THE SOIL TO SURFACE WASHING.

Surface erosion can be largely prevented by such a system of cultivation and cropping as will introduce as large a quantity of organic matter into the soil as possible. A very old method of recovering washed and gullied lands is to place straw in the furrows while ploughing, the straw not only acting

mechanically to hold the soil in place and prevent surface erosion, but also in a very efficient way to increase the quantity of humus, thus making the soil hold large quantities of water which otherwise would have passed off over the surface.

As soon as a sufficient supply of humus has been accumulated and the lands are brought up to an adequate condition of fertility, clover or grass should be seeded if the land is at all suited to these crops, or rye, oats, or field peas should be sown to help hold the surface.

A soil containing a fair supply of lime is much less liable to wash than one similarly situated and exposed which is deficient in lime. Clays which are heavily impregnated with lime salts are in a flocculated state, the fine grains of clay being held together and in contact with the larger grains of sand. This flocculated mass quickly settles, and is originally not so easily disturbed and carried off by moving water. A stiff clay soil is practically impervious to the penetration of surface water when it is delivered in such torrents as we are liable to have in our summer storms. A well limed soil, on the contrary, although it may contain as much clay, but in which the particles are flocculated or drawn together, is much more pervious to water, and the amount of water which the soil will carry down through under-drainage is increased, and the excess which has to flow off over the surface is diminished.

II.—WASHING OF LANDS MAY BE PREVENTED BY METHODS OF CULTIVATION AND UNDER-DRAINAGE.

A field in a condition of fine tilth and ploughed to a depth of 10in. will hold 2in. of rainfall and absorb it very readily, and a soil in such a condition will suffer no surface washing from any ordinary rainfall. This will not only save the surface from being washed and gullied, but it will also increase the store of moisture held by the soil, which is of very great value in the time of drought.

It is important also for this, as for other reasons, that the soil be covered with vegetation as much as possible throughout the year, as the roots and organic matter serve to bind the grains of the soil together.

Another very effective method, when properly carried out, to prevent the washing of lands is to under-drain the soil with tile or other drains. These drains carry off quite rapidly an excess of moisture, so that much more of the rainfall is absorbed by the soil and carried off through the drains and less washes over the surface of the land.

In cases where these methods may not be sufficient it will be necessary to provide for a more uniform distribution of the flow over the surface, and to prevent any accumulation of water which would have the effect of a torrential stream. This is secured in a great measure in cultivating the soil by laying off the rows according to the contour of the surface, so that each row will have a very slight incline of not more than from 1in. to 6in. in 100ft., in which the flow of water would be so slow that there would be little or no erosion.

To prevent an accumulation of water from breaking down the rows, larger and more substantial ditches may be provided, following very nearly the contour of the field, so that there shall be a fall of from 1in. to 6in. in 100ft. The distance apart of the ditches will depend upon the slope of the field; with a very steep slope they should be close together, often not over 6ft. to 10ft. apart; with a gentle slope they should be at intervals of 15ft. or 20ft., or even farther apart, depending upon the texture of the soil and the contour of the surface.

These sidehill ditches are very easily constructed, being made almost entirely with the plough. It is well to get the bank forming the lower side of the ditch sodded with grass to help to hold it and to lessen the danger of its giving way during a heavy rainfall. Unless these ditches are thoroughly constructed they are worse than useless; for, if they break, they concentrate a volume of water upon one point in the field which would otherwise have been distributed over the surface, and this often forms a torrent which does great damage. They should always be run with a level, of which there are several forms on the market suitable for this work.

A more efficient, but at the same time much more expensive, method of preventing the washing of lands where there is a considerable slope, is to terrace the fields so that there shall be level steps upon which the water can rest for awhile and be absorbed.

III.—RECOVERING GULLIED HILLSIDES BY REFORESTATION.

Forest ground is not subject to this erosive action of the rainfall, because in a forest a large part of the rainfall never reaches the soil, as 20 or 30 per cent. is intercepted by the foliage and evaporated before it reaches the ground. The rainfall which reaches the surface is rapidly absorbed, as the soil is kept granular and loose and much more of the water is carried off by under-drainage rather than by surface drainage.

Just as deforestation of hillsides and hilltops is the first cause for inducing erosive action, so is reforestation the most effective means in curing the evil. This has been demonstrated in France, where the Government and the farmers together have spent during the last thirty years over 40,000,000dols., and expect to expend three or four times that amount to reforest 1,000,000 acres of denuded mountain-sides, the soil and débris from which has been carried by the torrents of water into the plain, covering over 8,000,000 acres of fertile ground and making it useless for agriculture. Sodding for pasture has been found mostly less effective, and on the steeper slopes entirely ineffective.

Wherever the ground in the hill-country is not fit for agricultural use it should be set and kept in forest, not only to make it produce a timber crop, but also to prevent the erosion which finally becomes dangerous to the lower valley lands. The forest should occupy all hilltops which, as a rule, have too thin a soil to allow profitable agricultural use; it should be kept growing on the steeper slopes, where the water acquires the greatest momentum and the loosening of the soil by the plough furnishes a most favourable condition for erosive action; it should be placed on all rocky, uneven, agriculturally useless spots, because it will produce useful material even on such unfavourable situations, and, finally, forest belts should be maintained on long slopes alternately with fields and pastures, running along the brow of the slope of widths and at distances proportionate to the character of the land and the angle of the slope—on the steeper slopes closer together, on the gentler slopes further apart. In the deeply-gullied hill lands, where ploughing is impracticable, it is necessary to break the force of the water by constructing brush dams across the gullies, as shown in the second illustration, and roughly fill in the latter with stone, gravel, earth, &c., in front and rear if they are shallow, and at least in the rear if they are deeper. Where the ravines are especially deep and wide, it may become necessary to supplement and strengthen the rough dam with a loose rubble embankment or a dry wall of stone. A simple and efficient method has been practised in France, which consists in filling up the ravine with brush placed lengthwise, and keeping this down by poles laid across and fastened in the sides of the ravine. The waters are thus allowed to drain off, while the soil carried by them is retained in and over the brush, and in a short time the gulley will fill up of its own accord; then alders and willows are planted along the edge, and soon finish the work of securing the ravine against washing. The means for thus breaking the force of the water in the gullies and changing it from a rushing torrent into a series of gentle falls, and in part from surface drainage into subterranean drainage, and of filling up the gullies themselves will have to be devised in every special case as circumstances permit and the ingenuity of the operator suggests. The brush dam is preferably made of willow, poplar, alder, or other readily sprouting material, which becomes alive, and, by striking root, adds to the firmness of the dam.

PLANTING.

To cover the soil as quickly as possible with a dense and permanent aborescent cover is the object to be attained. Where the soil has not been so far eroded that ploughing could be done, it might be best for the first season to sow oats, field peas, or other crops that will readily grow and make a cover. The cheapest and most readily germinating tree seed should be looked for, and the quantity used per acre should be lavish, to secure a dense stand from the first. The most readily available kinds are the silver or red maple, box elder, elms, ash, and black locust, and, since for various reasons variety or mixed woods are preferable, it is advisable to use as many kinds as can be readily obtained.

Where the ground is too much cut up and too uneven to permit of ploughing, recourse must be had to sowing of seed in plats, or planting of seedlings or cuttings by hand. This is naturally much more expensive, and therefore should be done with greater care and foresight. Plats may be made by loosening the soil with a hoe or spade, and sowing the seed into these seed beds, covering the seed only slightly. The plats should be 3ft. to 4ft. apart to make sufficiently rapid cover.

The cheapest and most readily growing material for the general cover is furnished by the willows and poplars, to which may be added the box elder, the black locust, and the catalpa, while other more valuable kinds may be introduced, when the first cover has been established, by the planting of two or three-year-old plants in single specimens.

The first and principal object being to break the force of the surface waters, the arrangement in setting out the plants should be as nearly as possible in horizontal and parallel rows along the brow of the hill, following the contours. To get a full cover as soon as possible, the plants should be set not farther apart than 3ft. to 4ft. and even less, making from 5,000 to 7,000 per acre. If this is found too expensive, or for some reason impracticable to be done at once, the work may be reduced and divided into several seasons; the rows then may be made farther apart, say from 6ft. to 16ft., according to the slope, and the plants in the row 2ft., when the number will be one-half or less.

IV.—GRASSES AND SIMILAR VEGETATION PREVENT EROSION AND WASHING OF AGRICULTURAL LANDS.

On gentle slopes a good turf of perennial pasture grasses, especially those with creeping rootstocks, prevents corrosion, or washing of lands, and short, steep embankments may also be protected with this same covering. On longer and steeper slopes, however, this method is not so effective as that of reforestation.

In enumerating the effects to be obtained by the growth of grasses and other herbaceous vegetation on washing lands, or lands liable to be eroded, it should be stated that such growths are calculated to break the force of the rainfall and prevent its packing the soil; to render the ground more porous through the root penetration into the subsoil; to make the soil more absorbent and more retentive of moisture through the addition of humus to the soil from the decay of the plants; to retard the rate with which the surface waters flow off; and, lastly, to bind the particles of soil together, which is especially effective in the case of light, sandy lands, and of newly-formed embankments, whether of sand or clay.

CHIPS.

It has been decided by the Health Committee of the Liverpool Corporation "that in future the city engineer, before recommending the committee to prescribe a building line, confer with the surveyor as to the probable cost and amount of compensation that may have to be paid."

A refuse destructor is in course of construction at Yarmouth, and various alterations have been made which tend to increase the cost. The last has been the substitution of a circular for a square chimney shaft at an extra cost of £300, making the total £10,800.

The town council of Shrewsbury have decided to purchase for £30,400, 152 acres of land at Shelton, required for the purposes of the water-supply scheme about to be carried out from plans by Messrs. John Taylor, Sons, and Santo Crimp, of London.

The structural rearrangement of the fish and vegetable section of the Central Market, Farringdon-road, E.C., is proceeding rapidly under the direction of Mr. Andrew Murray, the city surveyor, and will be carried out at a cost of about £9,000. Three or four shops are now ready for occupation, and will be let on lease for a term of seven years.

Lowestoft Town Council have agreed to borrow £6,000 for a technical school and £8,486 for the new sewage outfall works of a bank at 3 per cent.

In the cemetery at Bovey Tracey, a cross has recently been placed at the head of the grave of the late Bishop Knight-Bruce (1852-96), a former vicar of the parish. A shaft of polished granite, surmounted by a combined cross and crown, is let into the lower half of a pyramidal block of similar stone. The grave is surmounted by rough granite stones. The work was executed by Messrs. J. Easton and Son, of Exeter.

Professor Herkomer, R.A., has finished the portrait in oils of Mr. R. D. M. Littler, C.B., Q.C., which he was commissioned to paint by the Middlesex County Council. It is at present on view at the artist's studio, and will ultimately be hung at the Sessions House, Westminster.

FIG. 1.—HOW THE FARM IS LOST.

Cutting off the timber allows surface water to rush rapidly over the ground, washing away soil and cutting surface into gullies.

FIG. 2.—HOW THE FARM IS REGAINED.

Replant the forest and woodlands; check rush of water by brush dams; control drainage by terracing, contour ploughing, and ditching; restore organic matter by manuring and cultivation.

FIG. 3.—HOW THE FARM IS RETAINED.

Cut out the timber judiciously; preserve fringe of wood on banks of streams; divide farm into pasture and woodland; repair at once any damage by water.

Building Intelligence.

ABERDEEN.—Rapid progress is being made with the construction of the corporation lodging-house, East North-street, Aberdeen, where 261 male lodgers will be accommodated. The scheme is being carried out under the Housing of the Working Classes Act. The total cost of the buildings will be £12,000. There are in all five blocks, three of which will be four stories in height. The front dressings are of white granite, and those in the back walls are of red granite. There is a large amount of masonry work in the contracts. Reading and recreation rooms, lavatory, and bath accommodation are to be provided. Messrs. Marshall and Dick, Newcastle-on-Tyne, are the architects of the buildings, and Mr. John Ogilvie is inspector of works for the corporation.

DOVER.—The Hôtel Burlington was opened on Saturday. It faces the centre of the bay, being set back a little from the Marine Parade; but the houses which intervene are to be cleared away, so as to give an unimpeded view of the Channel from every part of the building. The hotel contains 380 rooms, the decoration and artistic furnishing being done by Messrs. Maple and Co. Opening out of the grand hall, which forms the lounge of the hotel, are some decorated and richly upholstered apartments. This chamber is fitted as an Oriental divan, with some Indian carvings forming structural screens and portières, and can also be utilised as a ball or concert-room. Long corridors traverse the three wings of the hotel, and on the upper floors give access to the bedrooms and private suites. They are furnished in various styles, French and English. The architects are Messrs. Murray and Foster. The outlay on furnishing alone has been about £7,000.

FALMOUTH.—The parish church of Charles, King and Martyr, at Falmouth, an attempt to combine Pointed Mediæval with Classical details, erected in 1663, has now been unroofed, preparatory to restoration, from plans by Mr. Edmund Sedding, of Plymouth. He recommended that an entirely new roof should be provided, the side galleries removed, the pillars taken down and re-erected, a new apsidal chancel built at the east end, and a new tower over the entrance porch; the present roof, tower, and galleries being quite unsafe. A contract has been entered into for the first portion of this scheme dealing with the main structure only, and on opening up the building it is evident that considerable work must be undertaken beyond that provided for in the contract. The parishioners have raised the sum of £1,200, but £3,000 more will be required to complete the undertaking.

HAMMERSMITH.—The new town hall, which has been erected in the Broadway at a cost of about £25,000, was opened by the Duke and Duchess of Fife on Friday. The design of Mr. J. H. Richardson, of Finsbury-pavement, was selected by Mr. Emerson in a competition limited to seven architects, and was illustrated in our issue of May 4, 1894. The buildings are in the Renaissance style. The front is of red brick with Portland stone. There is a lofty tower between the public hall and the council chamber. The main entrance to the offices is at the north end in Brook Green-road, and gives access to the large octagon hall, with the vestry clerk's offices on the right-hand side in front, the medical officer's department on the left, and the overseer's department on the east side. The corridor walls are lined with Belgium marble, and the floors with marble mosaics. The basement is used for storage purposes, testing of gas, &c. The public hall and the council chamber are side by side on the upper floor. The former is approached by a grand staircase from Brook Green-road, occupies the whole width from front to back, 66ft. by 51ft., and affords accommodation for 650 people. It has a large recessed stage platform. The council chamber is shown externally by a lower elevation than the public hall, having a separate roof and *flèche*. It is 42ft. by 28ft., and has a deputation room adjoining. A gallery for the public and the Press is provided with distinct entrance and exit. The second floor also contains artists' rooms and conveniences, while on the third floor are caretakers' rooms. The buildings are lighted by electricity, a separate installation sub-station being provided for the purpose, while the heating is on the low-pressure system. The floors throughout are fire-proof, and each section is provided with iron doors. The builders are Messrs. Wimpey and Co., of Hammersmith. The heating and ventilating arrangements were intrusted to Messrs. Kite and Co., Euston-road; the electric light fittings to Messrs. Verity, King-street, Covent-garden; the iron construction to Messrs. Lindsay, Neal, and Co., Paddington; and the construction work of the roof and galleries to Messrs. A. Dawnay, Nine Elms. The lifts and iron doors were supplied by Messrs. Clark, Bunnett, and Co., and the marble by Messrs. Patterson, of Manchester. The work was superintended on behalf of the vestry by Mr. Alfred England.

LIVERPOOL.—The fever hospital at Netherfield-road, which was taken over by the city corporation in 1885 from a charitable body, and was enlarged in 1887-8 at a cost of £13,640 from plans by the city surveyor, has now again been enlarged. The extension, officially opened on Friday, comprises two new pavilions, having two wards with ten beds each, or a total of 40 beds, and an isolation block containing four wards with ten beds, additional accommodation being provided for 50 patients, thus bringing the total accommodation up to nearly 150 beds. The scheme also included the extension of the laundry buildings and the provision of new machinery and fittings, these being used entirely for the cleansing of the patients' clothing while the old appliances are reserved for the use of the staff. A new lodge has been erected containing discharging rooms, waiting rooms, and porters' office, with bedroom accommodation for five porters. Improved accommodation has also been provided by the alteration and enlargement of the administrative block, giving additional bedrooms for ten nurses and eight servants, the total staff now provided for being one doctor, one matron, 25 nurses, 22 servants, and five porters, total 54, as against 32 before the extension was made. A new approach to the hospital has also been made of easier grade from Netherfield-road. The total expenditure of this scheme, including the cost of acquiring properties, furnishing, electric lighting, drainage, and laundry machinery, amounts to about £26,000, while the area of the recent extension is 5,500 square yards, thus making the total area of the hospital 15,140 square yards.

LEXDEN.—The parish church of Lexden, near Colchester, was reopened on Sunday after the renovation of the nave. Some time ago a new chancel was built, and in order that the interior of the building may be as harmonious as possible, the work of reseating and decorating the nave, as well as lowering and relaying the flooring, was a short time since intrusted to Mr. R. Beaumont, of Lexden. Some of the carving in the chancel and on the gallery front, and two open-work screens which have just been added to form the ends of the clergy stalls, have been executed by the rector, Canon Lester. The nave is now seated with oak pews, the ends of which, abutting on the aisles, are carved in patterns copied from standard antique examples, and the whole floor of the nave has been lowered 6in. and laid with wood blocks. The side and end passages, as well as the porch, have been floored with red-and-black tiles. The wooden panelling which forms a dado to the north and south walls of nave has been decorated with a quiet ecclesiastical pattern. To the font have been added a base, floor, and steps in various rich marbles. Carved corbels, supporting figures of angels, have been added to the chancel arches, as well as some other carving.

LONDON COUNTY COUNCIL.—At Tuesday's meeting of the County Council it was, after a long discussion, decided that, subject to the Wandsworth District Board agreeing to pay the Council a sum of £10,000, and to a further sum of £5,800 being raised by subscription, the Council should purchase for £31,500 a plot of land 20 acres in extent abutting on the Putney-bridge-road, Wandsworth, and having an extensive river frontage, with a view to its being laid out as a public park and recreation ground. The Housing of the Working Classes Committee recommended that the work of constructing the sewers and roads with temporary surfaces on the Millbank estate be carried out by the Council without the intervention of a contractor, and that the plans, specifications, quantities, and estimates of £11,635 be referred to the works manager, Mr. Adams, for that purpose. This was agreed to after discussion and a division. The same committee also brought forward recommendations with regard to the building of certain blocks of artisans' dwellings. The first two blocks were Hogath Buildings, to be placed on the Millbank estate at an estimated cost of £14,690, and Romney Buildings, in the Boundary-street area, at an estimated cost of £14,576. It was agreed, without discussion, that tenders should be invited for this work, the committee having presented a supplementary report stating that the works manager was not prepared to undertake the work of erecting Hogarth Buildings and Romney Buildings at the architect's estimate. The committee recommended that Clifton Buildings on the Boundary-street area, estimated to cost £17,943, be erected by the Council, without the intervention of a contractor; this was assented to. With regard to the Molesey Buildings, estimated to cost £5,460, Lord Onslow moved that the work should be tendered for. This motion was defeated, and it was decided that the work should be dealt with by the department. On the recommendation of the General Purposes Committee it was resolved that an expenditure up to £100 be authorised for the purpose of printing a register of buildings of historic or architectural interest in London, on condition that the particulars, plans, and drawings which would form the register were presented to, and became the property of, the Council. The particulars for the register have been completed so far as the parishes of Bow, Poplar, and Bromley are concerned, by the Committee for the Survey and Registration of the Old Memorials of Greater London. The registers, plans, and drawings will be presented to the Council free of cost.

NAIRN.—The new parish church was opened on Friday. The site, which is a gift, is very central, at the corner of Seabank-road, at the west end of Nairn, and the edifice has been erected at a cost of £9,000. The style is of the Early English Transition period, and is from plans by Mr. Starforth, Edinburgh. Its main external feature is a massive square tower at the west end, about 100ft. high, in which is the main entrance. On either side of the main tower are two smaller towers, which give access to the galleries. The material used is the old red sandstone of the district, and where the masonry is plain it consists of bold hammer-dressed rubble. The interior of the church is transeptal in design, but the seating is arranged on a circular plan. Two memorial windows have been presented to the church. The church is seated for 1,200 persons.

NORTHWICH.—On Saturday afternoon the Duchess of Westminster formally opened the Verdin Technical Schools and Gymnasium at Northwich. The schools and gymnasium are built on a site in London-road, free from chances of subsidence, containing 2,679 yards, and having a frontage of 132 yards. Plans were prepared by Mr. Joseph Cawley, architect, Northwich, the contract being let to Mr. W. Molyneaux, also of Northwich. The two principal façades are in the style of the English Renaissance, the whole being enriched with terracotta ornament and stringing. The building is of two stories, and within it provision is made for technical and manual instruction, art teaching, &c. There are a chemical and a physical laboratory, an art school, 47ft. by 32ft., four classrooms, workshops, cookery-room, and laundry, with all the necessary adjuncts thereto. The gymnasium is placed on the south side, and is 60ft. long by 31ft. 6in. wide, and of unusual height, a gallery being placed at one end. Stained glass fills two of the windows—the Empire window over the main entrance, and the Victorian window over the entrance to the art department; both were executed by Mr. G. Sutherland, of Manchester. The inclusive cost of the buildings is £12,000.

The Post Office (Sites) Bill came on Friday before a Select Committee of the House of Commons. The Bill proposes to enable the Postmaster-General to acquire lands in London, Brighton, Norwich, Plymouth, Southampton, Oban, and Cork for the public service. This part of the measure was passed, but clauses confirming an agreement in relation to Aldersgate Public Garden or Postmen's Park were struck out. The Bill was reported to the House for third reading.

A new organ, built by Messrs. Harrison and Harrison, of Durham, has just been opened in the Free Kirk, Lerwick, Shetland Isles.

The dedication of a new school building, an addition to the schools of St. Nicholas with St. Leonard, in Queen Charlotte-street, Bristol, took place on Friday. The new building, which has been erected by Messrs. Love and Waite, from plans by Mr. W. V. Gough, also of Bristol, is principally to be used, the basement for cookery, and the first floor for drawing.

Engineering Notes.

STEEP-GRADE RAILWAY AT THE DEVIL'S DYKE.—A railway or tramway running up and down the precipitous face of the Devil's Dyke, about half a dozen miles north-west of Brighton, was opened on Saturday. There are already established at the highest point of the dyke an aërial railway running from hill-top to hill-top, and other contrivances. The steep-grade railway, however, claims some amount of utility, in affording rapid communication between the Brighton Railway Company's branch terminus at the head of the Dyke and the villages lying in the plain at the foot of the Dyke hills. It is of the same type as the cliff railways at Scarborough and elsewhere, although the engineer, Mr. C. O. Blaber, has introduced some new features in the details of construction. The whole length of the line, which is a double one of 3ft. gauge, is 840ft., the "lift" being 395ft. From the top there is a run of 240ft. at a gradient of 1 in 1·8, the second and steepest part being 1 in 1·5, and the last and lowest gradient 1 in 2·9. The vertical curves between the different gradients have about 1,000ft. radius. There being a scarcity of water as well as of solid fuel at the head of the Dyke, the hauling power is obtained from a Hornsby-Ackroyd oil-engine. The haulage ropes are 2in. steel wire cables, and the cars, each seating 14 persons, are fitted with powerful brakes, by which a car running down hill would be promptly stopped before any great momentum had been obtained. The brakes are also designed to prevent the cars from leaving the track. There is a powerful brake on the shaft of the main hauling pulley, worked by a foot lever, as well as from the platform. The opening ceremony was performed on Saturday, by Sir H. Howorth, M.P., who turned the lever which set the cars going.

SUTTON BRIDGE.—The new railway and road bridge across the river Nene at Sutton Bridge was formally opened last week. It replaces a structure on the same site erected by Robert Stephenson in 1850, at a cost of £18,000, and provides a connection between Lincolnshire and Norfolk. One half of it is set apart for road-traffic, for which a toll is charged, and half for railway-traffic. It is a swing bridge, the pivot pier being formed of nine small cylinders arranged in three parallel rows, the two other piers in the river being constructed of four cylinders similar to those in the pivot pier. The spans are from east to west, 50ft., 77ft., 99ft. 3in., and 69ft. 3in. The abutments are of brickwork in cement, resting on piles. The cylinders used in all the three piers are alike; they are of cast iron, 10ft. diameter at the bottom, tapering in a length of 10ft. to 6ft. diameter. The nose-end and pivot piers are protected by timber fenders of creosoted pitch-pine. The ground through which the cylinders passed was bad, consisting of fine silt, peat, sand, gravel, and a few thin layers of clay. They were sunk in the usual way under compressed air, to a depth of from 56ft. to 68ft. below high-water mark. The two fixed spans each consists of three main steel-plate girders, 7ft. 6in. in depth, with cross girders and rail-bearers. The girders in these two spans rest on cast-iron bed-plates bolted to a steel box girder, which runs along the top of the four cylinders. The main girders are 17ft. 3in. from centre to centre, dividing the bridge into two parts, each 15ft. clear width, the southernmost side being used for the railway, and the other for the road. The swing span consists of three main girders with cross girders and rail-bearers, as in the fixed spans, the distance from the pivot to the nose-end being 98ft. 3in. The swinging is effected by hydraulic power. The bridge has been built for the Midland and Great Northern Joint Committee, Mr. J. Allen M'Donald being the engineer. Messrs. Handyside and Co., of Derby, are the contractors, and the hydraulic work was supplied by Sir W. G. Armstrong, Whitworth, and Co., Limited, of Newcastle-on-Tyne.

BRITISH ASSOCIATION OF WATERWORKS ENGINEERS.—The annual meetings at the Town Hall, Westminster, to which we referred in our last issue, were brought to a close on Friday, under the presidency of Mr. H. Ashton Hill. Mr. W. Coles Finch, of the Brompton, Chatham, Gillingham, and Rochester Water Company, opened the proceedings by reading a paper on "Electrical Water-Level Recorders," describing one of which he had had charge at the City of Rochester Strood Waterworks. It was invented by Messrs. Barr and MacWhirter, of Glasgow, and made by the Glenfield Company, of Kilmarnock. The author showed that not only is the electrical recorder useful for the purpose for which it was primarily intended—namely, recording the water-level in the reservoirs, but it can be also used for the purposes of detecting and locating waste, for indicating and recording the variations of level in wells, and for testing the yield of wells and springs at various times. Mr. J. Shaw, of Boston, Lincolnshire, read a paper entitled "Notes on Distribution." The writer stated that whilst in the old times hydraulics were well understood, and Greece and Rome had their aqueducts and great public supplies of water, mechanical difficulties prevented any real domestic supply. The minute details on the methods of distribution as to mains, sewer-pipes, and hydrants, and the means of preventing leakage, were dealt with. The discussion on both papers was taken together, in which Mr. C. Gilby (Bath), Mr. W. Matthews (Southampton), Mr. Whitaker (Croydon), Mr. Robert MacIntyre (London), Mr. H. Francis (Devonport), Mr. C. E. Jones (Leyton), Mr. F. J. Bancroft (Hull), Mr. C. H. Priestley (Cardiff), Mr. Donald Cameron (Exeter), Mr. W. G. Pierce (Richmond), and the chairman took part. Mr. Shaw and Mr. Finch replied to the various criticisms, and votes of thanks were passed to them. On the motion of Mr. Gaskin, a vote of thanks was accorded by acclamation to the president for his conduct in the chair, and the meeting concluded. In the afternoon the members visited the Southwark and Vauxhall Water Company's works at Hampton, and on Saturday the members proceeded to Windsor for the purpose of visiting the Corporation Waterworks on Tangier Islands, Eton.

CHIPS.

The principal business in the Coventry City Council at their last meeting was a report from the Electric Light Committee recommending the extension of the works, plant, and mains, at an estimated cost of £37,900, making a total capital expenditure from the outset of £71,000. The greater part—£27,900—of the proposed expenditure is to go in mains, so that outlying districts may have the benefit of the light.

Mr. W. Q. Orchardson, R.A., having completed his portrait of the Earl of Derby, K.G., as Lord Mayor of Liverpool, the framed canvas has been formally accepted by the committee who were intrusted with the task of securing for the city a permanent memorial of his fourth year of office. The earl is represented as seated and wearing the robes of a chief magistrate, and the portrait will be hung at the town hall.

The memorial to the late Poet Laureate, which takes the form of an Iona cross on the Beacon Down at Freshwater, is now erected, and will be dedicated by the Archbishop of Canterbury on Friday, August 6, at 3 o'clock p.m. The cross was designed by Mr. J. L. Pearson, R.A., and is made of Cornish granite. It has been taken over by the Trinity House, and will serve as a sea-mark, under the name of the Tennyson Beacon, in place of the Old Nodes Beacon.

On Thursday and Friday a Local Government Board inquiry was held at Spalding before Mr. Willcocks, C.E., into an application by the urban district council for sanction to a loan of £3,400 for the enlargement of the Corn Exchange and Butter Market, and £300 for the purchase of a steam roller. The plans for the Corn Exchange and Butter Market enlargement have been prepared by Mr. Corby, of Stamford, and a provisional contract has been entered into for carrying out the work with Mr. Sherwin, of Boston, his tender being just under £3,000. The enlargement of the Exchange would accommodate 20 additional corn-stands, and it is proposed to enlarge the Butter Market by extending it underneath part of the Corn Exchange, the floor of which would be raised so as to give the underneath Butter Market a headway of 8ft.

Mr. Silvanus Trevail, F.R.I.B.A., of Truro, has had to sever his connection with the Cornwall County Council, of which he has been a member since its formation, having been appointed architect for the extension of the county lunatic asylum at Bodmin.

The Belfast Corporation have applied to the Irish Local Government Board, among other things, for leave to borrow £11,000 on the proposed new police cells, the present arrangements being in a very unsatisfactory state. There are to be 51 cells for the accommodation of 107 prisoners. There are to be new offices for the Commissioner of Police, the detective department, and a medical man and matron.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

WILTSHIRE ARCHÆOLOGICAL SOCIETY.—The members of this society held their summer meeting on Tuesday and Wednesday at Bradford-on-Avon, the centre of a very interesting district. The business meeting was held on Tuesday afternoon at the Town-hall, under the presidency of Mr. C. H. Talbot. The Rev. H. E. Medlicott then read the report, which stated that at the present time there were 333 annual members, 21 life members, and 19 exchange members, making a total of 373, which was a decrease from the numbers last year. There was an increase of a few pounds in the funds of the society. The additions to the library and museum had been again considerable. The railway proposed to be constructed by the Great Western Company from Pewsey to Salisbury would pass near many of the important relics to which solitude and remoteness were protection; and, with 40,000 acres for military manœuvres, the absence of the protection of solitude and remoteness was likely to become a melancholy reality before their next meeting. Education and improved taste must be relied upon for the due preservation of the relics of Salisbury Plain. The cutting and levelling of some short lines of railway in the county ought to give geologists an opportunity for further research. The report was adopted, and honorary officers were re-elected with some additions. Leaving the town-hall, the party proceeded to the old Saxon church, under the guidance of Mr. C. S. Adye, M.S.A., who gave some interesting particulars respecting the structure. There are nave, chancel, and a porch on the north side of the nave. The original step of the chancel, although much worn, is still *in situ*, and is well worthy of inspection. The walls of the church are of various thicknesses from 2ft. 4in. to 2ft. 6½in. There were no doors to the entrances on the north or south side, and Mr. Adye conjectured that the nave was at all times open to the people, while the chancel would only be exposed to view during Divine service. The building was evidently insufficiently lighted, as there were only three original windows. The chancel window remains just as when it was first built, but the other two windows have been mutilated. Mr. Adye suggested that perhaps the deficiency of light might be due to the fact that glass was difficult, if not impossible, to obtain. The edifice was so near the parish church that there was no necessity for service there. Though the trustees had to keep the Saxon church in repair, yet contributions forthcoming left some profit. Although the structure was small, yet it was striking on account of its height. When first discovered by Canon Jones the church was used as a school, and there was a master's house built on one part, while a large stable hid the architectural features. On the east side was an old house covered with ivy, which hid the church from view. Inside, the nave was divided into rooms for the school, and the chancel formed a labourer's cottage—to such base use did it come. On obtaining possession the trustees took down the modern buildings, lowered the ground, and removed the partitions and doors, and exposed the original work. They replaced missing portions of the old work, but did not remove a single stone of the original structure. In taking down the chimney-stack erected between the chancel and the nave all the stones of the arch, except one, were discovered. Canon Jones found out the church through directing his attention to the building as he gazed on it from a hill in the locality. He believed that there were a nave and a chancel, and this was the first intimation of the original structure. The interior had been so altered that no one could then have recognised it as built for ecclesiastical purposes. The parish church, which is dedicated to the Holy Trinity, was next visited under the guidance of Mr. Adye. It is a noble structure, though opinions differ as to the value of the restoration carried out by Messrs. Manners and Gill, of Bath, in 1866. The original church was built in the 12th century, and in the 14th century the chancel was lengthened by about 16ft., and it is now 48ft. long from east to west. The nave was formerly separated from the chancel by an oak screen and a wood loft, and the screen must have been richly coloured, to judge from the remains. Barton Farm was visited specially to see the spacious tithe barn, which was erected towards the end of the 14th century. It was the tithe barn of the Abbots of Shaftesbury, and is 170ft. long and 20ft. wide.

There are four porches—viz., two on the north and two on the south side. The farmhouse contains some remains of the original building, the date about the same as that of the barn, and this might have been the residence of the agent of the Abbot. The Hall (formerly known as Kingston House) was also visited. At night there was a conversazione, and the president delivered an address, and papers were read.

YORKSHIRE ARCHÆOLOGICAL SOCIETY.—The second excursion organised by this society took place on Friday, the members meeting at Milford Junction in the morning, and, taking carriages, proceeded to Steeton Hall. The numerous shields were examined, and the vaulted room and other fragments of Mediæval work were a source of interest to the visitors. Ledsham and Monkfryston Churches were next visited. Birkin, the next place seen, is one of the most perfect examples of a small Norman church to be found in Yorkshire. With the exception of the addition of an aisle, it was found that it had been very little altered. Brayton Church was the last place visited. The earliest part of the present structure is of about the same date as the Norman work of the church at Birkin, and represents a church built under the same influence, but on a larger scale. The tomb of George, Lord d'Arcy (1558), and the arms thereon were matters which proved exceptionally interesting. Mr. William Brown, the secretary, gave historical notes on each church visited, and Mr. J. Bilston, F.S.A., submitted the architectural descriptions.

CHIPS.

The Wandsworth public library commissioners have accepted a gift of a piece of land near Wandsworth Common from Mr. H. N. Corsellis on which to erect a branch free library for that district. The branch will be built and furnished from a legacy of £2,000 left by a late resident in the parish.

A railway is in course of rapid construction, uniting Zermatt with the Riffel Alp, Riffelberg, and the Gorner Grat. Some hundreds of Italian workmen are employed upon it. The railway, which starts from the Zermatt terminus of the branch line from Visp, will be unrivalled in its command of the grandest mountain scenery. The gradients are very steep, and the height to be attained exceeds 10,000ft.

A remarkable instance of the depreciation of the value of agricultural land was furnished at an auction sale which has just taken place at Spalding. A freehold estate, consisting of 125 acres of land, realised only £4,280. It had cost the vendors £11,000.

In order to provide for the wants of the district, which is rapidly extending in population, the directors of the S uth Hants Waterworks Company are constructing an additional reservoir on the high level at Mitchelmersh, and they propose at once constructing an additional reservoir at Basset. They have also provided additional boiler and engine power, and an engine-house to contain the same will forthwith be erected. The 10in. main from Chandler's Ford to Compton, Shawford, and Twyford has been laid for a considerable distance; and also a duplicate 18in. main from the works at Mitchelmersh to Romsey.

Messrs. Christie, Manson, and Woods concluded on Friday the two days' sale of the collection of objects of art and decorative furniture of the late Mr. George Thomas Robinson, F.S.A., who was for many years art director to Messrs. G. Trollope and Sons, 196 lots realising about £1,000, and including the following: An old English clock, by S. Toulmin, London, in tall case inlaid with panels of scroll foliage and flowers in marqueterie of coloured woods, 7½ft. high—22 guineas (Gregory); an oblong table, with tray top and drawer, of inlaid satin and other woods, the sides inlaid with panels of black and gold lac, 37in. by 25in.—26 guineas (E. Benjamin); and a set of 12 Dutch chairs, richly inlaid with vases of flowers and birds and foliage in coloured woods—32 guineas (Hart).

The workhouse accommodation committee of the Wolverhampton Board of Guardians have had under consideration the offers of three sites of land for the proposed new workhouse. One of the offers relates to a piece of land on the Wednesfield-road, Causeway Lakes; another is off the Hordern-road, Whitmorereans; and the third is situate on the Cannock-road. Owing to the high prices asked, the committee rejected the first and last-named offers, and the value put upon the second plot was considered too high.

The Harbour Board of Southampton have appointed Mr. E. Cooper Poole as surveyor in succession to his father, lately deceased, to whom he was chief assistant. The salary is £100 with 2½ commission on new works, private practice being allowed.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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NOTICE.

Bound copies of Vol. LXXI. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LIV., LVIII., LIX., LX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

*** IN response to complaints from readers that they are unable to get the BUILDING NEWS at Messrs. W. H. Smith and Son's bookstalls, we can only suggest that they should order the paper of some other newsagent. Messrs. W. H. Smith and Son recently requested us to allow them an extra discount beyond that allowed to the general trade, and because we declined they have ceased to send the paper out to their bookstalls. We have, of course, no remedy; but we do not think the demand was a fair one.

RECEIVED.—F. H. P.—E. C. N.—M. and N. G.—B. W. R.—G. J. and Son.

Correspondence.

MR. JUSTICE CAVE AND ARCHITECTS.

To the Editor of the BUILDING NEWS.

SIR,—From your report of the case of "Jalland v. Tyler and Hind," in your issue of this day, it appears that no less than ten architects and surveyors were called upon to give evidence.

The learned judge, in summing up, is reported to have said that "there are no such unsatisfactory men as architects," inasmuch as they failed to come to some sort of agreement, like other scientific men! Lawyers, as well as doctors, disagree, and prosper under the process, and there have been cases beyond number where even judges have differed from each other, and have reversed and re-reversed decisions. If two or three judges cannot agree, it appears less likely that ten architects should do so.—I am, &c.,

GEORGE H. BIBBY.

Hampstead, N.W., July 23.

SPONTANEOUS CONFLAGRATION IN SUMMER.

SIR,—The frequency of serious damages by fire in summer may seem somewhat paradoxical to the outsider, as he might suppose they ought to be much decreased then owing to the less necessity for them for warming purposes than in the winter, when fires are really wanted. Mansions, cottages, flats, factories, timber-yards, goods warehouses, ships, chambers—all are indiscriminately selected for conflagration in summer, apparently, whether they are occupied or not, or are in full work or left alone.

Spontaneous combustion of lightning and intentional incendiarism are invoked to account for them, and tramps, blacklegs, and boycotting and strikes are anathematised by the owners of destroyed properties. If one, however, considers the question in a more scientific spirit, it may be brought within the area of rational explanation by chemical speculation. The final combustion or flaming-out of timber or wood may be but the last stage of chemical action of heat and air acting on unstable organic compounds, as the rise of temperature of a tree, say, at 52° Fahr., up to 2,000° Fahr., temperature of average flame ignition. Each stage of the thermometer records above 52° Fahr. the wood might be subjected to by heat of sun or air would mark a progressive change in the chemistry of its organic constituents.

By 212° Fahr. all the moisture would be driven off, and would not return. The resins and oils would go next, say at 400°, not to return, and the starches and sugars would follow next to be decomposed and not evaporated, say at 600°; and lastly the woody fibre to be charred, say at 900°. Each of these increments of heat and change need not be effected in one event, but in successive events at long intervals of time or seasons, or years; but each would be permanent, and ready for the next *coup de soleil*, till the last increment, however small, converts the timber into a tinder, ready, by a few additional degrees of heat, to explode into flame. Say a bulk of wood projecting into a chimney-stalk, which is bathed for 12 hours a day by a stream of hot air of 160°, and for 12 hours is cooled down to the outside air of 56°, the change effected by the one is passed on the other by increment of degrees, or accumulated degrees, not by actual elevation of temperature at a given moment.

Again, a ridge beam of a roof of a house or factory, insufficiently insulated, may be subjected in the daytime to solar heat, say of 140° Fahr., which effects a certain organic change in the wood. It gets cooled down at night, but the heat has done its work on the wood for the time. The next day of solar temperature of 140° Fahr. would effect a mischief of 280°. Another day of the same heat would change the conditions of the wood as if it had been 420° Fahr. exposure; and again, a fourth day of 140° in the sun would have done the damages of 560°.

At length, by successive increments of heat and chemical change, say of eight days of 140° exposure to the sun, the timber is ready for exploding into a real flame at 975° Fahr. by the smallest additional increment, say 150° Fahr., on some particular hot day in summer.

Similar phenomena may be surmised to take place in winter weather, where domestic fires are increased in number and amount, and furnaces and hot-air pipes, machinery, are set agoing with increased industry and power.

The accelerated degree of a hot-air apparatus would soon then mount up from 60° Fahr. to past 212° Fahr., when it would become gradually more dangerous to timber after passing the temperature of boiling water, and of evaporations of water from wood construction and fittings in the buildings. In order to lessen this tendency of timber to degenerate under the influence of heat to firing point, it may be pertinent to suggest that its calcification or silicification might be useful for specified purposes. Wood would then be converted into fossil wood, which is uninflammable.—I am, &c.,

W. I. BLACK, F.R.M.S.

The Public Works Loan Bill, issued on Friday, authorises the Government to issue loans to local bodies at 2¾ per cent. instead of at 3 per cent. as under the present law.

The dinner given annually by the Edinburgh Merchant Company on the occasion of the close of the summer session of the schools took place on Friday evening in the Hall, 14, Hanover-street. Between seventy and eighty gentlemen attended, the guests being received by the Master, Mr. W. Wybrow Robertson, H.M. Board of Works, who afterwards occupied the chair. In proposing the health of the chairman, Lord Kinnear congratulated Mr. Robertson on the success and distinction achieved by his son, who is now the head boy in the school.

METROPOLITAN SCHOOL: RUSSELL SQUARE, W.C.

SIR ISAAC PITMAN & SONS, LD.

G. D. MARTIN, ARCHITECT.

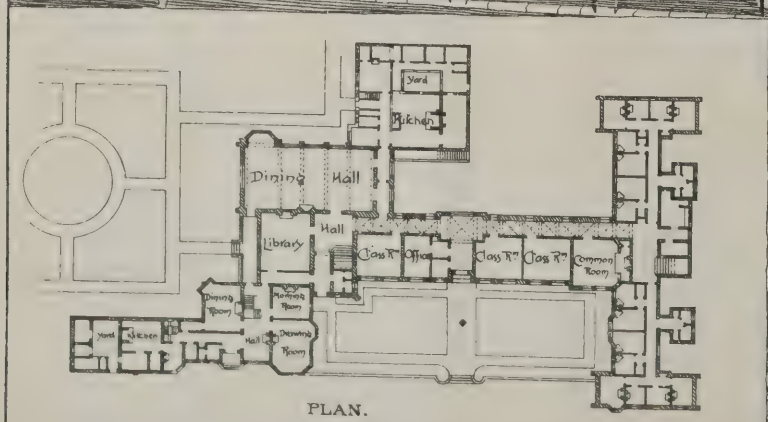
Photo-Lithographed & Printed by James Akerman, 6, Queen Square W.C.

ST ANSELM'S CHURCH, DAVIES ST, M

PHOTO-TINT by James Akerman 6 Queen Square London W.

AIR W MESSRS BALFOUR & TURNER ARCHTS

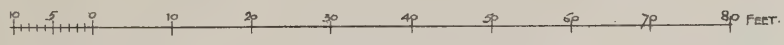
WEST ELEVATION



PLAN.

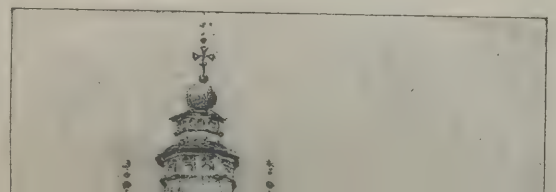
Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

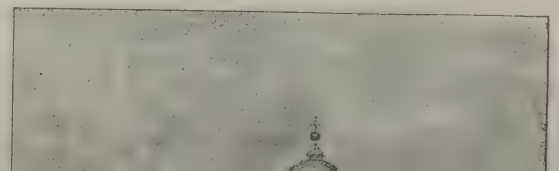
SECTION · THRO' MAIN BLOCK

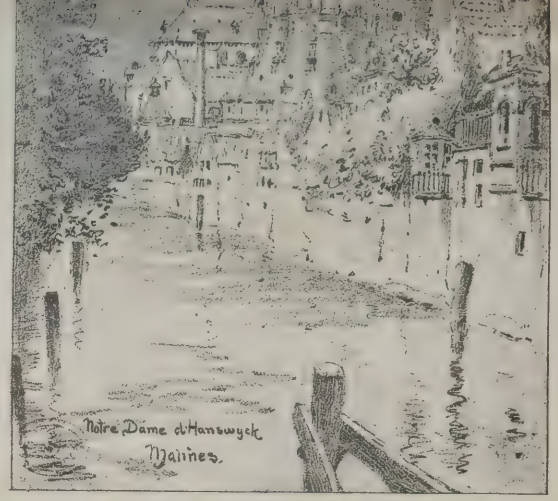


Quai du Rosaire
Bruges.

Grand Place
Malines.







SKETCHES IN BELGIUM

NATIONAL SILVER MEDAL DRAWINGS BY JOHN D WALKER

"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.

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ST. ANSELM'S CHURCH, DAVIES STREET, W.—SKETCHES IN BELGIUM.—METROPOLITAN SCHOOL, RUSSELL SQUARE, W.C.—DUDLEY NEW GRAMMAR SCHOOL.—PRESBYTERIAN CHURCH OF ENGLAND, WESTMINSTER COLLEGE, CAMBRIDGE.—MAYORAL CHAIN FOR ARUNDEL, MADE BY MESSRS. HARDMAN, POWELL, AND CO.

Our Illustrations.

ST. ANSELM'S CHURCH, MAYFAIR, W.

WE have already given the plan* and exterior views† of this church, lately erected on a site given by the Duke of Westminster in Davies-street, W., from the designs of Messrs. Balfour and Turner, architects, to provide for the congregation of Hanover Chapel, Regent-street, now pulled down. The church is, in many respects, very unusual, both in architectural design and in internal arrangement, giving the building an individuality which greatly enhances its interest. The arcade of the nave has double columns supporting also the cross arches dividing the church into bays. Blue Robin Hood stone is used for the interior dressings, the walls being of plaster, white-washed with a dado of glass mosaic. The choir stalls are of teak, and the choir screen walls are of Irish green marble. Messrs. Holt and Sons, of Croydon, were the builders.

NATIONAL SILVER MEDAL: SKETCHES IN BELGIUM.

THIS sheet of artistically-rendered pencil studies by Mr. John D. Walker, of Bradford, represents some typically picturesque street and river views in Bruges, Malines, and Ghent, reproduced from the original drawings, which won last year a National Silver Medal of the Science and Art Department. The subjects are too well known in most cases to require individual descriptions; but for careful sketches, touched in with facility and a due regard to accuracy, these pages from a student's note-book leave nothing to be desired; they cannot fail to recall many a characteristic feature in these quaint old Flemish towns, a familiar hunting ground for the architectural sketcher, and the enjoyable haunt of many a holiday keeper.

PITMAN'S METROPOLITAN SCHOOL.

THE accompanying illustration, giving view and plan, represents the first wing of the above new building, now being erected in Russell-square, W.C., from the designs and under the superintendence of Mr. G. D. Martin, F.S.I., architect, of Pall Mall, S.W. The accommodation is as follows:—Basement: Lavatories and heating apparatus. Ground-floor: Administrative offices of the school. The five upper floors will be devoted to classrooms for the male and female students, the sixth floor being given up to the housekeeper. Space has been left for a further enlargement of the school. The front elevation will be of red brick, with Portland stone dressings. The whole of the internal fittings on ground-floor will be pitch-pine. The building will be of fireproof construction, and will be lighted throughout by electricity, and ventilated and heated. The builders are Messrs. Perry and Co., Tredegar Works, Bow, and the cost of the building will be about £27,000.

* BUILDING NEWS, Feb. 21, 1896. † *Ibid*, March 12, 1897.

DUDLEY GRAMMAR SCHOOL: SELECTED DESIGN.

THIS is the selected design chosen from 54 plans submitted in the recent competition held at Dudley for the new Grammar School buildings. The cost contemplated is £7,000. The accommodation is for 150 boys. The hall is planned to seat 250 adults, inclusive of the scholars. A headmaster's house adjoins the school. There are five classrooms, seated with dual desks, one being arranged with a north light for drawing classes. There are also a laboratory and small demonstrating-room. The headmaster's room is suitable for committee meetings. Red stock bricks are to be used with red terracotta for the elevations, and brindled tiles for the roofs.

PRESBYTERIAN CHURCH OF ENGLAND COLLEGE AT CAMBRIDGE.

THIS college, which is being erected for the Presbyterian Church of England on an exceptionally fine site at the corner of Madingley-road and Northampton-street, is to be called Westminster College. It is illustrated herewith from the perspective now in the Royal Academy Exhibition. The accommodation comprises classrooms and offices, dining hall, kitchens, &c., library, common room, twenty-six sets of rooms for students, and two sets for fellows, and a principal's house. The materials are red facing bricks, with Clipsham stone dressings, and Colleyweston stone slates. The whole of the construction is fireproof, and a large portion of the internal joinery and carpentry is of oak. Mr. Saint, of Cambridge, is the contractor, and Mr. James Trill is the clerk of works. The design was selected in a limited competition early last year, the architect being Mr. H. T. Hare, A.R.I.B.A. We give this week the main and west elevations, with section through main block, and a double page of details of the dining hall. Next week we shall give a double page of details of the library block on the ground floor.

The Sheffield City Council have received the sanction of the Local Government Board to borrow £12,773 towards the cost of clearing away premises where the Act for the housing of the working classes was to operate.

The Dominion Government proposes to complete the deepening of the St. Lawrence River from Quebec to Montreal this season. Already about 3,500,000dol. has been expended to make the 160 miles of river of a depth of 27½ft. It will require 500,000dol. more to finish the work, and that sum has been voted to the Minister of Public Works for the purpose.

Efforts are being made throughout the State of New Hampshire to preserve Mount Washington from a lumber company which recently purchased it for 100,000dol. The State at present makes no provision for the preservation of the forests, but efforts are being made to induce the State to pass a law which will cover the case. If the lumber company is not restrained, the highest and best-known peak in the Eastern States will be totally stripped of all verdure.

Building operations in Scarborough are proceeding apace. New streets are being formed to the north, the north-west, and the west, and small tenements, with rentals of from £14 to £18 and £20, are occupied as soon, or sometimes before, they are completed. In connection with the purchase of the area lying between North Maine-road and Cemetery-road, and now named the Victoria Park estate, the plans of no less than 467 new houses were last week before the streets and buildings committee of the Scarborough Corporation. These, together with the plans of 55 other houses, make a total of 522.

The contractors for the Jungfrau Mountain Railway are taking advantage of the summer months to push forward the work, and the first blasting of the Scheideck Tunnel began last week. This part of the track pierces through rocks some 50 mètres above the Scheideck, winding for some distance through open galleries up the mountain wall of the Eiger, and then continuing as a tunnel to the end of the distance. The route between the Scheideck station and the entrance into the boring is being actively opened out, and admits the use of mountain ballast waggons over a part of the intervening distance; 120 men, mostly Italian navvies, are here at work.

COMPETITIONS.

BLACKPOOL.—The new Liberal club, which it is proposed to erect in Victoria-street (near the tower), is estimated to cost, inclusive of site, about £6,000. Out of the designs received, that of Mr. Herbert Wade, of Talbot Chambers, has been accepted by the committee. The building will be stone-fronted, and the interior will include large assembly-room, billiard-room for four tables, smoke-rooms, registration and committee-rooms, &c. The work will be commenced immediately after the present season.

NUNEATON.—The plans of Mr. Chas. Wm. Smith, M.S.A., architect and surveyor, Market-place, Grantham, have been selected in the recent competition for a new Conservative Club at Nuneaton. The new building is to be four stories high, and will comprise an assembly-hall, two billiard-rooms for two tables each, coffee and smoke-rooms with bar accommodation, reading-room and library, and apartments for caretaker on top floor. A skittle-alley and wine and beer cellars, heating chamber, &c., occupy the basement. The materials to be used are red brick with stone dressings and green slated roofs. The probable cost is £4,000. Over 200 applications were received from architects for particulars of this competition. A short list was made of two from the designs sent in, the authors of which were invited to submit further amended plans, and the committee's decision was in favour of the plans as above stated, and Mr. Smith has now the work in hand.

SALFORD.—The competitive designs for the intended nurses' home in Salford, to be built as a memorial of the Queen's long reign, were submitted on Friday to a meeting of the general arrangements committee, held at the Salford Town Hall, under the presidency of the Mayor, Sir Richard Mottram. After consideration, the plans of Mr. Henry Lord, architect, John Dalton-street, Manchester, were adopted. The architect was directed to prepare working drawings, in order that tenders may be obtained and the work put in hand at as early a date as possible. The premiated plans have received the approval of the committee of the Manchester and Salford Sick Poor and Private Nursing Institution, to whom the management of the home is to be intrusted.

CHIPS.

At the last meeting of the select vestry of Liverpool a letter was read from the Local Government Board sanctioning the expenditure of £18,750 on a cottage home at Wavertree.

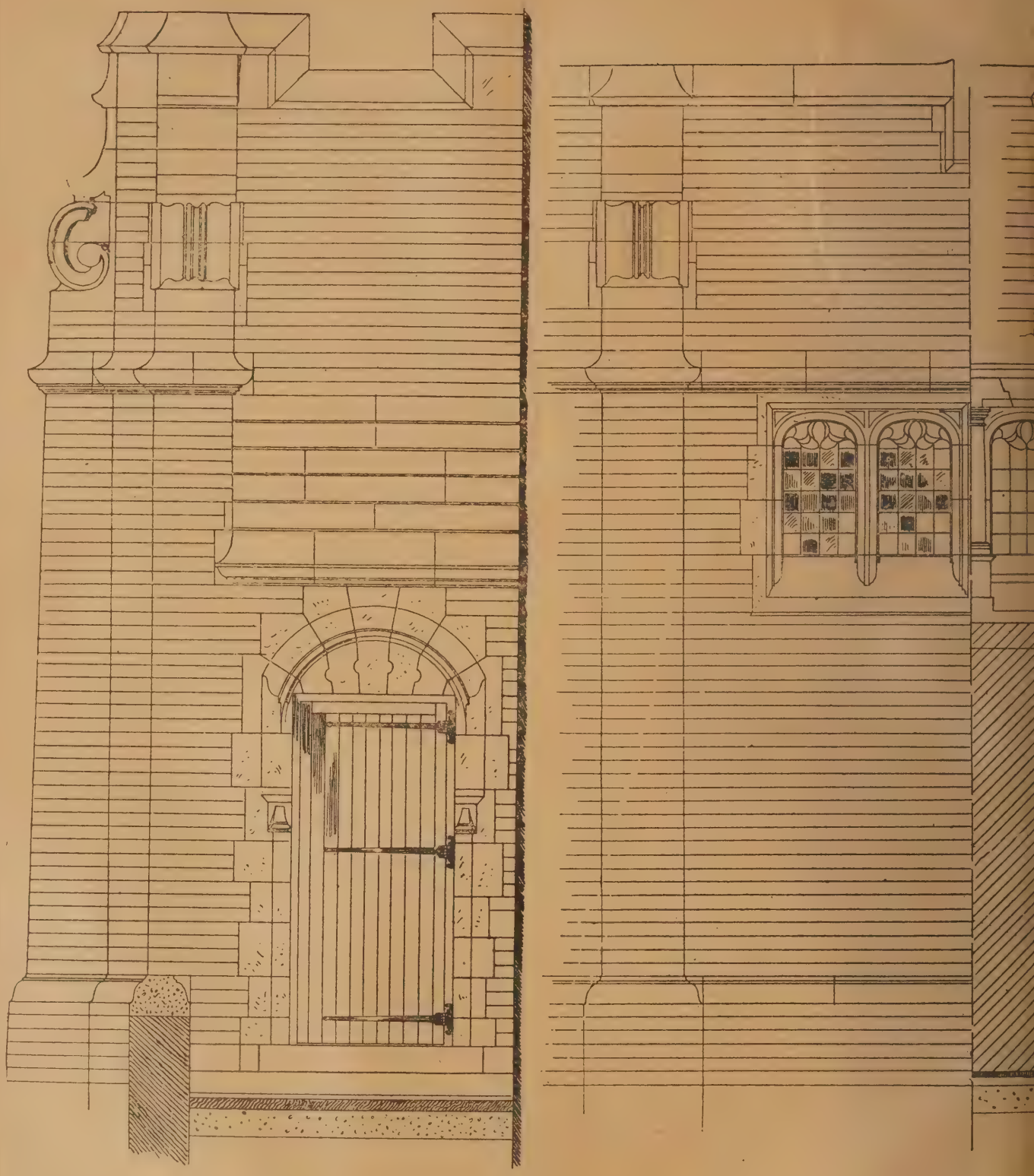
The Public Health Committee of the Edinburgh Town Council again considered, on Tuesday, the estimates for the erection of the general offices, staff quarters, and scarlet fever pavilion of the New City Hospital at Colinton Mains. After discussion it was resolved to recommend acceptance of separate estimates for each branch of the work, amounting to about £89,000. At last meeting of council the estimate of Mr. Colin Macandrew, amounting to over £93,000, was recommended for acceptance for carrying out the whole of the work, but the matter was recommitted owing to some alleged irregularity in the opening of the estimates.

A new church of St. Paul is about to be erected at Yarmouth, from plans by Messrs. Bottle and Olley, of Queen-street, in that town.

Mr. James Diggle, jun., draughtsman in the surveyor's department of the Heywood Corporation, has been appointed surveyor and nuisance inspector to the Ashton-on-Mersey Urban District Council at a salary of £120 per annum. There were 47 applicants for the post.

Plans have just been approved by the Japanese Imperial authories for the construction of about twelve hundred miles of railway in Formosa. There is to be one main line and several branches for the development of the interior of the island, in order to facilitate the transmission of produce to the coast for shipment.

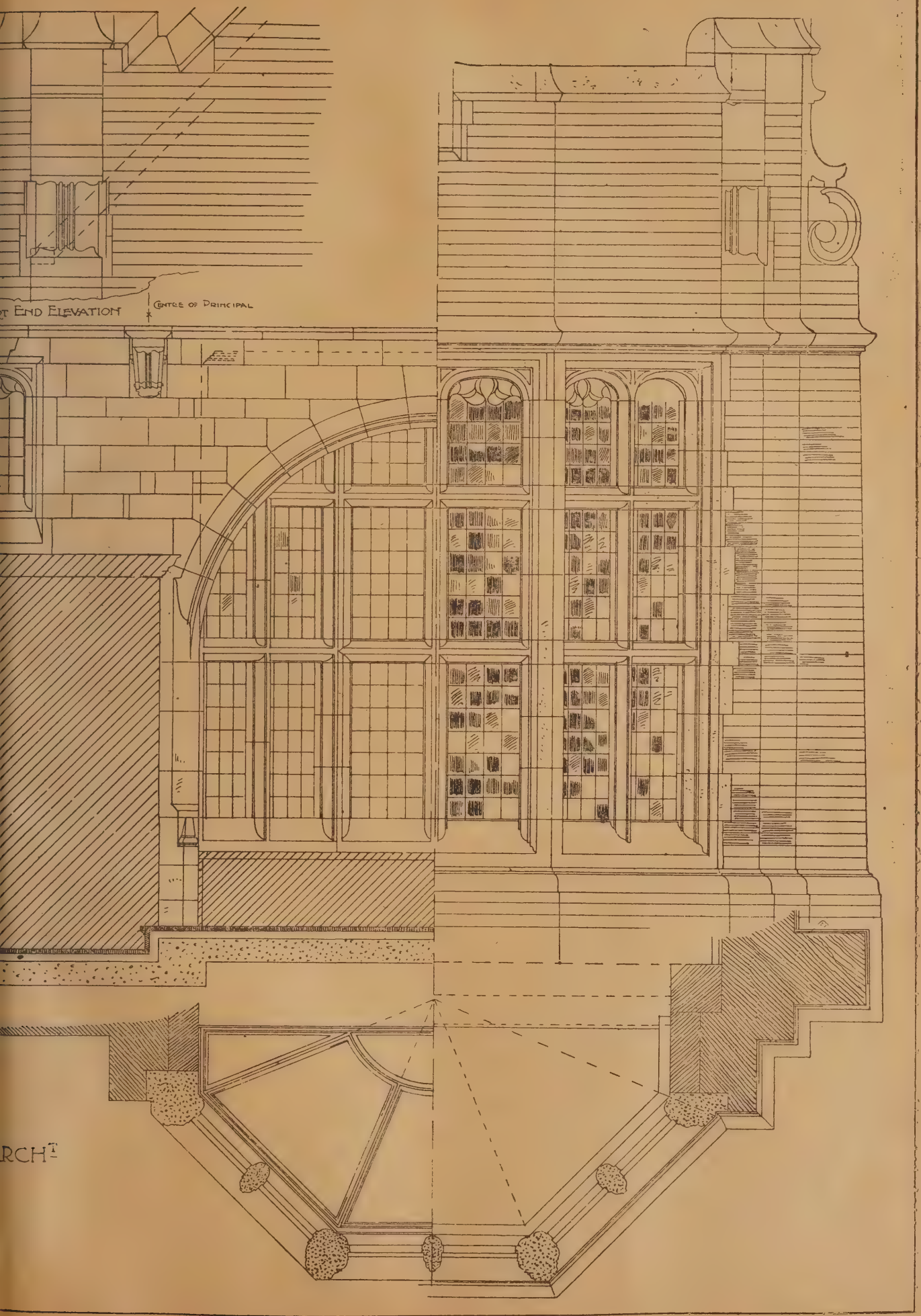
Colonel A. J. Hepper, an inspector from the Local Government Board, held an inquiry at the Town Hall, Leamington, on Friday, into the application of the town council to borrow £3,000 for laying out the new Victoria Park, the levelling of which alone will cost about £1,700; £145 for erecting a fence along the river bank in the Jephson Gardens, and for laying on a supply of water for irrigation purposes from the town river water-mains, £850 for the erection of a steel suspension bridge over the Leam, near the mill, and £235 to extend the river wall in the New River Walk. Evidence was given by the deputy town clerk, Mr. C. H. Passman, and the borough surveyor, Mr. de Normanville.



PRESBYTERIAN · THEOLOGICAL · COLLEGE

CAMBRIDGE · H·T·HARE ARI

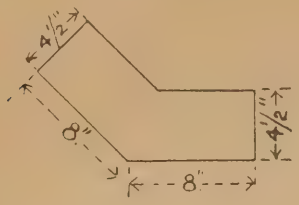
Detail · of Dining-Hall

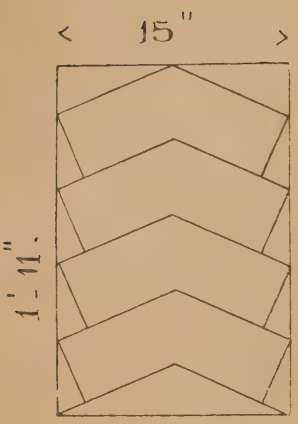

T END ELEVATION
CENTRE OF PRINCIPAL
RCHT

Intercommunication.

QUESTIONS.

[11714.]—**Measuring Stonework.**—Kindly give me an opinion with reference to the following dispute, which has arisen between one of my contractors and a stonemason who is fixing the whole of the stonework for a great number of houses we are building at 3s. 10d. per foot, which was the price agreed. The point in dispute is the measurement of the stonework for the several mullions. I herewith send you sketch of one mullion, and





also the block of stone, showing how they are cut out, and also the measurements I have allowed to the stonemason. His contention is that he should be paid for the square that each block *might* have come out of, but not the stone which each one was actually cut from.—G.

[11715.]—**Marks on Deals.**—Will some practical reader kindly say whether shippers are in the habit of branding their goods with two different marks on the same deals—such as D.F.D. on the end, and D.M. on the flat? Please say what quality these marks represent, and from whence is the timber imported.—W.

[11716.]—**Overflowing Cistern.**—Every now and then my cistern at the top of house under the roof gets so full as to overflow through the waste-pipe into the yard below, much to the disturbance of neighbour. I have tried to secure the ball-tap, but in vain, and I think the tap must be worn out, or the lever attached may be stiff and will not respond to the change of water-level. Any advice will oblige.—A HOUSEHOLDER.

[11717.]—**Old English Houses at Earl's Court.**—Can anyone inform me what the outer walls of the old stone and half-timber buildings are made of, and what is the stucco used which has been painted to imitate stone and timber so well?—G.

[11718.]—**Spires and their Construction.**—Is there any work on spire construction which will give mode of jointing, thickness of masonry, and other details?—PRO RE NATA.

[11719.]—**Drain-Pipe Joints.**—Many joints have been invented; but I should like to be informed by a practical man which he considers the best.—T. S.

[11720.]—**Gauged Brick Arches.**—How are these set out, and is it necessary to have a cut key brick for the point of a Gothic arch? Will someone kindly reply?—BRICKWORK.

[11721.]—**Dry-Rot in Timber.**—Is there any specific that can be used in treating the ends of ground-floor joists affected by this malady, which has spread to the walls above? Remedial measures only can be adopted.—FUNGUS.

[11722.]—**Stable Paving.**—I want an impervious jointless paving which can be laid down to old stables. Are clinker bricks with channels the best kind?—F. G. S.

[11723.]—**Flushing Cisterns.**—I should like to know of the best flushing cistern for a dwelling-house. Are the lead-lined wood-cased cisterns better than the cast-iron sort? I am told they are. The siphon is also recommended.—AN OLD SUBSCRIBER.

[11724.]—**Foundations in the London Clay.**—Bearing in mind that in some recent hot and dry summers a great many houses in N. and N.W. London fractured on account of the evaporation from the clay subsoil on which they were built, causing contraction of the soil below the bottoms of the walls and below the concrete under, would some kind reader, who has had his attention practically turned to the matter and so had actual experience in dealing with it, favour me with his views as to the depth to which the foundations of a house should be carried? The house is about to be built in a district where the London clay is of great depth and comes to the surface, which is fairly level. No cellars or basement of any kind. Height about 30ft. above surface to eaves; stories, ground floor, first floor, and second floor. Also any hints as to thickness of concrete and width of projection beyond bottom course of footings would be highly esteemed.—R. W. J.

[11725.]—**Velocity of Flow of Air.**—I have read of many experiments on the flow of air, and have used various formulæ for calculating the same; but I should be much obliged if some of your scientific readers would answer the following questions:—(1) With what velocity will air of 11·71lb. absolute pressure per sq.in. and 60° temperature flow into air of 8·5lb. per sq.in., and what weight of that air will pass through a well-formed nozzle 1in. in dia. in one minute? (According to experiments the velocity of flow will not be increased if the lower pressure be 0lb. or a perfect vacuum.) (2) What will be the velocity and weight of air passing through a 1in. dia. nozzle if the pressure be 300lb. per sq.in.? (Velocity in feet per *second*, and weight in lb. per *minute*.) (3) What is the greatest possible velocity that air—of, say 15,000lb. per sq.in.—could acquire in passing through a nozzle 1in. in diameter? (Temperature of air 60° Fah.) (4) Suppose the temperature of the air in the above cases to be raised to 600° Fah., how would that affect the velocity of flow and the weight of air discharged?—R. W.

[11726.]—**Strain of Girder.**—Can Mr. Palmer or "T. C." kindly inform me how should I calculate size of a lattice girder (T-irons top and bottom, or two T's top and two T's bottom, with plates), given the span and the weight such girder is going to support?—J. C.

[11727.]—**Roofs.**—How do you find strains on each particular member of a principal of a roof or a lattice girder?—A. D. W.

REPLIES.

[11693.]—**Party Walls.**—"G. H. G.," in your issue of two or three weeks ago, kindly gave Emden's definitions of the four kinds of "party walls," but hardly fully grasped the question I asked. Taking the four definitions in the order given, what are the privileges of either party as to raising or interfering with the level of the wall or chimney-stacks therein?—H. E.

[11709.]—**Slates.**—Write for samples to Tilberthwaite (Westmoreland) Green Slate Co., Kendal.—ALLEN T. HUSSELL, Ilfracombe.

[11709.]—**Slates.**—Slates of various sizes are recommended because of the difficulty of obtaining large quantities of a particular size. On a roof of square pitch a 12in. by 6in. slate would be suitable. As to colour, the green slate has not stood London atmosphere well. Before you decide on any quarry, it would be as well to make some inquiries, and to obtain samples. Westmoreland (Kendal) slates are recommended as superior to all other slates of this colour. Penrith green slates and the Coniston grey slates are also good. Consult Laxton for prices and names of quarries.—A BUILDER.

[11708.]—**Timber Buildings.**—Books on timber construction are rare. Dallaway's "English Architecture," Dollman and Jobbins's "Analysis of Ancient Domestic Architecture," Habershon's "Ancient Half-Timbered Houses," Nash's "Mansions of England," Niven's Old Worcestershire, Old Warwickshire, and Old Staffordshire Houses, Parker's works, and Shaw's "Specimens of Elizabethan Architecture" are a few of the best works. For Lancashire examples, look over volumes of the BUILDING NEWS, where illustrations are found of all the important timber buildings in England.—G. H. G.

[11710.]—**Lead over Window-Frames.**—"Inexperienced" had better strip the plastering off, rake out joints of bricks inside and outside of the damp place, and stop with Portland cement, and replaster inside. It is a good plan when building to insert a sheet of 4lb. lead in the joint of brickwork above the window-frame, turning it up inside. In building hollow walls I have always provided lead over all door and window-frames; this lead to be laid in the outer thickness turned up in the cavity and extending 6in. or more beyond the window-frame. The moisture which finds its way through the outer thickness of wall is thereby intercepted, and escapes at the ends or finds its way through the joint. No damp can penetrate to the inside thickness of wall. Wherever hollow walls are built, especially exposed to rainy quarters, the lead should be used. Of course, a layer of asphalte would also do.—G. H. G.

[11711.] — **Lightning-Rod.** — The gables and chimney-stacks should have lightning-rods fixed on the prominent angles and points, and these should be connected together by continuous conductors along the roof ridges. The rods should be 4ft. high, and spaced at intervals not to exceed 50ft. in a large building. Copper tape conductors are preferred; this tape should be 1in. by ⅛in., about ⅛lb. per foot. Two earth connections are better than one, the conductors leading to them being connected at the base of building. It is better to carry the conductor down that front of building which is most exposed to wet. The gables should have the conductors brought down the verge or barge courses, so as to protect the angle of building. The conductor should terminate in earths offering a large surface, and for this purpose it is a good plan to coil the end of conductor spirally about 4ft. diameter.—ELECTRIC.

[11712.]—**Trigonometry.**—In reply to "B. W. L.," let the first angle subtended by the tower be called A, and the third B, and let the distance from the point where the tower subtends 45° to the foot of the tower be called c. Then, since B is 45°, the tower's height = c. Now—

$$\tan. A = \frac{a + c}{c}$$

$$\cot. B = \frac{c}{c - b}$$

But— $\tan. A = \cot. B \because A + B = 90°$

$$\therefore \frac{a + c}{c} = \frac{c}{c - b}$$

$$\therefore ac + c^2 - ab - bc = c^2$$

$$ac - bc = ab$$

$$\therefore c(a - b) = ab$$

$$\therefore c = \frac{ab}{a - b}$$

—A. STEWART.

STATUES, MEMORIALS, &c.

WHIPPINGHAM.—The work connected with the Battenberg Memorial Chapel at St. Mildred's, the parish church of Whippingham, is nearly completed. The new sarcophagus, fixed some few feet from the marble altar-table at the east end, to allow space for worshippers, is richly carved. It has taken the place of the plain tomb, which has been standing in the chapel since the funeral of Prince Henry. The base is composed of dove marble, and small triple columns of marble from the Marquis of Lorne's estate in Scotland are arranged at the sides and angles. The panels, of pure white statuary marble, are carved with the orders and the arms of Prince and Princess Henry. The centre panel on the south side has the following inscription:—"Henry Maurice, Prince Battenberg, Governor of the Isle of Wight. Born, October V., MDCCCLVIII. Entered into his rest, January XX., MDCCXCVI." The massive cover of the sarcophagus is elaborated with scriptural texts, and the Latin motto, "In te Domine spero." The altar-table, constructed of dove and statuary marble, is approached by polished marble steps. Above the table is to be erected the figure of an angel with outstretched wings, which will stand about 8ft. high, and occupy the major portion of the east end. H.R.H. the Princess Louise (Marchioness of Lorne) is now engaged upon this work. The floor is of polished stone, with a border, into which are introduced, in monogram, the initials B.B. In the north wall are three new stained-glass windows, representing St. Henry, St. Elizabeth, and St. Mauritz. Mr. Alfred Gilbert, M.V.O., R.A., has the bronze screen and gate in hand.

CHIPS.

Westminster Vestry has decided to go in for asphalte paving in preference to wood. The wood pavement in Victoria-street, Millbank-street, and Chapter-street will be replaced by asphalte, which will be laid down by the Limmer Asphalte Paving Company.

The function of unveiling the statue of Charles Darwin, which has been made by Mr. Mountford, a native of Shrewsbury, for the Shropshire Horticultural Society, will take place on Tuesday, August 10 next, in front of the Free Library, Shrewsbury. The statue will be unveiled by Lord Kenyon, the president of the society.

The board school at Terrace-road, Newport, Mon., is being enlarged and altered from plans by Mr. G. T. Lawrence, of that town. Messrs. Bennett Brothers are the contractors.

Everything is now in readiness for the extension of the museum buildings, William Brown-street, Liverpool. It is the intention of the committee having charge of the matter to ask the city council at its next meeting to allow tenders to be invited for carrying out the work. The architect is Mr. Edward W. Mountford, F.R.I.B.A., whose design, as selected in competition by Mr. Aston Webb, the assessor, was illustrated in our issue of August 14, 1896.

A fire which broke out early on Saturday morning at the Woking factory of the International Electric Supply Company destroyed the main workshops and stores, and did damage to the extent of many thousands of pounds. Among the things destroyed were about £2,000 worth of electrical instruments, and large quantities of machinery and tools, celluloid, and other inflammable materials were stored on the premises. The damage is covered by insurance.

After occupying the attention of the sanitary authorities for nearly a quarter of a century, a scheme of drainage for Ruabon has at length been agreed to. At Friday's meeting of the Wrexham Rural District Council, it was announced that the Local Government Board had sanctioned the borrowing of £6,830 for the purpose of carrying the scheme out, and had recommended the Public Works Loan Commissioners to lend that sum. The clerk was instructed to advertise for tenders for carrying out the work. The deputation appointed to wait upon the Mayor of Wrexham (Mr. Philip Yorke) with respect to the provision of an outfall for the drainage of Rhostyllen reported that Mr. Yorke was prepared to place land at the disposal of the council for sewage-disposal purposes, provided satisfactory arrangements as to details could be arrived at.

Dr. Tristram, the Chancellor of the Diocese of London, held a Consistory Court on Thursday in last week, when Mr. Atlay applied on behalf of the rector and churchwardens of St. Mary-le-Strand for a faculty to enable them to construct a road through the disused burial ground of St. Mary-le-Strand, the proposal being to make a new street communicating east and west between Drury-lane and Catherine-street. Dr. Tristram, in giving judgment, said the faculty would be granted in consideration of the payment of £2,500 to the vestry of the parish, and of £500 to the Metropolitan Public Gardens Association.

Photo Lithographed & Printed by James Akerman 6 Queen Square W.C.

LEGAL INTELLIGENCE.

CORPORATION'S POWER TO INSIST ON PARTICULAR WATER-CLOSETS.—WOOD v. MAYOR OF WIDNES.—Mr. Justice Lawrance and Mr. Justice Ridley gave judgment on Saturday in the Court of Queen's Bench in this case stated by two justices of the county of Lancaster. The appellant was the owner of certain houses, 52 to 68, Terrace-road, Widnes. At a petty sessions holden at Widnes a complaint was preferred against him by the respondents under section 36 of the Public Health Act, 1875, claiming payment of certain private improvement expenses in respect of slop water-closets fixed at the appellant's houses. The justices adjudged that the respondents should recover the sum claimed. The facts were as follows:—On February 12, 1895, the respondents, who were the urban sanitary authority for the borough of Widnes, confirmed a resolution of the health committee requiring that in all future reconstructions of privies and ashpits, such privies and ashpits should be converted into the waste water-closet system. On March 22, 1895, the respondents' inspector of nuisances served upon the appellant a notice requiring the appellant to abate a nuisance at his premises, 52 to 68, Terrace-road, by converting the privies into water-closets. On April 3 the inspector reported that certain houses in the borough, including the appellant's, were without a sufficient water-closet, earth-closet, or privy, and on April 9 the respondents confirmed a resolution of the health committee that notice be served upon the appellant and the other owners of the house requiring them to provide sufficient privy and ashpit upon the waste-water closet system approved by the corporation. On April 23 notice was served upon the appellant in accordance with the terms of this resolution, and the notice not having been complied with, the respondents did the necessary work, and then took these proceedings to recover the amount. It was contended for the appellant that the resolution of February 12 and the subsequent proceedings thereunder were invalid. The question of law for the opinion of the Court was whether the resolution of February 12 was valid, or, if not, whether it invalidated the subsequent proceedings.—Mr. C. A. Russell, Q.C., for the appellant, contended that the respondents could only require an owner to provide a sufficient water-closet or privy. They were attempting to enforce in every case the substitution of a particular kind of water-closet—viz., the slop water-closet—for privies. There was no power to do that, and the proceedings were invalid. Mr. McCall, Q.C., for the respondents, contended that it had been decided in many cases that a sanitary authority could substitute water-closets for privies. He cited "St. Luke's Vestry v. Lewis," "Hargreaves v. Taylor," "*Ex parte* Whitchurch," and "Bogle v. Sherborne Local Board." The Legislature had left the matter to the discretion of the local authority, with a right of appeal to the Local Government Board. There was no finding in the present case that the respondents had treated the appellant's case as part of a general question, or that regard had not been paid to the particular requirements of the case. The Court allowed the appeal. Mr. Justice Lawrence said that it was contended for the appellant that the respondents had, by the resolution of February 12, adopted a general rule that a particular kind of water-closet was to be used, and that this rule was to be applied in all cases, without any regard to the particular requirements of individual houses. The local authority were not entitled to do that. They must inquire into each case, and, although it was not disputed that in every case they could require a water-closet to be substituted for a privy, they were not entitled to say that only one particular kind of water-closet should be used. Section 36 of the Public Health Act, 1875, used the expression a "sufficient" water-closet, and that was all that the local authority were entitled to demand. In his Lordship's opinion the resolution of February 12 and the subsequent proceedings were invalid, and the appeal must be allowed. Mr. Justice Ridley concurred. It was impossible not to see that the respondents were intending to apply one general rule in all cases. The resolution of February 12 referred to "all future cases," and mentioned the particular kind of water-closet that is to be used, and the notice served on the appellant was to the same effect. Although it might be most desirable that uniformity should prevail in these matters, still in this case the intention of the Act of Parliament had not been observed.

DILAPIDATIONS IN FARM BUILDINGS.—A special county-court was held at Bangor on two days of last week, when his Honour Judge Sir Horatio Lloyd and a jury heard a case which was of considerable interest to the farming community. Sir Henry Cunningham and Colonel G. W. H. Olive, the trustees under the will of the late Sir John Hay Williams, Bart., were the plaintiffs, and Hugh Williams, Bodrida, Llangaffo, Anglesey, was the defendant. Damages amounting to £78 were claimed by the plaintiffs for an alleged breach of the agreement signed by the defendant when he took the farm of Ty Fry, Pentraeth. It was alleged that the damage had been caused by the neglect of the defendant to repair the buildings and the outhouses, the fences, walls, ditches, and drains, and the failure of the consumption on the farm of the hay and straw grown on the land. There was a counter-claim of £250 for two stacks of hay and one stack of straw, and also £67 2s. 7d. in respect of unexhausted improvements. For plaintiffs, Mr. J. Mason Parry, the agent for the estate in question, gave evidence of the damage caused, and stated that the incoming tenant came into possession on November 12, and witness made a list of the things which were out of repair. When cross-examined, however, the witness said he had lost the original memorandum of these things. He was the only man present when he took an inventory of the dilapidations. He had not put down the various items which made up the total claim, and he had not sent a detailed statement of the claims to the defendant. Mr. Walter B. C. Jones, land valuer and estate agent, Criccieth, said he visited the farm in April, 1897, and valued the total damages at £149, of which £75 was due to loss of manure. Cross-examined: The house was in a decayed condition, and for choice he would reconstruct the whole thing. Mr. R. Brocklebank, Plas Llandegfan, practically agreed with the figures of the previous witness. His total valuation was £150. Mr. Evan Evans, county surveyor of Carnarvon, said he had made a valuation of the damages caused by the tenant's neglect to patch up the house during his tenancy, and estimated it at £78 10s., and on account of the manurial loss £64. The house was in a very dilapidated state. Mr. Algeo, surveyor and valuer, Menai Bridge, gave his estimate of the total damage, with the exception of the manurial loss, to be £78 13s. Defendant said that when he left Ty Fry, Mr. Mason Parry pointed out the repairs which were to be done, and witness did all the things which were pointed out to him. Mr. R. G. Thomas, J.P., member of the Society of Architects, Menai Bridge, architect and valuer, said that £15 would cover the dilapidations charged against the defendant. What were now called dilapidations were, in his opinion, only ordinary wear and tear. The farmhouse had been built, and occupied for about 120 years as a family mansion, and it would be ridiculous to ask an ordinary farm tenant to keep it in repair when not more than half the house was used. His estimate of the dilapidations was based upon the principle that the materials for the repairs would be supplied, and that the tenant would have to find the labour. Mr. R. Gardner, Valley, gave evidence of a similar character. A number of adjoining farmers and workmen gave evidence as to the condition of the farm before and after the defendant came to the farm, and they said that the house and fences and ditches were equally good when he left as they were when he came there. The jury returned a verdict to the effect that they allowed a sum of £31 12s. to the plaintiffs for the manurial value of the hay and straw. As to the repairs to the buildings, the fences, and the ditches, they considered that the buildings had been left in as good repair as when the outgoing tenant took the farm. As to the counter-claim for unexhausted improvements, they found for the tenant in the sum of £19 10s., and for the tenant on account of the feeding stuffs to the extent of £46 7s. 11d.

LIABILITY FOR DAMAGE TO ROADS.—The House of Lords delivered judgment on Friday in the case of the "Kent County Council v. Lord Gerard," which raised the question who was liable to compensate the County Council for damages to roads by extraordinary traffic. Lord Gerard was rebuilding his mansion at Eastwell Park, and large quantities of building and other materials were hauled there by traction engines, considerable damage being done to the roads. The County Council claimed that Lord Gerard was liable, but he maintained that if anyone was liable it was the contractors. The magistrates before whom the case first came held the respondent was liable. The Quarter Sessions reversed this decision, but on appeal the Queen's Bench Division reversed the judgment of the Quarter Sessions, and again the Court of Appeal reversed the decision of the Queen's Bench. Their lordships affirmed the judgment of the Court of Appeal, holding that Lord Gerard was not liable.

BETHELL v. LONDON COUNTY COUNCIL.—ALLEGED FRAUDULENT MEASUREMENTS.—Before his Honour Judge Lumley Smith, Q.C., in the Westminster County-court, on Tuesday, this case came on for hearing. It appeared that the Works Department was carrying out the Lewisham sewer works, and shot 4,472 yards of earth on the plaintiff's land by her permission, and they paid her for 3,489 yards, or one-third less. She was not aware of this for some time afterwards. Frederick Horwood said he was confidential clerk to Mr. Holloway, the late manager of the Works Committee. He measured the earth placed on Mrs. Bethell's field, and it was then perfectly solid. There was a great deal of water in the workings and the men struck. After he and King, another officer of the Committee, measured, witness suggested to King "that as Mrs. Bethell did not know how much had been shot there, they should deduct a third." At first King objected, but eventually agreed. His Honour: Am I to take it you suggested to him to cheat Mrs. Bethell? Witness: That is what it comes to as a matter of fact. His Honour: Is that not very disgraceful on your part? Witness: I did not think so, considering how the Council had treated me. I thought if it got through the Council and Mr. Wise, the acting manager, and passed the Committee, I should have exposed the Committee. His Honour: Then this was a trap for Wise? Witness: That is so, and the Council in general. Cross-examined: You were dismissed for signing bogus transfers? Witness: Yes; that was the reason given. In answer to further questions, the witness said he first had 30s. a week, and then 45s. a week. He considered "they all" fell into this trap, and he suggested that the Council themselves should have measured it. His Honour: Why, when they send a man whom they suppose to be honest, should they go and measure it? Albert Sydney Waterlow King, a surveyor employed by the Council, said the earth was loose, and the third was properly deducted. There was no truth in the statement made by Horwood of his falling in with his view to defraud the plaintiff. His Honour, in giving judgment for the defendants, said Mrs. Bethell was satisfied with what she received until Horwood had been discharged, and then he went to her, and in effect said: "I am a rogue, and when I gave you the measurements they were false and fraudulent." The claim should never have been brought. Defendants would have their costs.

CONTINUED DEFAULT UNDER THE LONDON BUILDING ACT.—At the South-Western Police Court on Tuesday Mr. J. L. Schiefer was summoned at the instance of the London County Council for having erected a building at the rear of Grove Mansions, Clapham Common, without a license from the Council, and after having been fined for this offence, had continued to make default. Mr. Chilvers, for the Council, said the defendant was fined 10s. in March last for erecting the building, and as he allowed the structure to remain, another summons was taken out against him for the recovery of cumulative penalties. This summons was dismissed, the magistrate being of opinion that proceedings had been taken out under the wrong section. The Council reconsidered the matter, and issued the present summons for continued default. Mr. W. R. Warren, for Mr. Schiefer, raised the question that the proceedings were illegal, for the reason that the summons had been taken out against the wrong person, the defendant having ceased to be the owner of the property. Mr. Chilvers said he was not asking for an order upon the defendant, but upon the Council, to enable them to go in and demolish the structure. Mr. Warren submitted that it would be monstrously unjust to punish a man for not doing what it was impossible for him to do. Then, again, if an order were made, it would be an injustice on the owner. Mr. Francis: I quite agree; but the section says nothing about that matter. Ultimately, the summons was adjourned, to consider the legal points raised.

WHAT IS A "NEW" DRAIN?—Mr. Chas. Whillier, a builder, and Mr. R. D. Duncan, a solicitor, were each summoned at Lambeth Police Court last week, by Mr. Julius Jones, a sanitary inspector in the service of the Lambeth Vestry, for having, at a house in Loughborough-street, Lambeth, in carrying out some drainage work, failed to comply with the regulations of the vestry. The house in question was formerly drained by an old brick drain, which became stopped up. Mr. Whillier, by the directions of Mr. Duncan, acting as solicitor to the owner of the premises, took away the old brick drain, and, on the channel taken by the old drain, put down a pipe drain. Mr. H. J. Smith, who supported the summonses on behalf of the vestry, argued that what had been done amounted to the construction of a new drain, and contended that the vestry were entitled to inforce compliance with their regulations relating to new drains, which require the fixing of an intercepting trap between the drain and the sewer, and the provision of inlet and outlet shafts. The point taken by Mr. Duncan was that this was a repair to an existing drain, and that the vestry were consequently not entitled to require the extra work to be done. Mr. Denman remarked that if a man took a spade and dug a hole in the field, and water flowed through it, it was a drain. If he bricked it over it was still a drain; if he took away the bricks and replaced them with pipes, it was still a drain—the same old drain altered and repaired, but not a new drain. A drain, it seemed to him, was the channel along which the drainage went. In this case he thought the drain was altered and repaired. The meaning conveyed to his mind by the word "drain" was the line or channel through which the drainage went. The old drain was there, the channel had not been altered, but it had been repaired and made better than it was before, although it did not comply with the requirements which the vestry were entitled to insist upon if it were a new drain, but which they were not entitled to insist upon if it were not a new

drain. The summonses would be dismissed, with £3 3s. costs against the vestry.

Carpenters and Jubilee Syndicates.—At Southwark Police-court last week, Mr. Fenwick heard the complaint of four carpenters, named Greenwood, Richards, Neal, and Griffin, against George Ashley and Co., of 133, Oxford-street, and the Mutual Jubilee Syndicate, Limited, of the same address, who were said to be jointly liable for unpaid wages earned in the erection of the Jubilee stand in front of St. Saviour's Cathedral. Mr. White, for the defendants, produced an agreement between the syndicate and a builder named Firbank, who, he said, contracted to do the work for £600, but only did part of it, and left both the syndicate and the workmen in the lurch. Mr. Fenwick said the men must be paid. Mr. Ashley had made himself liable by telling the men to go on working when Firbank had disappeared. Mr. White said the syndicate accepted the responsibility, and they paid all the men who attended on a certain day. The complainants replied that there was not enough money to go round. The magistrate then entered into a detailed examination of the men's claims, which were checked by the time-sheets and the evidence of a foreman named Bishop. In the result, Greenwood's claim of £3 7s. was dismissed, as he had been fully paid already; Richards, who claimed £7 13s., obtained an order for £4 14s., and 2s. costs; Neal, who claimed £3 3s., was allowed £3 17s., and 2s. costs; and Griffin, who demanded £5 14s. 9d., was awarded £4 4s. 6d., and 2s. costs. Mr. White undertook that the amounts should be paid without further delay.

Heavy Failure of an Oxford Builder.—*Re* Thomas Axtell, jun., builder, 17, Edith-road, Grand-pont, and 9A, St. Aldate-street. The Official Receiver, Mr. George Mallam, has issued observations with respect to this case, in which he states that the receiving order was made on the debtor's own petition. The debtor, a contractor and builder, commenced business in Oxford in March, 1893, with a capital of £300—which was borrowed. He soon commenced to undertake a number of contracts, and has been financed by his father, to whom he states he owes approximately £11,000. The debtor is unable to state the amount of his indebtedness, or the amount of his assets; but his clerk has supplied a list of creditors, which shows liabilities amounting to about £16,000, though this is probably not exhaustive. The debtor estimates his assets in preliminary examination at about £6,000. The Official Receiver added: "The confusion in the debtor's affairs caused by the fact that his books show neither his liabilities nor his assets nor his financial position on any one of his contracts is deplorable. I have to record the flagrant disregard of my orders to the bankrupt made in the interest of creditors. I cannot at present understand what has become of the considerable sums he has received during only four years' trading." The first meeting of creditors was held at the Golden Cross Hotel, Oxford, on the 23rd inst. The Official Receiver in the chair. It was reported that the debtor was ill in bed. A committee of inspection and a trustee were appointed, and the proceedings were adjourned.

A receiving order has been granted in the case of William Henry Clark, of College Park-terrace, Willesden, and Howard-road, Cricklewood, N.W., builder.

The Commissioners of Northern Lighthouses are inviting tenders for the erection of a light tower, engine-house for fog-signal, and dwelling-houses for the lightkeepers, on the Blackhead, a bold promontory about two miles and a half north of Portpatrick Harbour, on the west coast of Wigtownshire. The Blackhead will form an intermediary light between Corsewall Point and the Mull of Galloway, while the light of Mew Island, near the Irish Coast, will be almost directly opposite. Four acres of ground have been secured at Killantringan, in connection with the proposed buildings.

A Bill has been passed for the construction of a line of railway along the north side of Loch Earn, and is entitled the Lochearnhead, St. Fillans, and Comrie Railway. When constructed it will complete the route from Dundee to Oban by uniting the Lochearnhead Railway with the Comrie Railway, and thus give a railway across Scotland from east to west.

Lord Norton being about to lay out his property in the neighbourhood of Cherrywood-road, Saltley, Messrs. Wilmot, Fowler, and Wilmot, his surveyors, have submitted plans to the Birmingham Corporation for widening and improving that thoroughfare between Fordrough-lane and Denbigh-street. At present the road is of a very irregular width, some points being not more than ten yards wide. By the proposed arrangement, which has been approved by the corporation, the road will be made between the points named, of the uniform width of 14 yards. The estimated cost to the city of carrying out the work is £1,400.

WATER SUPPLY AND SANITARY MATTERS.

Chester.—Considerable progress has been made in the construction of the south side intercepting sewer, which is to serve the districts of Queen's Park, Handbridge, Curzon Park, Hough Green, and Lache-lane. Up to the present the sewage from these districts has had its outfall direct into the Dee, that from the first-named district entering the river directly under the weir. The scheme now in process of construction is designed to intercept the whole of this sewage, and deliver it into the intercepting sewer on the north side of the river, whence it will be conducted to the outfall works, and treated with the rest of the Chester sewage. The lift-house near the Old Dee Bridge is almost ready for the lifting machinery, which will consist of a 12H.P. turbine and a Woodford's pump, the power being obtained from the upper river water flowing along the old mill race. The pumping-well has two outfall pipes, 12in. in diameter, which run from here directly across the river parallel with the old bridge. At this point the two lines diverge—one to intercept Queen's Park and the junction for Handbridge, and the other for Curzon Park will intercept Greenway-street, Brown's-lane, the Cemetery, the Dingle, and Curzon Park sewers. The work is being carried out under the direct supervision of the city surveyor (Mr. I. Matthews Jones) by his staff of workmen. The pipes have been laid across the river, and the trench is open for 70 yards on the river bank going towards Curzon Park. In the course of three or four months the scheme will be an accomplished fact.

Liverpool.—The members of the water committee of the Liverpool Corporation visited the Aubrey-street pumping-station on Friday, where the Lord Mayor formally started a new pumping-engine, built by Messrs. Hathorn, Davey, and Co., of Leeds. It is a three-cylinder triple expansion vertical rotating engine. It can be driven at various rates of speed to suit the varying demands for water, and there is also an arrangement by which it can be controlled by the rise and fall of the water in the high-level tank. The expenditure has been £5,640, which sum included all the alterations and the removal of the old engine. The Lord Mayor mentioned that the engine formed the completion of the works suggested by the water engineer, Mr. Parry. His estimate for these works was £149,100, but the actual sum expended had been £113,004. The Lord Mayor has also formally cut the first sod of the Conwy Tunnel works for the diversion of the river Conwy into Lake Vyrnwy, by which another million gallons of water a day will be provided for the city.

Salford and its Sewerage Difficulties.—At the Salford County Court on Friday, Judge Parry had before him an adjourned application by the Mersey and Irwell Joint Committee for a peremptory order to compel the Salford Corporation to carry out a scheme for dealing with the effluent from their sewage filtration works. It was stated on behalf of the Corporation that a resolution had now been passed authorising the raising of money for completing the scheme. Mr. J. Corbett, the borough engineer, gave evidence as to what was proposed to be done, and as the result of a discussion, in which Mr. Sutton (who appeared for the Joint Committee), Mr. Caradoc Evans, the assistant town clerk of Salford, Mr. Corbett, and the Judge took part, it was arranged that the application should be adjourned, that the Corporation should proceed with the work, and that they should report as to its progress from time to time to the Joint Committee. It was understood that the scheme might be completed in two years.

CHIPS.

The Duchess of Teck visited Isleworth on Wednesday afternoon to lay the foundation-stone of a new isolation hospital for the joint use of the borough of Richmond, in Surrey, and the Heston-Isleworth District Council, in Middlesex.

Mr. Law has held a Local Government Board inquiry at Barnes in reference to the application of the urban district council for permission to borrow £1,600 for the acquisition of a site for workmen's dwellings and £450 for street improvements.

Mr. Cotton, chief engineering inspector, Local Government Board, has held an inquiry in the city hall, Dublin, touching an application made by the corporation for a loan of about £40,000, including £840 for altering and improving artisans' dwellings at Benburb-street; £1,000 for new meters for the public gas lamps, £7,000 for paving, £17,000 for repaving, £8,500 for flagging, and £5,500 for concreting.

The south window of the Lady Chapel in Winchester Cathedral is now being filled with painted glass, as a memorial to the late Bishop Thorold, whose grave is adjacent. The artist is Mr. C. E. Kempe. The window will be dedicated at three o'clock on Saturday in next week, when an address will be given by Bishop Barry.

Canon Moor, vicar of Gainsborough, on Wednesday in last week laid the foundation-stone of a new organ aisle and clergy vestry, to be added to the old Norman church of St. Peter's at Barton-on-Humber. The alterations, with new organ, will cost £2,000, towards which Mrs. Holt, widow of the late vicar, has given £1,000, besides a special donation of £250 for the restoration of the ancient oak chancel screen.

The Public Health (Scotland) Bill passed through the last stages of Committee in the House of Commons on Wednesday evening, and was read a third time the same evening amid cheers. The Bill contains about 200 clauses.

Herr Eduard Ritter von Engerth, late Director of the Imperial Picture Gallery at Vienna, died on Wednesday at Semmering, near Vienna, aged 79. He was a noted painter, one of his chief works being a picture of the Emperor Francis Joseph's coronation as King of Hungary.

The Duke of Cambridge has fixed October 18 as the date on which he will visit Bath to open the new pump-room and lay the foundation-stone of the Diamond Jubilee Art Gallery. Mr. J. M. Brydon, F.R.I.B.A., is the architect of both buildings.

The committee charged with the erection of the Civil War Soldiers' and Sailors' Monument, to be set up on a site in or near New York not yet determined upon, have invited Messrs. Richard H. Hunt, Gilbert, and Ward, W. H. Hume and Son, Stephen W. Dodge, Stoughton and Stoughton, and James E. Ware to submit competitive plans before September 1, with the understanding that the author of the best design is to be appointed architect of the work.

Messrs. R. Waygood and Co., Ltd., write us that they are informed that some of their competitors are calling on their customers, and circulating reports that, owing to the present unfortunate strike, they are unable to execute orders. They beg of us not to be misled by such reports, which are entirely without foundation, and hope their customers will not be influenced by such methods of endeavouring to obtain orders. We are sure that all who extend to them that confidence they have merited in the past will find that inquiries and orders will receive prompt and careful attention.

Alexandre Debelle, the landscapist and historical painter, who devoted his life to illustrating the Dauphiné, has died at Grenoble, at the age of 92. The son and nephew of soldiers who distinguished themselves under the First Republic, he was a pupil of the famous Baron Gros. He has left all his fortune to local charities.

The Birmingham City Council accepted, on Tuesday, a mace presented to the city by Messrs. Elkington, and agreed that the civic emblem should be placed in the art gallery for a few months in order that it may be inspected by the general public. An offer by Mr. W. H. Barber to present to the corporation a statue of her Majesty the Queen, by Thomas Brock, R.A., was gratefully accepted, and the public works committee were requested to confer with Mr. Barber, and suggest a suitable public site for the statue.

The new bridge across the Lee at Clapton was formally declared open for traffic on Wednesday by Mr. W. J. Bull, Chairman of the Bridges Committee of the London County Council. The new bridge is 32ft. wide, and is divided into two equal parts by a central girder, so that there will be two lines of traffic. The total cost of the work, which has been carried out from the designs of Sir A. Binnie, engineer to the London County Council, was £8,399.

The special committee of the Liverpool Corporation, who have in hand the taking over of the tramway system in that city, have decided to commence the improved system of haulage by establishing a service of cars the propelling force of which is to be electricity. The experimental line will be run by overhead communication. It is proposed to commence operations by a service from the city to the Dingle, and up Warwick-street to the Prince's Park gates.

Mr. Harley Hackford, assistant surveyor to the Whitechapel District Board of Works, has been appointed as surveyor to the St. Luke's Vestry.

The new Royal Baths at Harrogate, opened by the Duke of Cambridge on Friday last, have been built from plans by Messrs. Baggallay and Bristowe, of London, at a cost of £100,000. The principal contracts have been carried out as follows:—Masonry, brickwork, carpentry, and joinery, Mr. Isaac Gould, of Leeds; ironwork and plumbing, Messrs. H. Braithwaite and Co., of Leeds; plastering, Messrs. S. Johnson and Sons, of Mirfield; slating, Mr. Joseph Shepherd, of Harrogate; painting and decorating, Messrs. J. Pollard and Son, of Leeds.

The authorities at Gefle, in Sweden, have decided to build a new harbour, and to deepen and improve the access through the "fjord." The total cost is estimated at £55,000 sterling.

Our Office Table.

THE Select Committee on the museums of the Science and Art Department have agreed on a second interim report. The report emphasises the original view taken by the committee as to the danger of fire in present circumstances, and urges the construction of the central buildings at South Kensington as soon as possible. It does not, however, deal with the administration of the Department, which will be the subject of future inquiry, and in regard to which there is much difference of opinion in the Committee.

THE preliminary programme of the sixteenth congress of the Sanitary Institute, to be held in Leeds from September 14th to 18th, has now been issued. The president of the congress is Dr. Robert Farquharson, M.D.Edin., LL.D.Aberd., F.R.C.P.Lond., M.P., D.L., J.P. The congress will include three general addresses and lectures. Three sections will meet for two days each, dealing with (1) Sanitary Science and Preventive Medicine, presided over by Mr. T. Pridgin Teale, M.A., M.B. (Oxon), F.R.C.S., F.R.S., (2) Engineering and Architecture, presided over by Mr. Lewis Angell, M.Inst.C.E., F.R.I.B.A., (3) Chemistry, Meteorology, and Geology, presided over by Mr. Wm. Whitaker, B.A., F.G.S., F.R.S. Six special conferences:—River Pollution, presided over by Major Lamorock Flower, Sanitary Engineer, Lee Conservancy Board; Municipal Representatives, presided over by Councillor B. Womersley, chairman of the sanitary committee, Leeds City Council; Medical Officers of Health, presided over by Dr. Edward Seaton, M.D., F.R.C.P., F.C.S.; Municipal and County Engineers, presided over by Mr. Thomas Hewson, M.Inst.C.E.; Sanitary Inspectors, presided over by Dr. Peter Fyfe, F.R.S.E.; and Domestic Hygiene. In connection with the congress, a health exhibition of apparatus and appliances relating to health and domestic use will be held. Excursions to places of interest in connection with sanitation will be arranged as usual for those attending the congress. The local arrangements are in the hands of an influential local committee, presided over by the Right Hon. the Lord Mayor of Leeds, with Dr. J. Spottiswoode Cameron, M.D., B.Sc., Medical Officer of Health for the City, and Messrs. A. E. Pearson, M.R.C.P., L.R.C.P., and W. Spinks, Assoc.M.Inst.C.E., as honorary secretaries. According to the programme, over 300 authorities, including several county councils, have already appointed delegates to the congress, and, as there are also over 2,000 members and associates in the institute, there will probably be a large attendance in addition to the local members of the congress.

A GREATER BRISTOL will doubtless be an accomplished fact before Parliament rises, although the promoters of the scheme have only secured a portion of the extension at which they aimed. After a sitting extending over nine days, the Select Committee of the House of Commons concluded their inquiry on Friday into the Bill promoted by the Bristol Corporation for the extension of the city boundaries, by which, if conceded in its entirety, 7,880 acres, and a population of about 61,000, would have been added to the city, the present estimated population being 228,000. The committee decided that Bristol had established a case for the inclusion of the lower part of Horfield, St. George, and Stapleton. The Brislington boundary is modified and reduced, and Sneyd Park, Westbury-on-Trym, and Stoke Bishop are eliminated from the Bill. The additions sanctioned are entirely, it will be noted, on the north-eastern side of the city. The Bill had already passed the ordeal of a House of Lords committee.

MESSRS. MAXWELL AND TUKE, architects, of Manchester, who examined the tower and buildings of the Blackpool Tower Company after the recent fire on the summit, state that "no damage has been done to the main structure or entertainment portion of the buildings, the fire being confined simply to the three landings above the 380ft. platform, where certain woodwork has been destroyed, and where the heat fused the cables, causing the two balance weights which assist the hydraulic engines to raise the lifts to fall down their track inside one of the legs of the tower. The tower and buildings are in as stable a condition as when they were built." The tower and the group of buildings clustered around its base were erected in 1891-4, from Messrs. Maxwell and Tuke's designs, at a total outlay of £300,000. The total height to the top of the flagstaff is 518ft. 9in., and to the crow's nest 480ft. The two independent lifts rose to the 380ft. level, whence staircases each 20ft. high led up to the platform below the crow's nest, which was reached by an iron ladder. The disaster is attributed to the cables that conveyed the electric current to the arc lights on the balconies becoming fused and setting fire to the adjoining wood casing.

MR. LAWSON TAIT has patented a new form of kitchen-range, of which the principal object is the prevention of smoke, and consequently of waste. When chairman of the Health Committee of the Birmingham City Council, Mr. Tait was much impressed by the pollution of the atmosphere by the smoke from kitchen fires, and for several years he has been at work in the endeavour to perfect a cooking-range which shall be free from the objection of wasting coal and producing smoke. He believes he has now succeeded, and has exhibited the result of his work to a number of interested persons at 195, New-hall-street, Birmingham. Mr. Tait's kitchener is a self-contained structure of iron, requiring no brickwork flues. The fire is wholly inclosed, and is arranged upon sharply-inclined bars, coal being fed from the top of the slope. This principle has been adopted in various furnaces; but Mr. Tait adds to it the feeding of air at the point of combustion through a tube forming part of the structure of the oven, and which, becoming heated, gives a hot-air blast, and secures complete combustion. The kitchener has two ovens and a tubular water-heater. The inventor claims for it that it will do its work with one-eighth the quantity of fuel required for a range of corresponding dimensions of the ordinary type.

THE Vestry of St. Mary, Newington, has adopted the artesian-well system to supply the extensive and commodious public baths and washhouses recently erected by them at Manor-place, Walworth-road with the large amount of water required daily. One of the two wells which it was found necessary to bore has been already completed by the contractors, Messrs. Neill and Booth, to a depth of 352ft. On testing the supply of water at this depth, it was found to be fully 5,000 gallons per hour. The water is fairly soft in character, and will prove a good water for steam-boiler and laundry purposes. It comes from the flinty chalk, and its purity is assured by a thick overlying stratum of clay, through which no surface-water can penetrate. Why on earth more people in London do not follow the example of the Newington Vestry, in the face of the rapacity and unreliableness of the water companies, we cannot imagine.

THE congress at Bristol of the National Master Builders' Association was brought to a close, as we briefly intimated in our last issue, p. 103, by a visit to Bath on Thursday in last week. The visitors left Bristol at 10 a.m., arriving at the Bath G.W.R. station at 10.18, where a deputation from the Bath Master Builders' Association, including Mr. E. W. Wooster (the president) and others, received them, and subsequently conducted the company over the Roman bath and the bathing establishment, the Abbey and Municipal Buildings being also visited. Light refreshments having been partaken of, a start was made for Box, a number of four-horse brakes having been chartered for the journey. The usual route was departed from, for the benefit of those unacquainted with the architectural and other beauties of Bath, and a drive was taken through Queen-square and the Victoria Park, thus affording a capital view of the Royal crescent, circus, and assembly-rooms, before entering upon the London-road. The city having been left behind, Rudloe Firs, Box Hill, some eight miles out, was the rendezvous, and here the party were received and entertained at luncheon by the directors of the Bath Stone Firms, Limited. There was a short and informal toast list, that of "The Bath Stone Firms," proposed by the President of the National Association, being received with much enthusiasm. Mr. George Hancock, managing director of the company, responded, and spoke in terms of admiration of the aims and objects of the association. Bath was reached about 7 p.m. The banquet, which was subsequently given at the Guildhall by the local association, was a great success, upwards of 100 sitting down.

THE Incorporated Society of Medical Officers of Health held their provincial meeting in Bristol on Saturday at the invitation of the West of England and South Wales branch. The members assembled at the Guildhall, where they were officially received by the Mayor (Alderman R. H. Symes). At the business meeting which followed, Dr. Bond, of Gloucester, occupied the chair as president of the local branch. The proceedings were of a private character. In the afternoon, Alderman C. W. Cope-Proctor, chairman of the Bristol Sanitary Committee, entertained the members attending the conference, and his colleagues on the committee, at luncheon at the Council House. Subsequently, the company proceeded to Ham Green, where they inspected the fever hospital, under the guidance of Dr. D. S. Davies.

THE distribution of prizes gained by the students of the Royal College of Art took place on Wednesday in the lecture theatre of South Kensington Museum. The report of the principal, Mr. J. C. L. Sparkes, stated that the students of the college, in the national and local competitions, and in examinations in 1896, had gained three gold, 39 silver, and 104 bronze medals, 148 National competition books, and 36 Queen's prizes. Since the commencement 28,633 students had passed through the various classes in the school. Sir Wyke Bayliss, addressing the students prior to distributing the prizes, said it was for them to fulfil all that their fathers had failed to accomplish in the field of art—to make the old paths broader and safer, and to discover new ones. The artist of to-day had two things to fight against—despondency and conceit. The true artist was always trying and always failing, for beyond his highest achievements there always lay a still higher aspiration. Art was a living and a growing force. They need have no fear of heresy among their ranks, for its effect was in the end purifying. Finally, he exhorted them to study the accumulated wisdom of the centuries, and to base their own knowledge upon a personal study of art.

A GENERAL meeting of the members of the Photographic Survey of Warwickshire was held on Friday night in Birmingham, Sir Benjamin Stone, M.P., presiding. Mr. C. J. Fowler, one of the hon. secretaries, submitted the draft by-laws which had been drawn up by the council. These provided that photographs must be printed in carbon platinum or bromide, and be deposited, unmounted, with the curator, who would have them uniformly mounted upon the official mounts provided for the purpose; and that for the sake of uniformity whole-plate ($8\frac{1}{2}$ by $6\frac{1}{2}$) should be regarded as the standard size for photographs. Two or more prints of a smaller size might be placed on one mount, but enlargements beyond whole-plate were not recommended. On the proposition of the chairman, the by-laws were approved. It was resolved, on the motion of the chairman, that there should be a further exhibition of Warwickshire photographs at the Birmingham Art Gallery as soon after October 1 as could be arranged with the authorities.

BY order of the Secretary of the United States Treasury, the design of public buildings is thrown open to competition among American architects, in accordance with the provisions of the Tarsney Act of 1893. Under the new regulations information as to cost and general requirements of buildings placed in competition will be furnished by the supervising architect of the Treasury Department at Washington, who will also depute a superintendent of construction, or clerk of works, for each building; but the designing of the structure, and the general superintendence, will be intrusted to such of the competing architects as may be selected, and he will be paid for this service a fee of 5 per cent. on the amount expended on the building up to 500,000dol., $3\frac{1}{2}$ per cent. on the next 500,000dol., or any part thereof; and $2\frac{1}{2}$ per cent. on any excess beyond 1,000,000dol. The competing designs will be examined by a commission, consisting of the supervising architect and two other architects or experts in construction, who will report their conclusions to the secretary of the treasury; but the right is reserved to reject any or all plans. The first buildings to be designed under the new regulations are those at Norfolk, Va., and Camden, N.J. Among the buildings which may possibly be opened later to competition is the new Philadelphia Mint; although designs have been prepared for this building in the office of the supervising architect, they have not been satisfactory to Philadelphia people. At present competition will be restricted to architects invited by the secretary of the Treasury, who is, in each case,

to call upon at least five members of the profession in good standing to submit designs.

THE Goldsmiths' Institute Building Constuction Classes have obtained an exceptionally good report on the result of the recent May examination. Forty-one students sat for the elementary examination, and of these 24 are recorded as having "passed," while eight have obtained a "fair" mark. In the advanced stage, every student has passed, five obtaining first-class, and 19 obtaining second-class certificates. Two students of this institute have gained second-class certificates in honours. The carpentry classes have also gained distinction, all those who sat for honours having gained second class certificates, whilst two of these students recently obtained silver medals from the Carpenters' Company, and another has gained a first-class certificate at the same examination.

CHIPS.

Mr. John Phillips, C.E., late surveyor to the Metropolitan Commissioners of Sewers, died on Wednesday, the 21st, at his residence, 25, Disraeli-road, Putney, in his 81st year.

A public inquiry has been held at Pembroke, before Mr. Rienzie Walton, M.I.C.E., concerning the application of the town council for sanction to borrow £23,000 for the execution of amended schemes for the sewerage of the borough.

A joint committee representing the London, Brighton, and South Coast Railway Company, the Seaford Urban Council, the Newhaven Rural Council, and the various landowners whose property abuts on the Buckle-road, Seaford Bay, met at the County Hall, Lewes, on Monday, for the purpose of considering a report by Mr. E. B. Ellice-Clarke, on sea defence work along the foreshore of Seaford Bay. It was decided to take steps to carry out the works recommended by Mr. Ellice-Clark.

A new church of St. Paul, with schools attached, is about to be built at Blackpool, from designs by Messrs. Garlick and Sykes.

The South-Eastern Railway Company having intimated to Mr. Cumming Macdona that they are prepared to arrange for a station at or near Jamaica-road, so that their proposed loop-line may give his constituents better access to the City, the country, and the seaside, the member for Rotherhithe has withdrawn his opposition to the Bill now before Parliament authorising the construction of the said line.

Messrs. Roscoe and Lumb, who have examined the Hermite process rather closely, report that whilst complete sterilisation of sewage by the Hermite process is not practicable, deodorisation is easily obtained by the weaker solutions; and that whilst the stronger solutions of the electrolised sea-water are very unstable, and soon lose their deodorising properties, the weaker solutions are fairly stable. This process has been experimentally used at Lytham and Ipswich; it is also in successful operation at Netley Hospital, Southampton, and a fairly large plant is about to be put in operation at Bombay.

New Roman Catholic day-schools, erected at a cost of £4,000, were opened at Batley on Sunday by the Right Rev. W. Gordon, Bishop of Leeds.

In the House of Lords on Tuesday, the Whitechapel and Bow Railway Bill, which had already passed successfully through the House of Commons, passed the committee presided over by Lord Morley without opposition. The object of the measure is to incorporate a company for making railways from junctions with the Metropolitan District Railway at Whitechapel to a junction with the London, Tilbury, and Southend Railway at Bromley, the railway to be worked by steam-power or electricity.

Mr. H. A. Poyser cut, on Monday, the sod for a new church to be erected at Rhosrobin, a mining district near Wrexham. The church will cost about £1,300, and will be erected on a site kindly given by Sir Watkin Williams Wynn.

The Dowager Lady Tweedmouth laid, on Monday, the foundation-stone of a memorial chapel which she is having erected at the Northern Infirmary, Inverness, in remembrance of her late husband.

Since the failure of the Embabeh bridge the subject of railway-bridge building in Egypt has been brought prominently before the authorities. It has been stated that the acceptance of a tender from a French firm which was not much more than one-half that of the English competing firm was a mistake, as a properly constructed work could not be made for the sum demanded—viz. £81,200. This statement seems to be well supported by the fact that £33,000 have now to be expended in strengthening the bridge in question. But even then, as Lord Cromer points out, the sum will not equal that asked by the English tendering firm—viz., £138,000.

Busines was very brisk at the Mart last week, although some of the larger estates failed to find purchasers. The sales for the week, as registered at the Estate Exchange, amounted to £264,817 as against £189,067 recorded for the corresponding week of 1896. The amount, moreover, of Messrs. Edwin Fox and Bousfield's sale must also be taken into account, bringing the grand total to over £300,000.

At the Council House, Bristol, a Local Government inquiry was held, on Friday, by Mr. Rienzi Walton, M.I.C.E., the Bristol Town Council having applied for powers to borrow £58,000 for the purposes of streets improvements, and £7,060 for the provision of public baths.

Mr. Hippolyte Blanc, R.S.A., architect, has received instructions from the cathedral committee of the commissioners of the burgh of Kirkwall to visit and report upon St. Magnus Cathedral there with a view to carrying out some long-desired improvements.

The City Commissioners of Sewers decided on Tuesday to offer no opposition to an application from the Central London Railway Company for permission to proceed with the public staircases at the corner of Walbrook and Queen Victoria-street.

The statue of Joan of Arc, by Paul Dubois, exhibited in the Salon of 1895, is about to be erected at Paris in the centre of the Place des Petits Peres, opposite the Church of Notre Dame des Victoires.

At the last meeting of the Holywell Rural District Council plans were submitted of the water supply which Sir Pyers Mostyn, Bart., of Talacre, is giving to the village of Gwespyr as a memorial of the Diamond Jubilee. Sir Pyers will make and maintain the works, which will include a tank with a capacity of 17,000gal. The plans were approved.

A special service was held at the Central Synagogue, Great Portland-street, on Sunday, on the occasion of the unveiling of three windows to the memory of the late Mr. Lionel Louis Cohen, M.P. The central of the three windows bears an inscription surrounding the armorial bearings of deceased.

The town of Ashton-in-Makerfield was on holiday on Saturday when Lord and Lady Gerard drove over to lay the foundation-stone of the new Record mill at Ashton Heath. The mill is for 3,000 ring spindles, and will be three stories high. It will be lighted by electricity. It is 283ft. long and 136ft. in width. Lady Gerard subsequently drove to Wigan-road and declared open two small parks and recreation grounds on either side of the road.

Madame Patti laid the memorial stone of a new theatre at Swansea on Monday afternoon. Mr. William Hope, of Newcastle-on-Tyne, is the architect.

The Duke of Devonshire will formally inaugurate the new water supply for Eastbourne on Friday in next week, August 6. The works, which have been completed this week, have been carried out by Messrs. John Aird and Sons.

The Birmingham City Council have decided to carry out the first section of a widening of Bull-street, at an estimated cost of about £30,000. A larger scheme was submitted in February last, but was rejected, on account of the outlay involved, about £85,000.

A new school is to be erected at Nanpean, St. Stephen's-in-Branwell, from designs by Mr. Sampson Hill, architect, Redruth.

The new electric tramway from Roundhay Park to Kirkstall Abbey, a distance of seven miles, will be opened next week. The works have been carried out for the Leeds Corporation under the direction of Mr. Talbot, representing Dr. Hopkinson, F.R.S., the consulting engineer.

Tenders for the work of constructing the proposed new Congregational church in the North-West Ward at Scarborough have been accepted. The church alone will be proceeded with at present. The initial seating accommodation will be for 500 worshippers.

The Holden memorial wing of the Rochdale Infirmary was opened on Saturday by Lord Stanley, M.P.

Through failing health, Mr. J. C. Horsley, R.A., has been compelled to resign the position of treasurer to the Royal Academy, which he has held for many years.

Princess Frederica of Hanover visited South Merstham, Surrey, on Monday, and laid the foundation-stone of the new church of All Saints. The estimated cost of the church is £3,000, and towards this £1,200 has been subscribed.

The patronal festival of St. James's Church, Handsworth, on Sunday, was marked by the dedication of a stained-glass window. The window was designed and executed by Mr. T. W. Camm, of Smethwick. The work is in harmony with that of the fifteenth century, and the subject treated is the appearance of the angel Gabriel unto Zacharias.

LATEST PRICES.

IRON, &c.

	Per ton.		Per ton.
Rolled-Iron Joists, Belgian	£5 15 0	to	£6 0 0
Rolled-Steel Joists, English	6 0 0	„	6 10 0
Wrought-Iron Girder Plates	5 15 0	„	6 10 0
Bar Iron, good Staffs	7 0 0	„	8 0 0
Do., Lowmoor, Flat, Round, or Square	17 0 0	„	17 0 0
Do., Welsh	5 15 0	„	5 17 6
Boiler Plates, Iron—			
South Staffs	7 17 6	,	8 5 0
Best Snedshill	10 0 0	„	10 10 0

Angles 10s., Tees 20s. per ton extra.

Builders' Hoop Iron, for bonding, &c., £6 15s. 0d. per ton.

Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.

Galvanised Corrugated Sheet Iron—

	No. 18 to 20. Per ton.		No. 22 to 24. Per ton.
6ft. to 8ft. long, inclusive gauge	£10 15 0	...	£11 0 0
Best ditto	11 5 0	...	11 10 0

	Per ton.		Per ton.
Cast-Iron Columns	£6 0 0	to	£8 10 0
Cast-Iron Stanchions	6 0 0	„	8 10 0
Cast-Iron Sash Weights	—	„	4 2 6
Cast-Iron Socket Pipes—			
3in. diameter	5 10 0	„	5 15 0
4in. to 6in.	5 5 0	„	5 10 0
7in. to 24in. (all sizes)	4 15 0	„	5 0 0

[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]

Pig Iron—	Per ton.
Cold Blast, Lilleshall	105s. to 110s.
Hot Blast, ditto	57s. 6d. to 62s. 6d.

Wrought-Iron Tubes—Discount off Standard Lists f.o.b.

Gas-Tubes	75p.c.	Fittings	77½p.c.
Water-Tubes	70	„	72½
Steam-Tubes	62½	„	65
Galvanised Gas-Tubes	60	„	62½
Galvanised Water-Tubes	55	„	57½
Galvanised Steam-Tubes	45	„	47½

	10cwt. casks. Per ton.		5cwt. casks. Per ton.
Sheet Zinc, for roofing and working up	£22 10 0	to	£23 10 0
Sheet Lead, 3lb. per sq. ft. super.	14 0 0	„	15 0 0
Pig Lead, in 1cwt. pigs	13 10 0	„	14 10 0
Lead Shot, in 28lb. bags	16 5 0	„	17 5 0
Copper Sheets, sheathing and rods	59 0 0	„	60 0 0
Copper, British Cake and Ingot	50 5 0	„	51 5 0
Tin, Straits	61 17 6	„	62 7 6
Do., English Ingots	66 15 0	„	67 15 0
Spelter, Silesian	17 5 0	„	17 10 0

	Per ton.		Per ton.
Cut Clasp Nails, 3in. to 6in.	£8 15 0	„	£9 15 0
Cut Floor Brads	8 10 0	„	9 10 0

Wire Nails (Points de Paris)—

0 to 7	8	9	10	11	12	13	14	15	B.W.G.
8/6	9/0	9/6	10/3	11/0	12/0	13/0	14/9	16/9	per cwt.

TIMBER.

Teak, Burmah	per load	£14 5 0	to	£16 10 0
„ Bangkok	„ ...	10 10 0	„	15 0 0
Quebec pine, pitch	„ ...	—	„	—
„ yellow	„ ...	2 0 0	„	4 0 0
„ Oak	„ ...	5 10 0	„	6 10 0
„ Birch	„ ...	3 15 0	„	5 10 0
„ Elm	„ ...	4 0 0	„	5 5 0
„ Ash	„ ...	3 5 0	„	4 10 0
Dantsic and Memel Oak	„ ...	2 10 0	„	3 10 0
Fir	„ ...	2 15 0	„	4 10 0
Wainscot, Riga p. log	„ ...	2 0 0	„	4 5 0
Lath, Dantsic, p.f.	„ ...	4 10 0	„	5 10 0
St. Petersburg	„ ...	5 0 0	„	6 10 0
Greenheart	„ ...	8 0 0	„	8 10 0
Box	„ ...	4 0 0	„	15 0 0
Sequoia, U.S.A.	per cube foot	0 1 8	„	0 1 10
Mahogany, Cuba, per super foot 1in. thick		0 0 5	„	0 0 6½
„ Honduras	„ ...	0 0 5	„	0 0 6½
„ Mexican	„ ...	0 0 4	„	0 0 5
Cedar, Cuba	„ ...	0 0 4½	„	0 0 5
„ Honduras	„ ...	0 0 4	„	0 0 5
Satinwood	„ ...	0 0 7	„	0 1 0
Walnut, Italian	„ ...	0 0 3½	„	0 0 7

Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 11in.:—

Quebec, Pine, 1st	£19 10 0	to	£25 10 0
„ 2nd	14 0 0	„	16 10 0
„ 3rd	6 10 0	„	10 0 0
Canada Spruce, 1st	10 10 0	„	12 0 0
„ 2nd and 3rd	8 0 0	„	9 5 0
New Brunswick	7 15 0	„	8 5 0
Riga	7 10 0	„	8 10 0
St. Petersburg	9 10 0	„	13 0 0
Swedish	9 0 0	„	16 10 0
Finland	8 0 0	„	8 10 0
White Sea	9 10 0	„	16 0 0
Battens, all sorts	5 0 0	„	20 0 0
Flooring Boards, per square of 1in.:—			
1st prepared	0 8 6	„	0 15 6
2nd ditto	0 7 0	„	0 12 0
Other qualities	0 5 0	„	0 6 6
Staves, per standard M:—			
Quebec pipe	—		—
U.S. ditto	35 0 0	„	42 10 0
Memel, cr. pipe	230 0 0	„	240 0 0
Memel, brack	200 0 0	„	210 0 0

OILS.

Linseed	per ton	£14 5 0	to	£14 15 0
Rapeseed, English pale	„ ...	26 10 0	„	27 5 0
Do., brown	„ ...	23 10 0	„	25 10 0
Cottonseed, refined	„ ...	14 10 0	„	15 10 0
Olive, Spanish	„ ...	27 0 0	„	28 0 0
Seal, pale	„ ...	23 0 0	„	24 0 0
Cocoanut, Cochin	„ ...	26 15 0	„	27 15 0
Do., Ceylon	„ ...	23 5 0	„	23 10 0
Palm, Lagos	„ ...	20 15 0	„	22 10 0
Oleine	„ ...	18 15 0	„	19 15 0
Lubricating U.S.	per gal.	0 6 3	„	0 7 6
Petroleum, refined	„ ...	0 0 4¾	„	0 0 4½
Tar, Stockholm	per barrel	1 2 0	„	1 5 0
Archangel	„ ...	0 12 6	„	0 15 0
Turpentine, American	per ton	21 0 0	„	21 10 0

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DECORATIVE VALUE OF MATERIALS.

WITH much truth Ruskin says: "Take most pains with the best materials. Never waste pains on bad ground; let it remain rough, though looked after and cared for." This principle may be usefully applied to building materials. The commonest of them are developed and elaborated to a superfluous degree, as in those fabrics which for their cheapness have pushed their way into notice. With our surplusage of new materials there seems to be a danger of neglecting those which have the most intrinsic value for substitutes of an inferior quality, and we see this in the treatment of building stones. We have a number of very beautiful natural products—sandstones, and limestones, to say nothing of clay goods—which are neglected because of the extra labour necessary in their use or decoration, and because it is easier and cheaper to carve a soft limestone than to carve granite or a hard sandstone. Ornament, not goodness of material, is at the root. The proper use of materials in a physical and technical sense is absolutely essential. We should condemn any architect who specified a soft limestone in a smoky moist atmosphere, or used inferior Swedish timber for exposed woodwork. We expect him to use the straight-grained and strongest-fibred timber for roofs and joists which have to stand stress and heavy loading, and to use the lighter and less durable for internal work exempt from strains; and for external stonework we naturally expect him to provide harder and a more durable stone than he would do for internal work and carving. Beyond these requirements there is the decorative value of materials, and for which another set of conditions appear to be necessary. For instance, an architect may be quite justified in using a grey granite for a part of a façade exposed to rough usage, though for decorative effect a warm-coloured sandstone would have looked better; but the latter is much less durable. In making up his mind he has to weigh well which of the requirements is the most pressing—durability or appearance. If the building was going to be erected in a smoky town like Birmingham or Manchester, where damp and acids are both active agents in the disintegration of stone, the latter qualification should take a second place. Any amount of decorative effect produced by using stones of warm colour and of easy working would be sacrificed where smoke soon discoloured. How short-lived would be the effect of two or three materials of different tints; how soon begrimed with black the sculptured frieze or carved bands; and how brief the pleasure derived from marble medallions or panels, or a band of glazed tiles. If all this decorative detail is to be covered with a film of dirt and soot, so that its beauty will be lost, there will be little to choose between a grey granite front, tool dressed, and the rich inlaid front; while the greater durability of the granite will give it a claim to adoption. These are points which have to be taken into our view in determining whether durability or decorative effect is to be preferred. It is amazing to see with what indifference the ordinary professional mind uses materials. He introduces polished red or Peterhead granite columns into his white stone front, slabs of polished granite cover up his iron stanchions of the shop-front; and his vestibules and interior are covered with "art faïence," polished mahogany, or embossed plaster. It never once occurs to him whether his outside granite or stone is in harmony with these lighter fabrics. Many of our new buildings illustrate this hetereogeneous mixture of materials.

In London the chief materials employed by architects for external use are stone, granite, marble, brick, and terracotta. But it cannot be said these are generally used intelligently or with any appreciation of their physical or decorative qualities. We see a building all brick, or all terracotta or stone, just which material happens to be selected or which the architect knows most about. Apart from moulded, or carved, or modelled, work, there is nothing to give any decorative value to the material by way of contrast, and when the smoke and grime of London atmosphere has toned down the whole façade, there is little to choose between them. All are reduced to the same dull monotone of grey. Take any dozen buildings in the City or West-End, in which these materials are employed; a dull grey, or drab, and reddish brown are the only colours discernible, the fresh-painted houses and the newly-built brick and stone fronts excepted. The stucco painted front can put on a periodical garb of cleanliness and brightness, and now and then we see a brick front coloured and repointed, giving it an air of freshness; but these refacings do not last long—a dingy coating of dirt and smoke soon obscures the tints or shades of colour that have been put on, and the short duration of the painted front, in London at least, makes it a very undesirable substitute for more lasting materials.

Taking brick and stone as the materials which the architect commonly uses, we may wonder how little has been done to make them decorative. The sombre effect of smoke and age very soon robs them of their brightness, and reduces them to a dull drab. Brick buildings, with bands and dressings of stone, are common enough; but in a few years the stone becomes black or grey, and the red a dull brown or dingy black. Artistically, the toning down is an improvement, for the spotty effect of red brick and stone dressings is certainly not pleasing. Hampton Court, Chelsea Hospital, and many of the old houses and edifices of the Georgian era to be seen in various suburbs of London are examples of the agreeable tones which these two materials assume when left alone. But they can hardly be called decorative in any special sense from the architect's point of view, though from the painter of landscape and the pictorial artist nothing is more charming to the eye as a pleasing contrast of colour than an old red-brick manor-house or country mansion peering between masses of green foliage, or standing in its own park. It is in this wider sense also that we speak of the decorative value of materials—namely, the contrasting effects produced by stone and brick buildings with their surroundings.

But the decorative value of materials may be regarded in another light, and a more architectural sense—we mean the contrast afforded by the relation of one material to another in the same building, and the treatment of each decoratively. Have we not means of contrast, in red and white Mansfield, or red Corsehill stone, light yellow or brown Whitby, the Derbyshire, and other sandstones within reach? We see every day buildings in which two or three different materials are mixed together without any definite meaning. Structural and decorative feature are confused: one may be of stone, another of brick. We see a window-dressing here of stone, and there one of brick, though both may be of the same importance. Cornices, stringcourses, and window-sills are of stone, and we notice panels carved with ornament of the same stone somewhere else. In the prominent parts, as well as in the retired planes, we see the stone used. But this is not the worst fault. In all this mixture of stone and brick there is no attempt to make the most of the materials in an ornamental sense, or to say, "I shall use the stone in all the architectural features, and the red brick in the minor surfaces," or arrange the two decoratively. So our brick and stone buildings are very uninteresting directly their freshness wears off. Then we have buildings of stock and red brick—most of our London School Board buildings are of this class. Many of them have got dingy and sombre; but the two materials combine well together when used with moderation. Red gauged brick arches, courses, and quoins give relief to the stock brick wall faces; but we think the fault in most work of this kind is a spottiness of effect, an even distribution of the two colours without any decorative value. It would be much better if the red brickwork was used in certain portions of the building, and the stock brickwork in other parts—say, red brick in ground story, and the upper stories of the stock brick, but with window-dressings of red to carry the same colour through. This would be more decorative than to use stock brick in the whole of the walling and red brick in the dressings. In a market with open arches in the lower story, the red brickwork could be used throughout the piers and arches, and above the light brickwork with simple dressings in the darker material. The new baths in Kennington-road show an excellent brick contrast of red facings and gauged work in dressings.

Passing to brick and terracotta much the same rule applies. The chief mistake is to employ it in a scattered way over the front in cornices, string-courses, bands of ornament and dressings with brick between in the manner most stone dressings are done. A disjointed effect is produced, and the bands or courses are often very rough and unpleasant to the eye. The better way is to employ the terracotta in a whole part of the building, say the ground story, the material appearing again in the main windows and features above; or, say, let the terracotta be employed in the entrance porch or in an angle tower or a bay window. The work is then all aligned in proper courses, and a decorative effect is produced.

A few buildings show this employment of material in the mass. The new Metropole Hotel at Folkestone has its ground story or basement throughout of the Burmantofts terracotta, and dark red brickwork from Tunbridge Wells in the upper portion of the building. A few examples in Regent-street and Oxford-street may be noticed as in Messrs. Redfern's premises, Conduit-street, where a porch vestibule of shop-front has been entirely constructed of terracotta. Another admirable example of this treatment is seen in some recently-built premises in Parliament-street, one of the most refined and artistically-finished fronts of brick and terracotta to be seen in London. Both in the delicacy of the arch members and ornamental details modelled in terracotta, and the general design of the building, the architect has shown how these materials can be combined with effect. Those who want to see how these two materials are used together in a whole street may make a tour of inspection through the rebuilt streets like Surrey- and Arundel-streets, which lead from the Strand to the Embankment. Both the modes of combining the two materials may be seen here—we do not say always successfully. The elaborate front of the School Board Offices loses much of its effect from the want of breadth of plain surfaces; the ornamental detail, instead of being confined to certain parts like the window bays, is too intermixed. At the corner of Arundel-street Messrs. Smith's premises show a reasonable combination: the recessed window bays are in terracotta

between piers of brickwork. In Sloane-street and Hans-place these two materials have been largely used together, and here and there one may find a decorative effect obtained by simple means.

Granites and marbles are important architectural materials; but how little architects have done to show their decorative value! We see a basement or ground story executed in polished grey granite, above is an ordinary stone or brick building. Granite, when used in the lump in this way, is seldom successful. In many of the newer City offices and shops we see granite used for pilasters or piers between the windows, very durable and effective, but without any relief of colour or contrast. In Aberdeen or Glasgow we may see how these hard materials have been used with effect and decorative value as in buildings designed by the late Thomson in the Neo-Grec style. The combination of dressings of different tints like blue and brown, as, for instance, the darker polished granite for pilasters, and the redder or lighter varieties for the walls or jambs of windows, may be adopted, as it has been done in a few City buildings, and a few in Westminster Bridge-road and Oxford-street. The various colours found in Devonshire and Irish marbles from red to blue and green and black, offer architects a mode of decoration of which they have not made much. Thus from Galway come some beautiful green marbles, and from Cork several varieties of red and grey, and from Plymouth many very charming varieties from delicate greys or lilac tints to rich brown and rose-red hues, many spangled marbles in which veins of black and pink, grey and dove, and yellow diversify the surface. These very beautiful marbles are of less price than the Italian varieties, and have been sent to all parts, Italy, Africa, and India, and are supplied in slabs of 1in. to 1½in. thick, polished on one face suitable for wall decorations and interiors, also in blocks and shafts for columns. If they can stand the atmospheres of cities like Birmingham and Leeds, they will do anywhere. In treating these granites and marbles, the modes of finishing their surfaces ought to be considered;—thus they may be sanded or have a polished face, be rough or fine axed, or "finely emeried"—a source of decorative effect which can be inexpensively employed.

Of late years coloured faïences have been introduced; but how few examples of successful decoration can be pointed to! We have one instance of an open loggia to a restaurant in the Strand, in which a yellowish glazed faïence has been employed successfully. For colour contrasts the material is excellent; but many of the applications we see have failed, because the architect has not studied a scheme of decoration. The failure has been due to over-elaboration and enrichment, instead of relying mainly on broad flat surfaces of one or two tints of broken quality. One or two designs, at the National Competition Exhibition at South Kensington for interior decoration applied to a music-room and to other purposes, show the right decorative treatment of this material. Might not many of our streets and interior vestibules and halls be made to contribute colour at once decorative and restful by glazed faïence of quiet shades of green and yellow, in the name fascias, arcading, and spandrels of shops and offices, and in the surfaces of interior walls? We do not mean elaborate patterns or painted and glazed pictures of the so-called "art faïence" make, but a scheme of colour gradation arranged architecturally as a wall treatment. The frittered and piecemeal distribution of the choicer materials, whether it be gauged brickwork, stone, terracotta, or marble, destroys all decorative breadth, and is the cause of failure of most of our façades; the same quantity in main features and broad surfaces imparts grace and beauty.

NATIONAL COMPETITION OF SCHOOLS OF ART DESIGNS.

In the practical qualities of architectural design, the drawings exhibited at the National Competition at South Kensington are inferior to those of the last year or two. Two gold medals have been awarded for designs for buildings—one for a provincial market by James A. Swan, of Birmingham, and another for a memorial chapel by George A. Paterson, of Glasgow. We have seen the design for the provincial market before. It is shown by an able set of drawings, marked by some freshness and a masterly treatment of details. The plan shows a parallelogram longitudinally divided into three bays or avenues divided by open arches and pillars with two open sides, and of five bays in length for standings, and a hall or assembly-room above 81ft. 6in. by 34ft., with offices at the end and a projecting stair on one side leading to the assembly-hall. The roof is high-pitched, with *flèche*, and the upper story is pierced by mullioned windows, the whole in a Late Gothic style, of which the author shows himself to be an expert. The large detail of window-bay exhibits a free and clever treatment; the section of roof is also carefully designed; the coloured perspective is an effective drawing. The Memorial Chapel, by George A. Paterson, is of dignified monumental character in a Greco-Egyptian style, planned as a Greek cross, the arm on the left for the monument, that on the right for vestries, and the eastern arm for choir and altar, and a vestibule at the west end. The cross has a large circular area, seated in the centre, with ambulatories. A low dome crosses this part. Columns of the Corinthian order standing upon a spacious stylobate surround the central naos, and the entrance doorway is in this lower part, to which a flight of steps flanked by columns or balustrades lead. The details on a large scale show the coloured and bronze decorations. The author's work is characterised by a true Greek feeling, and clean, firmly-drawn elevations are sent. Several drawings receive silver medals. Another Glasgow Corporation student, Donald M. Stoddart, sends a design for a small art department. This scheme is Classic in design, with a domed square central compartment approached by a handsome flight of steps, having side-wings for paintings, also library and reading-room. A lecture-theatre is shown behind. Recessed Corinthian columns adorn the side wings. There is a heaviness of outline and detail, and the lighting does not appear to be sufficient. James McKissack, of the Glasgow Technical College, sends also a design for a museum and art gallery. The plan is rectangular, divided into galleries *en suite*, with picture galleries over. The building is designed in an Italian Renaissance manner, with angle cupolas and a centre dome. The details are poor, especially the windows and outline of dome. We cannot admire the design for a monument by Donald M. Stoddart, which takes a silver medal. It looks like an unfinished Gothic tower, and poor at that, with canopied figures at top and an open flat arch for the reception of the principal statue.

We next come to the bronze medal book prize designs. These are numerous, and include a few works of considerable merit, especially in the designs of a decorative character. First we notice buildings. Alexander M. Gardner, of the Glasgow School of Art, sends a design for an art department of a university, an elaborated Italian design, with centre dome, spoiled by groups of figure sculpture, and of a very poor profile. Andrew Roll, of the same school, wins a bronze medal for the same subject, also defective in its external proportions, and wide portico. The drawings are scarcely up to the mark. The design for chapter-house—we suppose the subject is given because it brings into play the skill of the student for a constructional Gothic exercise—by J. A. T. Houston, of Glasgow, is an extraordinary example of misapplied architectural knowledge. The author shows prodigious flying buttresses of the heaviest kind; the *arcs boutant* are richly traceried with buttresses of unnecessary proportions, and the details of construction not shown. But why give the subject to a student who has not mastered the elementary principles of the art? James Christie, of the same school, sends a preferable design; but the pinnacles which surmount buttresses at corners of octagon are extravagantly large. The same medal also goes to a design for a palatial club-house, Italian Renaissance, with clever details, but poor proportions and plan. A book prize is given to H. Henderson, Leeds, for a design for an institute—a well-grouped building in a free style for architecture and the arts, accompanied by an ably-drawn perspective, which deserves a higher award, and the same student's design for a village inn is also artistically treated. The same prize is won by E. Brain, of Longton (Art Class) for a country church, very simply and well treated with low tower, shown by a nice drawing. W. M. Carter, York, also creditably wins this prize for a country vicarage in a Late Gothic style, adapted to a stone district, the walling in "scutch" faced, hammer-dressed, random courses. The plan shows a large, projecting parish room, and the design is picturesquely handled, and deserves a higher place. We also notice a cemetery chapel design, and a very pleasing, quaintly-treated design for wayside inn, with half-timber and red-tile roof, by F. W. B. Yorke, of Oldbury. The same prize is given for a country house, heavy and poor in design and detail, with a plan by a novice. Who is responsible? An ambitious design for a cathedral, by H. Swanwick, Leeds, receives a book prize, though we are unable to see on what ground the award is justified. It is a Late quasi-Gothic style with segmental and pointed windows to nave and aisles, and ill-designed tracery. The central tower is storied with a cupola finish, and two other towers and spires are at the west end. The whole is devoid of feeling, and the detail is bad, as is the design of the vaulting. McGrath's design for a gate entrance is classic, and neatly executed with ink prospective.

We note a few designs for wrought iron-work. A bronze medal is give to G. Howard, of Putney, for terrace railing, and a book prize to V. A. Lawes, Warminster, for wrought-iron gates, which are rather crowded. A bronze medal is won by T. D. Bryan, of Bristol, for a pair of entrance gates treated with some skill, and a book prize goes to R. Eccles, Manchester, for a gate treatment of some merit; but on the whole the designs do not show any intelligent appreciation of smithery. In the designs for artistic metal-work a silver medal is awarded to Agnes Kershaw, Sheffield, for designs for electric-light pendants and brackets, which show some merit in adaptation and form, and a bronze medal to P. Connard, of the Royal College of Art, for a design for pendant, in which elegance and lightness are qualities.

Amongst other designs of a decorative character we may notice Herbert D. Richter's (Bath), design for a cigar cabinet and panel, for which bronze medals have been awarded. The former is a clever design, refined in treatment and detail. A silver medal for stained-wood hanging cabinet for books is awarded to W. F. Blagg, Chelsea, well treated, with a figure-subject in panel, the design and colour of which are very creditable. A bronze medal is also given to F. R. Wilkins, of the same school, for a panel design based on the poppy. One of the few high-class designs for decoration intended for a music-room is by Henry E. Crocket, of the Training Class, which receives a silver medal. The fireplace is

painted with figure-panels of a refined and suitable character, and there is much taste shown in the treatment of the panelling. The same award is given to James B. Fulton, Glasgow, for a screen in chapel of rich traceried design, and of Late Gothic. A design for a hall fireplace by W. S. Moyes, Glasgow Technical College Art Class, shows breadth and a sensible treatment. Arthur O. Carter's design for decoration of an assembly-hall, which receives a bronze medal, is very meritorious, and the silver medal design for the decoration of a Turkish bath by Alfred Coumber is worth notice for the choice and spirited treatment in terra-cotta, glass, and mosaic in dome and spandrels, and the glazed faience decoration.

A design for a piano front, an oak screen and mantel, receives a gold medal, and is by George Montague Ellwood, of Holloway School, in which an artistic treatment of materials is shown on the drawings. The decorations of mantels consist partly of gesso ornament and wrought-iron fittings. The piano front has panel in relief of St. Cecilia and other subjects, these being in gesso. A clever perspective sketch in ink for oak overdoor of music-room having six gesso panels is sent. Pillars of oak support the overdoor, and have copper bracket capitals, and the design shows freshness and originality of treatment. A fire-screen in oak with stained wood and gesso-work panels, copper, and side-leaves is pleasing and unique in design, and shows much ingenuity and taste. We may refer to the time exercises worked at local examinations in art. One of these is a pencil sketch of one bay of choir of St. Saviour's, Southwark, showing details done in four hours. Another is an architectural design made in three days of end of church with staircase turret, but in a questionable style of Gothic. A third drawing shows a timber roof. These time sketches are a useful mode of bringing out the candidate's faculty for design.

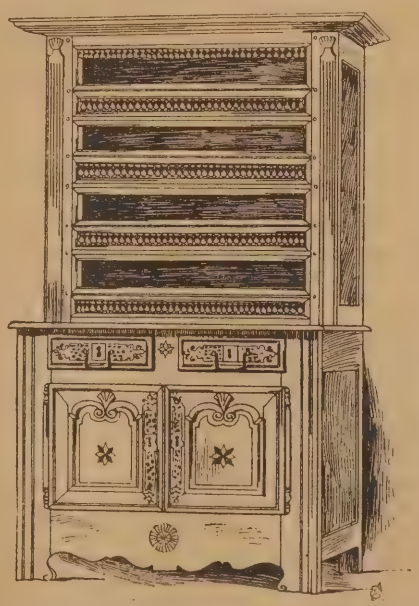
The drawings from measurement are below the average. We have seen a much larger number of examples of measured work, and those exhibited are not very high in merit, either as subjects or as drawings. One gold medal in this class is awarded to a Birmingham student, William Haywood, for measured drawings of St. Patrick's Church, Patrington, Yorkshire, and the elaborately carved pulpit of St. Chad's in Birmingham, and other drawings. The prize is deservedly won, though the subjects could have been better chosen. The drawings are in pencil. Other drawings we notice include details of Kirby Hall, for which a silver medal is given to Albert Herbert, of Leicester; measured drawings of the screen, Southwell (bronze medal), by Harry H. Goodall; drawings of oak stalls in St. Mary's, Lancaster, by Charles B. Pearson, of that place; drawings of Church of St. Mary, Stafford, by Wm. Plant, Stafford (bronze medal); measured drawings of an iron screen and gate, by W. Tomlinson, Derby (awarded a silver medal); measured drawings of a railing, by W. H. Meggs, of the same town (silver medal); measured drawings of wrought-iron gates, by Arthur E. Martin, Rugby; drawings of Broke tomb, Cobham Church, by Reginald J. Beal, Maidstone; and others for which bronze medals and book prizes are given.

Amongst modelled designs in plaster, the gold medal is given to Josiah Connor, Salford, for a modelling for an embossed wall filling, a low relief and chaste design. Another is given to Ernest G. Gillick, Nottingham, for a fireplace and side of room; the figure of a girl singing forming the pilaster or jamb of fireplace in a niched recess is well modelled, and the whole is quiet and broadly treated. A silver medal is awarded to Chas. A. Sheehan, Bristol, for a pulpit decoration. We notice also a nicely modelled design for wall docoration by David H. Hodge, of Plymouth; a design for a panel by Herbert D. Richter, Bath.

Many other departments deserve notice, but we can only mention a few of them under the class of design. James H. Rudd, Barnstaple, sends a design for metal work; a bronze medal is given to J. W. Harmstone, of the Royal College of Art, for a design for a gable containing a sundial, cleverly treated. The same prize is awarded to Philip Connard, of the same college, for an electric-light pendant. The design for wall-papers and stencilled designs comprise many of excellence and invention, and some of these are unrewarded. A gold medal is awarded to Helena R. Dow, of Glasgow, for a very appropriate design for wall-papered frieze, and to Robert Paterson, of Glasgow, for a carpet design, and to Geoffrey Alan Baker, Canterbury, for a stencilled frieze and filling—a clever and workmanlike design on blue ground, with blue and green female figures playing and reclining in the frieze. The silver medal designs by Elizabeth Davies and Christina S. Graham, Newcastle, for stencilled patterns, are bold and original in motive. A bronze medal is given to G. W. Hughes, of Birmingham, for a design showing much invention. Herbert D. Richter, of Bath, wins a silver medal for a wall-paper of much merit and quiet treatment. Robt. H. Arrol, of Glasgow, receives a bronze medal for a nice design. For stencilled designs, the works of Jennie Wood, Manchester; A. J. Madeley, of Maidstone; and C. H. Rogers have all been commended by the examiners, and receive bronze medals. We have no space here to refer to the designs for book illustrations, which are very clever. An able silver medal design is that by S. Rollinson, of Scarborough, in which the fairy-tale figures are cleverly drawn, and the arrangement is good. Margaret Thompson, of New Cross, also sends a clever design, which takes the same prize. We notice also a clever design for a lady's work-table in wood, with carved flat ornament, exceedingly quiet, by Isabel McBean, of New Cross, and some well-conceived figure designs in stained glass by Evelyn Holden, Birmingham, and a few modelled designs for metal-work by J. H. Cronshaw for bolt-plate, drawer handle, and kettle stand are very creditable in design.

A CABINET BELONGING TO THE LATE G. T. ROBINSON.

THIS cabinet was one of the few pieces of furniture belonging to the late G. T. Robinson, F.S.A., which were recently put up for



auction. It is made of stout oak, and is slightly carved and inlaid. There are two folding doors, with white metal hinges and pierced escutcheons, the two drawers above being likewise fitted with similar escutcheons and also drop-handles. In the upper portion are shelves with open baluster fronts. The total height is 7ft., and the width about 4ft.

THE HOUSING OF THE WALLACE COLLECTION.

THE committee appointed by the Treasury to consider the housing of the Wallace collection of works of art have just issued their report. The committee consisted of Lord Lansdowne (chairman), Sir W. Harcourt, Sir E. J. Poynter, Mr. A. B. Freeman-Mitford, Sir F. Mowatt, Mr. W. Armstrong, Mr. Alfred de Rothschild, and Mr. Alfred Waterhouse, R.A. The report, which is in favour of the acquisition of Hertford House for the purpose, is signed by all the members except Sir E. Poynter, who makes the alternative proposal to house the collection on the site in Pall Mall now occupied by Messrs. Hampton's furniture premises, immediately west of the National Gallery. The Hertford House collection was bequeathed to the nation by the late Lady Wallace, on the following conditions:—

(*a*) That her Majesty's Government shall agree to give a site, and build thereon a special museum; (*b*) that this site shall be in a central part of London; (*c*) that the museum shall be a "special museum," and that the collection "shall always be kept together, unmixed with other objects of art."

Four proposals for disposing of the collection were considered by the committee, namely:—

(i.) To retain it at Hertford House; (ii.) to remove it to a building adjoining, or in the neighbourhood of, the National Gallery; (iii.) to remove it to a new building to be erected upon an independent and suitable site; or (iv.) to remove it to South Kensington.

The committee were of opinion that proposal iv. would not be in accordance with the conditions of the bequest, and this was therefore dismissed from consideration. Proposals i. and ii. would comply with the provisions of the bequest in regard to centrality, and that although the retention of the collection at Hertford House might not involve the actual construction of a special museum, it would nevertheless sufficiently comply with the terms of the bequest, and be strictly in accordance with the intention of the testatrix.

As to the three alternatives thus left them, all the members except Sir E. Poynter decide in favour of Hertford House. In some cases the lighting needs improvement, and the whole collection suffers from overcrowding. The space between one picture and another is insufficient for their proper display. The large quantity of furniture now in the house would also interfere with the convenience of visitors; but under the bequest, "personal and modern jewelry, trinkets, and effects," as well as "ordinary modern furniture and chattels," do not pass to the nation.

On the advice of Mr. (now Sir John) Taylor, surveyor to H.M. Office of Works, the committee suggest that the space on the ground floor to the north and west of the courtyard at Hertford House, now occupied by stables, coach-houses, &c., could be appropriated for new exhibition galleries. These would not have any top-light, but could be well lit from both sides by windows opening into George-street, into Manchester-street, and into the central courtyard. This alteration would increase the floor-space available for exhibition purposes by about 7,000sq.ft., thus increasing the total available floor-space from some 18,000sq.ft. to some 25,000sq.ft. The length of the picture galleries on the first floor could further be increased by extending the skylights, thus converting the first floors of the eastern and western wings of the main building into exhibition galleries, lit from above. The adoption of these suggestions, or some of them, together with minor alterations, would, the committee believe, enable the collection to be worthily exhibited, and would afford ample room for ordinary visitors. As to the cost at which it would be possible to acquire Hertford House and adapt it for the purposes of a public exhibition, there is reason, it is stated, to hope that the leasehold and freehold interest may be obtained for between £60,000 and £70,000, and the cost of the alterations is estimated at about £24,000—a total cost of some £90,000. The estimate, however, is only approximate, and does not include electric or other lighting. In conclusion, the committee summarise their reasons for recommending the retention of the collection at Hertford House under the following half-dozen heads:

(i.) Such an arrangement would be in accordance with the terms of the bequest, and would, in the view of the executors, give effect to the wishes of the testatrix.

(ii.) It would, more than any other arrangement, preserve the distinctive character of the collection, and would retain it within the building in which its owners had placed it, and which they had adapted for its reception.

(iii.) It would be much the less costly of the alternatives suggested.

(iv.) It would avoid the risks inseparable from the removal and rearrangement of the collection.

(v.) It would provide a museum which, owing to its complete detachment from other buildings, would be specially free from risk of fire.

(vi.) It would avoid delay and afford the public an opportunity of entering into the enjoyment of this priceless assemblage of works of art within a few months of the present time instead of five or six years hence.

The witnesses were examined by the committee in private, and included Mr. (now Sir) John Taylor, who gave various estimates and particulars as to cost and space; Mr. Alfred Waterhouse, one of the members of the committee, who said he viewed the decoration of the rooms of Hertford House as a most valuable portion of the bequest; Mr. Murray Scott, Mr. Charles Davis, Mr. J. P. Heseltine, one of the trustees of the National Gallery; and Sir E. Poynter. A number of plans of Hertford House are appended to the report, as well as a plan of the National Gallery.

The following have been recommended by the Treasury as trustees of the collection:—The Earl of Rosebery, Sir Edward B. Malet, Sir John Stirling Maxwell, M.P., Major-General Sir Arthur Ellis, Mr. A. B. Freeman Mitford, Mr. Alfred C. de Rothschild, and Mr. John Murray Scott, who is required by the terms of the will to be a trustee. Mr. Claude Phillips has been appointed keeper of the collection.

The Government have lost no time in acting on the report, for a supplementary estimate has already been issued for the purchase of Hertford House, the sum asked for being £80,000.

THE VERDIN TECHNICAL SCHOOLS NORTHWICH.

THE schools were opened on Saturday week by the Duchess of Westminster, being a gift to his native town by Sir Joseph Verdin, Bart., D.L. The schools are built on a corner site, the two principal façades being well broken up and enriched with terracotta ornament and stringing. The main entrance is splayed on the angle of the building at the junction of the London-road and the Crescent, forming a very pleasing break to the front. Over the main entrance, inclosed in a bold panel, are the words, "The Verdin Technical Schools and Gymnasium," the pediment on which this is placed being supported on angle piers, corbelled out, and finished with enriched capitals.

Over the entrance to the art school, fronting London-road, are erected representations of Science and Art, splendidly modelled, and enriched with festoons of flowers and fruit.

A large ornamental panel is also placed in the principal façade fronting London-road, representing Painting, Sculpture, Music, and Science. The figures are admirably composed and modelled, and form a feature of great interest to the building.

A large polished granite panel is placed in the front, near the principal entrance door, surrounded by a terracotta frame with two specially-modelled figures supporting each side; carved on the granite panel in bold style is an inscription.

The building, as before stated, has two entrances, with vestibule and spacious entrance hall communicating with corridors, which form a square with an area in the centre, thus admitting light and ventilation all round; two means of exit are also formed at the back.

Mullioned and transomed windows in terracotta are provided to the two main fronts, and gables are surmounted with terracotta copings, terminals, and ornamental scrolls of special design. All the external facework is built with red Ruabon stock bricks, all of which, including terracotta, has been supplied by Mr. J. C. Edwards, of Ruabon.

Plans of the two principal floors are given on our illustration, which will show the general accommodation provided, which includes four classrooms, 21ft. by 25ft. 9in., divided with Strapps' latest patent sliding partitions, supplied and fixed by Messrs. John Heywood and Sons, of Manchester; also all the internal fittings, including laboratory fittings, &c. There is also a gymnasium, cookery and laundry classrooms, carpenters' and plumbers' workshops, committee and cloakrooms on the ground floor.

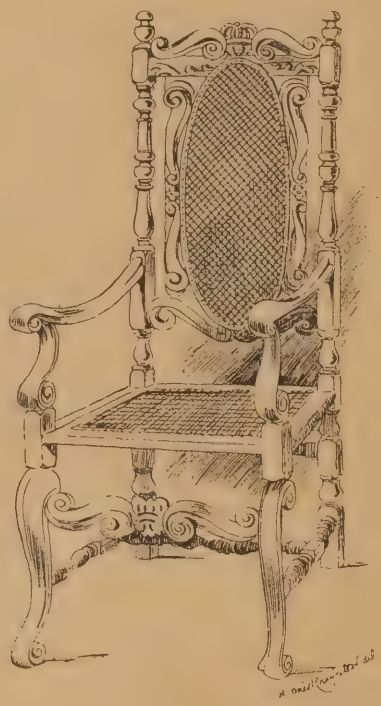
On the first floor is placed the chemical and physical laboratories, with preparation room, and also lecture room. The art rooms are placed on the north side of the building, well-lighted, with large windows cut up into the roof, and glazed with plate-glass, including elementary art, 28ft. by 25ft.; art room, 41ft. by 32ft.; art masters' room, 20ft. by 14ft.; storeroom, 14ft. by 12ft., and modelling room, 18ft. by 12ft.

The heating is by low-pressure hot-water pipes and ventilating radiators. In addition to the ventilating radiators a system of automatic ventilators has been carried out by Messrs. E. H. Shorland Bros., of Manchester.

Several stained-glass windows are in the main and art entrances. The whole of the building has been executed from designs, prepared by Mr. Joseph Cawley, M.S.A., architect, of Northwich, by Mr. William Molyneaux, builder, of the same town, Mr. John Broadhurst acting as clerk of the works, the total cost, including site, being £12,000.

A CHARLES II. CHAIR.

CHAIRS, like the Charles II. arm-chair, with scrolls and volutes freely used, and with cane seats and backs, were in use during the latter part



of the 17th and well on into the 18th century. The volute-like front legs in the subject of our sketch turn inwards at the feet; in many cases they turn outwards. The total height is 4ft. The width of seat, out to out, in front is 1ft. 10½in., and at the back 1ft. 6in.

THE ARCHITECTURAL ASSOCIATION EXCURSION, 1897.—I.

[WITH LITHOGRAPHIC ILLUSTRATIONS.]

THE late Edmund Sharpe, of Lancaster, the founder of the annual excursions of the Architectural Association will only be recollected by those excursionists who joined during the early years, when these useful and enjoyable outings were originated, and yet Lancaster, where he lived and practised, has for the first time only now been chosen as the headquarters for the party. As a Gothic revivalist, Sharpe's leading aim was to inspire young architects with the same enthusiastic love for Ecclesiastical detail of 13th-century date as that with which he himself was actuated, and, moreover, it was a *sine quâ non* with him to measure and plot, on the spot, mouldings and carvings of various periods so as to classify and tabulate them on scientific principles, always, be it noted, with the leading idea of furthering the purist's view of the revival of Mediæval Architecture generally and of the Lancet period in particular by preference, and at all hazards certainly aiming at its restriction to nothing later than the style contemporary with Richard II. Perpendicular English Gothic five-and-twenty years ago had few active admirers and no advocates. The turn of fashion in favour of the "Late and Flat," more recently set in motion by the late John Dando Sedding in favour of Tudor work, had in Sharpe's days hardly commenced, and so he was enabled by his personal charm and strong individuality of character to direct the studies unchallenged and marshal the industry of those who were attracted by his enthusiasum to follow his lead in these sketching trips. Early and late were the members at work, catching trains at all sorts of impossible hours, and ever making indefatigable efforts with the best of good will to keep pace with the serious enterprise of Edmund Sharpe, their cicerone—a task which at times led the less energetic, at any rate, to the opinion that these outings had lost their holiday guise more completely than had been contemplated. This ideal after Sharpe's lamented death became a memory only, and although the late George Edmund Street once called the A.A. excursions, as thus conducted, "architectural scrambles," those who took part in them never lost sight of the industry which their founder's methods of work inculcated, and for many years on each occasion after the final dinner it remained the custom for the week's work to be circulated for emulation and criticism. In this way, undoubtedly, much good work was done. Taste gradually saw a change, church-work no longer exclusively engaged the attention of the excursionists, while visits to old mansions and manor-houses in search of domestic architecture not infrequently became associated with hospitality on the part of the owners which scarcely accorded with the rigid *régime* of Edmund Sharpe, and certainly at times hardly conduced to sketching and measuring up. The congenial and ever-to-be-regretted John Loftus Robinson, the hon. photographer to the excursion for 14 years dating from 1880, introduced his irrepressible camera, and some of the members with pardonable resignation after his advent, relied unblushingly on this instrument, at least to some extent, for their records of the buildings visited. It is not thus difficult to realise how the holiday side of these excursions, as time went on, began to assert itself, particularly as men's minds had turned to seek inspiration from the buildings which originated in the opulence of the Renaissance, while even the productions of the less refined convivialities associated with Queen Anne's times may possibly have exerted some influence in the direction indicated, which scarcely the Puritanical tendences of a Dutch William could moderate or recall. "Free Classic," anyway, seemingly justified greater freedom in more ways than one. The absence of any concerted plan, too, left everyone unrestrained in the method of his working, the quartermaster's whistle alone remaining to assert the necessities of the programme. The leadership, on these occasions, of the successive presidents of the Association has approached, of course, nothing like the standard inaugurated by the founder of these outings, and so the excursions have drifted along their unrestrained and happy course, without perhaps any distinguishing records, though by no means devoid of practical utility, and, thanks to the endeavours of the hon. secretaries, always accompanied by good fellowship and mutual advantage. The admission, too, thus obtained to a very large number of private houses, many of them being in out-of-the-way situations not usually accessible, has enabled excursionists to see a vast variety of historic domestic work and antique furniture. It may be interesting, perhaps, in this connection, to give a complete list of the headquarters of these twenty-seven excursions, dating in the following sequence from 1870, when they began, the first six being arranged by Mr. Edmund Sharpe himself:—1870 Lincoln, 1871 Ely, 1872 Newark, 1874 Paris, 1875 Angoulême, 1876 Winchester, 1877 Warwick, 1878 Hull, 1879 Wells, 1880 Norwich, 1881 Worcester, 1882 Kettering, 1883 Yeovil, 1884 Bury St. Edmund's, 1885 Banbury, 1886 Town Malling, near Maidstone; 1887 Bath; 1888 Matlock Bath, Derbyshire; 1889 King's Lynn, 1890 Oxford, 1891 Shrewsbury, 1892 Taunton, 1893 Diss, 1894 Wells, 1895 Cheltenham, and 1896 Tunbridge Wells. It will thus be seen that Yorkshire has only been visited once, and Hull has hitherto remained the highest northern point till now, when Lancaster will carry the excursionists somewhat further afield, though it will be obvious that the several centres have been very well

THE VERDIN · TECHNICAL · SCHOOL & GYMNASIUM — NORTHWICH · CHESHIRE

JOSEPH · CAWLEY, MSA
ARCHITECT NORTHWICH

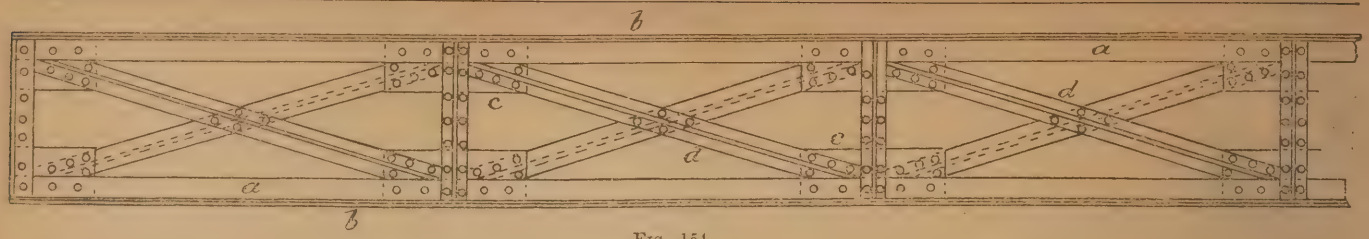


Fig. 154.

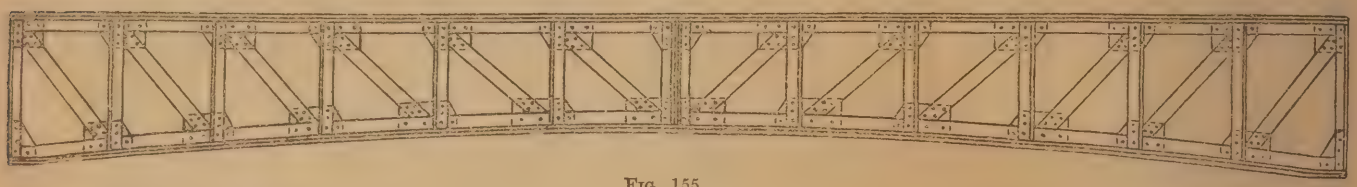


Fig. 155.

diversified, and often admirably chosen for the purpose in view. Of late years the selection has been made chiefly to include houses, as we have already mentioned, and this year this stipulation has led to the choice of a Lancashire and Westmoreland district, so as to comprise Claughton Hall, Cark Hall, Borwick Hall, Hoghton Towers, Samlesbury Hall, Livesey Hall, Levens Hall, Holker Hall, and Thurland Castle, nine well-known examples in the neighbourhood of Lancaster. We have on various occasions illustrated some of these, besides other Lancashire and Cheshire old mansions. To-day we accompany these notes with some other illustrations, so as to give our readers a more graphic idea of the places in the programme. Before passing on to these, it may be well to add that, although many of the older men have gradually dropped out of the ranks of late years, some still retain seats on the committee, and the position so usefully held for many years by Mr. H. D. Searles-Wood has now been taken up by Mr. W. Talbot Brown, the hon. sec., who is one of the original excursionists, and was personally connected with Mr. Edward Sharpe. We have no wish to anticipate the proceedings which commence on Monday, and the following descriptive particulars but briefly serve as giving a few facts concerning the places set down in the list, of which we give a copy, as follows:—

Monday, Aug. 9th, Claughton Hall, stay 1½ hours; Hornby Church, 1 hour; Thurland Castle, 45 minutes; Tunstall Church, 30 minutes; Kirkby Lonsdale, Bridge and Church, 45 minutes.

Tuesday, Aug. 10th, Cark Hall, 1 hour; Cartmell Priory and village, 3 hours; Holker Hall, 1 hour; Grange, 1 hour.

Wednesday, Aug. 11th, Borwick Hall, 2 hours; Beetham Church (luncheon), 30 minutes; Levens Hall, 2 hours.

Thursday, Aug. 12th, Samlesbury Hall, 1 hour; Livesey Hall, 1 hour; Hoghton Towers, 1½ hours.

Friday, Aug. 13th, Furness Abbey, all day; and on Saturday, Aug. 14th, Lancaster Castle, Gateway, and Church.

Lancaster itself has a history of the first consequence, and from its famous castle an excellent view of the greatest beauty is obtained overlooking Morecambe Bay, a fine expanse set off by the Westmoreland hills and the mountains of the Furness district, while the shallow Lune enriches, as it wends its way through, the fertile meadows to the left of the picture. John o' Gaunt, "time-honoured Lancaster," made the Palatine city his residence, and built the grand gateway and also the tower of the castle which bears his name. Over the archway of the gatehouse stands the modern effigy of the Duke, carved by one Nimmo, a Scotch sculptor between 80 and 90 years ago. The elevation and plans measured herewith were drawn by Mr. T. Baines and are reproduced by permission with our other line lithographic plates from the "John o'Gaunt's Sketch Book," a private and admirable publication issued for private circulation only among old pupils and friends associated with Messrs. Paley and Austin's office, Lancaster. There is no need here to recount the tale of Lancaster's story, which dates its records from the first century, when it possessed a camp on the lofty site of its existing castle. Roger de Poictou greatly enlarged the stronghold, 1094, and under the Conqueror the place was enfeoffed by nearly 400 English manors, and the whole of the county of Lancashire. There are now five towers—the Gateway Tower, the Keep, the Dungeon Tower, Adrian's Tower, and the Well Tower; the three last, the guide-book says, are on Roman foundations, which is very likely. Among the most interesting details to be noted by the architect in this district are the doorheads in stone, shaped and curiously moulded. We give five examples, drawn by Mr. W. J. Ralph—two in Lancaster itself, one near Bentham, another near Quernmore, and one from a house near Settle. They date from 1671 to 1693; but these are only a selection from the many other varieties of similar date, equally suggestive, to be seen at Wennington, Brookhouse, Torrisholme, Halton Park, Newby, Mellinghouse, and Giggleswick, as well as in Penny-street and Church-street, Lancaster. The church of St. Mary's-on-the-Hill at Lancaster was restored by the late Mr. Paley. It is chiefly of 15th-century date, and contains some good stalls and screen work, brought either from Cockersand Abbey or from Furness. The tower is only about 140 years old. Claughton Hall, one of the first places put down to be seen, is possessed of a gatehouse, with a Tudor oriel and a terrace, with two Stuart towers, which make an interesting feature. The modern church hard by has the proud possession of the oldest dated bell in the country. Its Longobardic inscription gives the year 1296. Of Hornby Church we give a drawing, by Mr. S. Wright, the zealous hon. sec. of the "John o' Gaunt's Sketch Book." It shows the tower, which is octagonal, as well as a sketch of Thornton Tower, also near Lancaster. Of Hornby Castle, towering, as it does, on the top of the hill in a fine park, much could be said, although it was "defaced, dismantled, and rendered defenceless" during the Civil Wars by order of Parliament, and so has been much modernised in the construction of the present mansion. Melling and Tunstall Churches, both of Perpendicular date, are to be seen. In the former, the unusually large remains of old stained glass are spoken of as worth noting, while in the latter the mutilated effigy of the builder of Thurland Castle is pointed out. This house is one of the few moated granges in Lancashire; but it was practically renovated by Sir Jeffry Wyatt, who destroyed everything he touched. Messrs. Paley and Austin restored the house after a fire some years since, adding thereby to its interest. At Kirkby Lonsdale, the old bridge over the Lune forms the interesting subject of Mr. W. Talbot Brown's spirited drawing accompanying these notes. Sections and plan are given with the view. From Levens Hall, Westmoreland, famous for its formal gardens, which are really rather toylike, we give three interior views, showing some of the chimneypieces, and on the same sheet is a charming group of old chairs and a monument in Cartmel Priory lady-chapel from photographs by Mr. F. Turner, of Morecambe. A view of the exterior of this famous church appeared in the Building News for June 25 this year. We shall give several other illustrations next week, including one of the gardens at Levens. Two exteriors of the hall itself were published in our issue for Dec. 25, 1891, drawn by the late J. D. Sedding.

On Saturday afternoon the corner-stones of a new Liberal club at the village of Norden, near Rochdale, were laid. The building, including the fittings, is expected to cost about £2,000.

WROUGHT-IRON AND STEEL IN CONSTRUCTIONAL WORK.—XXVI.

A FEW examples of the building up of braced girders may now be selected.

Fig. 154 illustrates a favourable form of light shallow girder. Though only 2ft. deep, it is built with lattice bracing, an advantage from the point

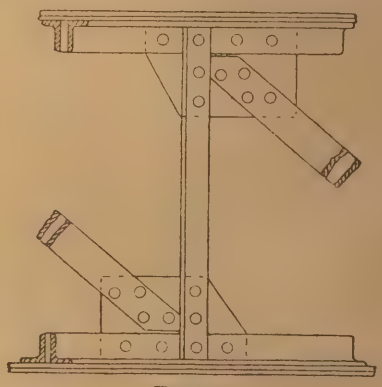


Fig. 156.

of view of appearance and of weight; this example is of the type used to support the promenade of the concert pavilion on Southsea pier. The top and bottom flanges are composed each of a pair of 3½in. by 3½in. by ⅜in. angles, *a*, riveted together with plates *b*, 7½in. by ⅜in., leaving an

Fig. 157.

open space for the gussets *c*, to which the bracings *d*, of T-section, 3½in. by 3½in. by ⅜in., are riveted; the vertical struts are also of T-section.

Fig. 155 illustrates a light girder 38ft. long, having straight top and segmental bottom flanges; it is 4ft. deep at the ends and 3ft. in the centre, The flanges are each formed of two angles, 3½in.

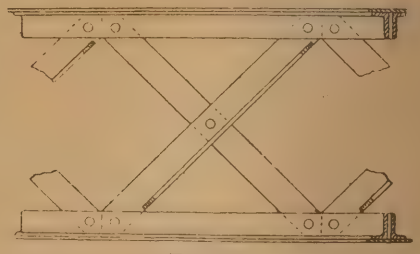


Fig. 158.

by 3½in. by ½in., connected with flange-plates; the ties comprise two bars, 4in. by ½in., and the struts, two angles, 3in. by 3in. by ⅜in., all being riveted through gusset-plates. Fig. 156 shows the joints enlarged. This is an example of a small class of girder which would have been solid plated only a few years since, but which is now

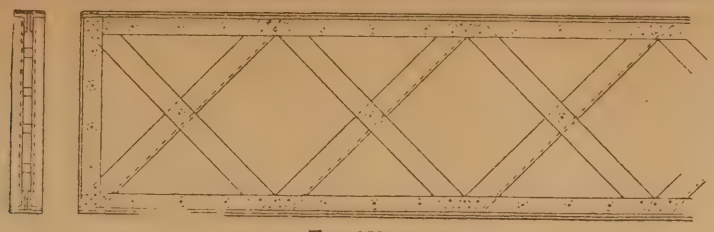


Fig. 159.

built up in a light and strong fashion. The roofs of our railway-stations and markets afford many examples of similar structures, girders so shallow as 10in. or 12in. deep being often lattice-braced rather than solid-plated. Fig. 157 is an

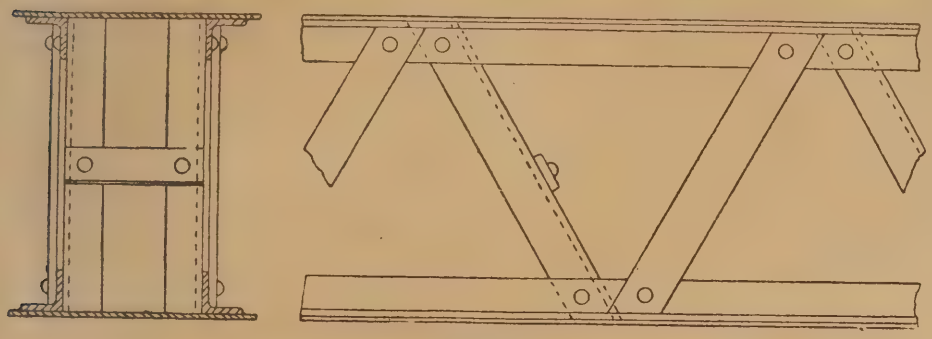


Fig. 160.

example of this kind. It is a small purlin 3ft. 10in. long by 12in. deep in the centre, built of a single 2½in. by 2½in. by ⅜in. angle for each flange, and bracings of 2¼in. by ¼in. flat bars only.

In purlins of larger size, double angles, with

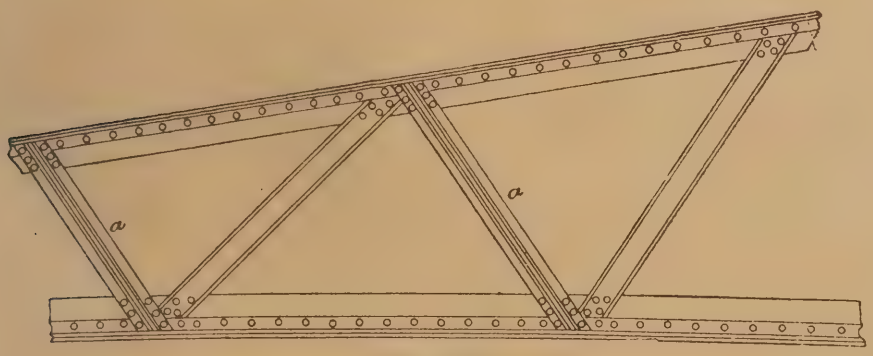


Fig. 161.

or without gusset-plates, would be used; besides increasing strength, the double angles permit of the insertion of the bars between, so rendering the structure symmetrical. If the bracing-bars are put outside of flanges of tee-section, or outside

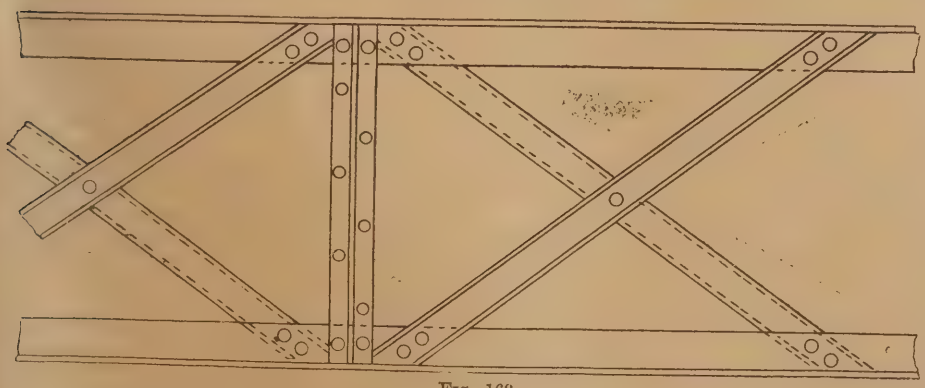


Fig. 163.

of angle-section flanges, then they must either be unsymmetrical if ranged on one side, or, if on both sides, packings must be inserted if they are crossed and riveted at the point of crossing, as they are in all but very small shallow girders.

In some cases bracings are bent slightly, in order to avoid the employment of distance-pieces, or to permit of the passing of bars which are in the same plane at the flanges. Fig. 158 shows an example of the latter kind, the flat bar and angle each passing between the double angles of the flange; not much bending of this kind is permissible, because it gives an initial set to the bars, and it would not, therefore, be permitted in any heavily-strained girders. Fig. 158 illustrates also the cutting off of the flanges of the angle strut to permit of the passing of its web between the flange angles. This is permissible, because the thrust on the angle is estimated to be taken by the rivets at the ends, and the strength afforded by flanges is of less importance at the ends than at the centre, where the bending moment is greatest.

Fig. 159 shows an example of a girder of moderate dimensions built with bars and angles, in which distance-pieces are freely used. The top and bottom flanges are formed each of two angles and a plate, the ties are each a single flat bar riveted between the angles, and the struts are each an angle, riveted outside; the flange angles are riveted together, a distance-piece encircling each rivet. The end-posts are formed of angles connected with rivets also passing through distance-pieces, and the riveting at the centre of the struts and ties is done through distance-pieces.

Fig. 160 shows how a wide light girder may be built up very cheaply. Top and bottom flanges are each made of a plate and a pair of angles separated widely apart; the tie-bars are flats riveted on the outsides of the angles, and the struts are angles riveted on the inside. The angle struts are connected and stiffened with cross braces, and might be braced still further, if desirable, by diagonal bracings, especially if the girders were deeper; if the ties were narrow, gussets would be used. At the ends where the ties are subjected to the greatest stresses, gussets

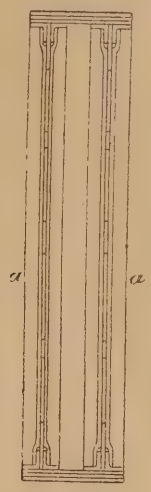


Fig. 162.

may also have to be used, even though not required about the centre.

The arched principals of large modern roofs are mostly lattice-braced, the bracing being generally either simple triangulations or simple crosses. The iron roof principals of the Machinery Hall of the 1878 Paris Exhibition were trussed girders built of angle, plate, and channel, three bays of which are shown in Fig. 161. Fig. 162 shows a vertical section at the deepest part of the principals. The top flange was straight, the bottom one curved; the straight flange was 63ft. long, composed of a plate and two vertical webs united with angles, the webs being 9·8in. apart, 7⅞in. deep, and ⅜in. thick; the angles measured 2¾in. by 2¾in. The lower curved flange was of a similar section, but stiffened towards the base with additional plate thicknesses. The vertical members of the truss were of angle-irons, *a*, grouped in pairs (compare Figs. 161 and 162), riveted on opposite sides of the top and bottom webs of the flanges. The diagonal ties were of single channel-irons, riveted outside the webs, those near the base being stiffened each with a plate riveted to their backs.

Fig. 163 shows a method of construction adopted in the bracing rafters and purlins of the Liverpool Central Station; the rafters, though 3ft. 2in. deep, have their top and bottom flanges of T-iron, connected with a single triangulation of channel-bars; the purlins are also 3ft. 2in. in depth, and the flanges are composed of a pair of angles placed back to back and connected with channel-bars. Distance-pieces are inserted at the points of crossing equal in thickness to the vertical web of the angles. J. H.

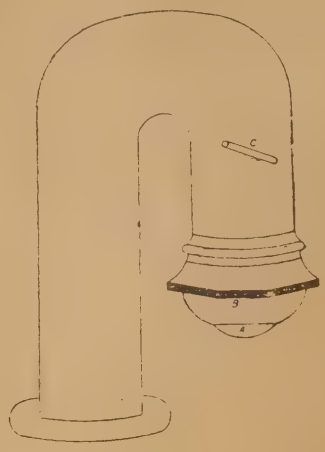
The Stanley Road Garden at Bootle was opened on Saturday. It is situated on the east side of that thoroughfare near Merton-road. It covers an area of 2,467 square yards, having a frontage to Stanley-road of 60 yards, and a depth of about 45 yards. When the corporation took possession, this land was about as rough and as unpromising a piece as could be found; but it has been levelled and drained under the direction of the borough surveyor, Mr. J. H. Crowther, and beautified under the superintendence of Mr. John Drysdale, the parks superintendent, at a cost of about £800.

ART STUDENTS' EXHIBITION AT SOUTH KENSINGTON.

THE exhibition of the works of students who have contributed to this year's National Competition of Schools of Art was opened on Monday to private view in the large iron building adjoining the southern galleries of the South Kensington Museum. The works sent in were 50,255 from 281 schools of art and branch schools, 35,560 from 298 science schools, and 11,796 from 449 art classes. The works selected for the National Competition were 5,853, of which about a fifth are hung. The thirty examiners included Mr. Walter Crane, Sir John Linton, and Mr. T. Armstrong, Director for Art. The prizes at their command were 16 gold medals, 94 silver, 255 bronze, 510 books, and in addition honorary rewards to Free Students at the Royal College of Art of three gold, 24 silver, 80 bronze medals, and 95 books in respect of 713 works contributed by them. The gold medals were won by Mr. Wm. Haywood of Birmingham for measured drawings of Patrington Church; Mr. Offlow Scattergood and Mr. J. A. Swan, both also of Birmingham, respectively for a tapestry design, and for a design for a provincial market. Mr. W. Bryan Binns, of Bristol, for model of a figure from the nude; Mr. B. G. Alan, of Canterbury, design for a stencilled frieze; Mr. W. N. M. Orpen, of Dublin, for chalk drawings, set of three, of figures from the nude; and Miss Helena R. Dow, also of Dublin, for a design for a wall-paper; Mr. George A. Paterson, for a design for a memorial chapel, and Mr. Robert Paterson, for a carpet design, both of Glasgow; Miss Alice Mary Appleton, of Hammersmith, for designs based on a flowering plant to fill given spaces; Mr. G. M. Ellwood, of Holloway, for a design for a piano-front; Mr. A. H. Baxter, of Leicester, for a design for the interior decoration of a library; Mr. Ernest G. Gillick, of Nottingham, for modelled design for a fireplace; Mr. Josiah Connor, of Salford, for modelled design for embossed wall-filling; Mr. R. W. Levick, of South Kensington, for a modelled small figure group of two wrestlers, remarkably finely conceived and executed—the Princess of Wales' Scholarship of £25 was also awarded to this student; and Mr. Alfred Champ, for model of a figure from the antique. The three gold medals to the students of the training class of the Royal College of Art were awarded to Mr. Robert Andrews, for a chalk drawing of the Laocoön; to Mr. Charles A. Eva, for studies of historic styles of ornament; and to Mr. Harry Watson for sketches from the nude. The reports of the examiners speak highly of Mr. Champ's study of the Bronze Hercules as admirable in the rendering of the action and character of the original. The modelled figures by Mr. Andrews and by Mr. Orpen are also praised. The section of laces, embroidery, and carpets again this year receive the approval of the examiners, who note a distinct improvement in the taste and selection of pattern forms. They say that there would seem to be quite a new impulse in the treatment of simple floral and linear forms. They add that quite remarkable taste and invention are sometimes shown in these designs and their suitability to the material is to be seen in the executed work.

A NEW ANTI-SIPHONAGE CLOSET-TRAP.

THERE have been various methods adopted for the contrivance of anti-siphonage traps for closets and other sanitary appliances which, with a varying degree of success, may be said to have accomplished the end in view. Mr. P. T. Ardley, of 6A, Stopford-road, Walworth, has patented a siphon made of brass or other metal to attach to the crown of the trap, and having at its turned-over end an indiarubber ball attached to a guiding-pin working in a slot, and so seated that the vacuum caused by the flushing of the trap to which this arrangement is attached lifts the ball, obtaining thereby at once a fresh intake of air by suction, and thus stopping all likelihood of siphonage. As the ball by its own weight resumes its place over the inlet-hole, an escape of soil gas is prevented. The simplicity of the patent is its chief recommendation, and the novelty mainly consists in the automatic action of the siphon, which, when properly fixed and kept free from corrosion, can hardly go wrong. The rubber ball is readily renewed. In the sketch, A is the rubber ball spindle or other valve, B the brass or other seating for the same, C is the bar or guide to prevent ball from passing over the top of siphon, and D the siphon, of brass or other material. It will readily be seen that the adoption of this trap will save much material and labour at present consumed in



carrying the long pipes to the tops of the houses. Its cost is very small, and it can, of course, be made of any material.

The memorial-stone of the new board school now being erected in the Essex-road, Little Ilford, E., was laid on Thursday, July 29 last. The schools are designed to accommodate 1,582 children—i.e., ground floor (infants), 582; first floor (girls), 500; second floor (boys), 500. The builders are Messrs. Wm. Gregar and Son, Stratford, E., the contract sum being £14,168 7s. 4d. The architect is Mr. S. Jackson, 65, Fenchurch-street, E.C., and Manor Park, Essex.

The directors of the Midland Railway Company have sanctioned the proposed arrangement for building a new bridge over the railway and river at Burton End, Melton Mowbray, and have authorised the work to be included in the company's Bill for next session. The estimated cost of the bridge is £12,000, the Leicestershire County Council and the Melton Mowbray Urban District Council each contributing £1,000, and the railway company finding the remaining £10,000.

The Honourable Mrs. Meynell Ingram, of Hoar Cross, has lately presented, for use in Lichfield Cathedral, a processional cross, and the Chapter have accepted it. It was purchased in the island of Corfu; it is of Italian workmanship, of the 13th or 14th century, made under Byzantine influence, the material copper, first silvered and then richly gilt. The cross is embossed with figures on both sides. On the obverse it has in the centre the crucifix, with figures of St. Mary and St. John in the quatrefoil ends, right and left, and a censing angel above and below; on the reverse is a figure of Christian glory, with the emblems of the Four Evangelists at the four ends. The whole is chased and much enriched with raised borders or edges.

Miss Harrison performed, on Saturday morning, the ceremony of opening a new post-office which has just been built at Lydney at a cost of £2,000. The building was erected by Messrs. Kear and Son, from plans by Mr. Howard Howells, of Lydney.

The memorial-stones of a Wesleyan school-chapel were laid on Saturday afternoon on a vacant piece of ground in Ladypit-lane, Beeston Hill, Leeds. The building will be of brick, with stone dressings, and will be seated for 250 persons; adjoining it will be three classrooms. Mr. G. F. Danby, of Leeds, is the architect. The contracts for brick and stone work have been let to Mr. W. Schofield, and that for joinery and carpentry to Messrs. J. Tomlinson and Son. The cost will be about £1,250.

Rapid progress is being made with the work of erecting the memorial to the late Prince Henry of Battenberg, governor of the Isle of Wight, at Carisbrooke Castle, by the conversion of the old gateway into a museum for the reception of interesting objects connected with the island and with the history of the castle itself. The programme of alterations includes the remodelling of the gatehouse and the conversion of the guardroom and portcullis chamber into a museum.

Good progress is being made by the Great Western Railway Company with the doubling of their line through Cornwall. On Sunday another section—that between Grampound-road and Probus—was opened for traffic, and the section between Burngelow and Grampound-road is nearly ready for inspection.

OBITUARY.

Mr. George Elkington, the senior member of the firm of George Elkington and Son, died a few days ago at Worthing. Mr. Elkington was in business as an architect and surveyor from 1847 to 1895, for the last 20 years of that time in partnership with his son. From 1854 to 1895 he was a Fellow of the Royal Institute of British Architects, but for the past two years has been on the list of Fellows retired from practice, and he also held for many years the appointment of surveyor to the vestry of Bermondsey under the Metropolis Local Management Act. He was a past-master of the Coopers' Company.

CHIPS.

Romney's portrait of Sir John Stanley has been purchased for the Louvre.

The Court of Common Council decided last week to hold another loan exhibition of pictures at Guildhall next year, illustrative principally of the French school.

The President of the Local Government Board has decided to appoint a Departmental Committee to inquire concerning the disposal of the sewage of large towns and cities.

The Lancashire and Yorkshire Railway Company are making preparations for the extension and improvement of Rosegrove Station, which, when completed, will be one of the most important in North-east Lancashire. The contracts involve an expenditure of some £100,000.

The urban district council of Ilfracombe have resolved to borrow £2,956 for a market and various improvements.

The foundation-stone of the new board school at Ketley, near Wellington, Salop, was laid by the chairman of the Wellington School Board on Friday. The builders are Messrs. R. and J. Millington, Oakengates, and the architect is Mr. C. R. Dalgleish, of Wellington. When complete, the building will accommodate about 350 children, and cost the sum of £2,800.

Mr. R. M. Littler, C.B., Q.C., chairman of the Middlesex County Council, laid on Tuesday the foundation-stone of the new police-court which is to be erected at the corner of Archway and Bishop's roads, Highgate. The building, which is to cost £6,000, is being built of red brick, with stone dressings, from the designs of Mr. F. H. Pownall, the architect and surveyor to the Middlesex County Council. The site cost £5,000.

Mr. Robert H. Bicknell held an inquiry on Friday, at the Croydon Town Hall, on behalf of thd Local Government Board, into the application of the Croydon Corporation for sanction to borrow the sum of £32,000 for the erection of new waterworks adjoining a well lately sunk at Waddon. Mr. Balfour Browne, Q.C., appeared in support of the application, which was opposed by Mr. Reginald Bray on behalf of several ratepayers and millowners on the River Wandle.

New board schools have just been opened in Ings-road, Wakefield. They accommodate 600 children, and cost £14,500. Messrs. W. and D. Thornton, of Wakefield and Dewsbury, were the architects, and the contracts were carried out by local tradesmen.

A new synagogue in Highfield-street, Leicester, was opened last week. It measures 34ft. by 38ft. Under the gallery is a schoolroom, shut off by revolving iron shutters.

The City and Waterloo Railway is expected to be opened for traffic at the beginning of next year. The two terminal stations are being constructed, and the rails are being laid, while the electrical installation at Waterloo is in progress. The chief delay is anticipated in connecting the City terminus with the central subway in front of the Royal Exchange, as a maze of sewers, electric, gas, and water mains has to be encountered, diverted, and reconstructed before the junction can be effected.

At Upton, Torquay, new Church schools have been opened, adjoining St. James's Mission Hall. They accommodate 300 children, and cost about £2,800. Mr. Edward Richards, of Torquay, was the architect, and Mr. S. G. Trethewrey was the builder.

A new Calvinistic Methodist Chapel at Berthen, Lixwm, Flintshire, was opened last week. The new chapel, which replaces an old and dilapidated one, has a front elevation of local stone, with circular windows dressed with sills of Halkin stone. The interior fittings are of pitch-pine, and there is seating for 150 persons. Mr. Edward Davies, Ffynnonycyff, has also provided a new schoolroom. The chapel was erected by Mr. Richard Jones, contractor, Holywell, from plans prepared by Mr. James Hughes, Denbigh. The total cost has been about £500.

Building Intelligence.

Aberdeen.—Alterations and improvements of considerable magnitude are at present being effected in the internal arrangements of the head office of the North of Scotland Bank, from plans by Mr. A. Marshall Mackenzie, A.R.S.A., of Aberdeen. No alterations will be made to the exterior, now more than fifty years old, which is locally regarded as one of the finest examples of architecture and of granite construction in the city. The windows to Union-street and King-street will, however, be modernised by the removal of the present small panes of glass, and the substitution of one large sheet of plate-glass in each window. In order to enlarge the telling-room a 2ft.-thick stone wall running right through the building, 50ft. long and 18ft. high, has been entirely removed by the contractors, Messrs. James Abernethy and Co., Councillor Duguid, and Messrs. M'Robbie and Milne. Steel beams and pillars now bear the weight of the upper structure. By the removal of the stone wall and the getting rid of passages on either side about 11ft. has been added to the width of the telling-office, while the officials' rooms have been rearranged. The outer vestibule leading to the telling-office is to be lined up to the height of 9ft. with polished granite of three kinds—Rubislaw, Corrennie, and Kemnay—while the lintels and jambs of the two doorways are to be of the same materials. The floor of the vestibule will be laid with marble mosaic, having the name of the bank in the centre. The floor of the telling-office will also be of marble mosaic. In the centre, between the entrance door and the counter, the bank's shield and motto on a large scale are introduced, the surroundings being Scotch thistles, panels, and scrolls. The walls of the telling-office, up to the height of 5ft. or 6ft., are to be lined with polished marbles of four different kinds, while round the walls at intervals thirteen marble pilasters to match the dado, each 15in. wide, will run from floor to ceiling, the bases and capitals being carved. The two large central pillars will be of marble to match the others. The jambs and lintels of all the doorways inside the telling-office will be of Sienna marble. The granite work is in the hands of Messrs. Alexander Macdonald and Co., Limited, while Messrs. James Bannochie and Sons are supplying the marble and the mosaic floors and at the same time executing the plaster-work. For the frieze of the telling-office Mr. Mackenzie has secured exact copies from certain of the Elgin marbles in the British Museum, the depth being about 3ft. The ceiling will be gilded. The electric light is being put into all the offices, safes, vaults, &c., by Messrs. Shirras, Laing, and Co. Messrs. M'Robbie and Milne are making the counters, desks, &c., and execute the other woodwork, whilst Messrs. George Donald and Sons supply all the glass and carry out the painting and other decorations.

Burslem.—A plot of land, formerly the site of one of the principal residences in the Potteries, that once occupied by the late Mr. Edward Wood, Hope House, Burslem, has been secured by the Roman Catholic body, for the accommodation of their Burslem mission. The site fronts Hall-street, and on the rear portion of the land a building to comprise a school-chapel has been commenced, the front pertion of the land being held in reserve for the erection of a permanent church and presbytery at some future time. The erection now undertaken will be of a plain character, in red brick, the schoolrooms being on the first story and the chapel above them, the windows of the latter having traceried lights to distinguish it from the schoolroom below. The school buildings are planned to give accommodation for 130 infants and 224 boys and girls in a mixed school. The church will accommodate 368 worshippers, and there are seats for a choir of 18 in the sanctuary. Priests' and choristers' sacristies are provided. The building contract has been let to Mr. W. Cooke, of Burslem, whose tender was £2,254, and the cost will be increased by the requisite fittings to £2,600. Messrs. R. Scrivener and Sons, of Shelton, are the architects.

Cummock.—The free church at Cummock, Ayrshire, is about to be rebuilt as a memorial to the late Hew Crichton, who died last year at the age of 97 years. The new church will be on plan a truncated cross, the end of the longer arm pointing to the Ayr-road. The elevation has a central high-pointed gable finished with a cross, with a buttressed tower surmounted by a spire on one side, and a smaller gable relieved by buttresses terminating in ornamental pinnacles on the other side. The main entrance door is in the centre of the front gable, and will be approached by a flight of steps. It will have on either side lancet-headed windows for lighting the corridor. The front gable is pierced by two two-light large windows filled with tracery, while above these is a circular window with moulded flowing tracery. The tower and spire rise to a height of 140ft., and the angle buttresses of tower terminate in moulded pinnacles with finials and carved crockets. The side elevations will be pierced by four-light and three-light windows filled with mullions and tracery work. The style adopted is the Decorated Gothic, and the flowing window tracery partakes somewhat of the Flamboyant treatment. Internally the church will have a front entrance corridor 8ft. 6in. wide, at one end of which is placed the session-room, with classroom above, while the tower at the other end contains the gallery stair, with side entrance door. The nave will be 44ft. wide, and the transepts 52ft., with a length from front corridor to back wall of apse of 68ft. The back wall will be broken up by an opening 27ft. wide, beyond which will be placed a raised platform containing the pulpit and elders' seat; and still farther back there is to be an apse, providing accommodation for organ and choir. The church will be seated for about 500. Behind the church there will be a hall which will hold 150, and the minister's vestry. The roof of the church will be lined with pitch-pine, and will be open to the collar beam, and the pews will also be of pitch-pine, with moulded ends. The church and hall &c., will be heated by hot-water pipes, and will be ventilated at the ridge. The architect for the buildings is Mr. D. Menzies, York-place, Edinburgh. The contractors are all local men, the Provost of the town (Mr. Richmond) being the builder.

Golcar, Huddersfield.—On Saturday afternoon, Sir James Kitson, Bart., M.P., Lord Mayor of Leeds, visited Golcar for the purpose of opening the new Sunday-school premises erected on the site on which stood the old chapel, built in 1834. The school contains thirteen classrooms, infants' schoolroom, secretary's room and library, and an assembly-hall 76ft. long by 36ft. 6in. wide. A reading-room and a conversation-room and gymnasium are also provided for the young men. The floors throughout are laid with wooden blocks on concrete. The front elevation is in the Renaissance style, built of Elland Edge pitch-faced wall-stones and Crosland Hill ashlar dressings. The internal joiners' work is of pitch-pine, varnished; the roof is covered with blue Westmoreland slates. Accommodation is provided for 700 persons. The work has been executed by the following contractors, viz.:—Masons, Messrs. A. and T. Haigh, Golcar; joiner, Mr. William Lockwood, Golcar; plumber, Mr. John Marsden, Huddersfield; slaters, Messrs. T. Longbottom and Sons, Huddersfield; ironwork, Messrs. G. W. Crosland and Co., Huddersfield; plastering and painting, Mr. Wilson Armitage, Golcar; wood block flooring and concreting, Mr. John Cooke, Huddersfield; heating apparatus, Mr. F. Milan, Huddersfield; electric bells, Mr. Fred Taylor, Golcar. The work has been carried out from the designs and under the superintendence of Mr. J. Berry, architect, 9, Queen-street, Huddersfield.

Manchester.—A sitting of the Consistory Court for the diocese of Manchester was held on Friday before Chancellor Vernon Smith in the Derby Chapel, at the Cathedral. A faculty was provisionally granted at St. Michael's, Flixton, to take down the east walls of the chancel and south aisle, to open out the present vestry, form a clergy vestry and organ-chamber south of the chancel, and carry out other alterations. The Chancellor granted faculties for the following purposes:—For the placing of stained glass in the west-end window of St. Clement's, Urmston; for the placing of stained glass in a window on the south side of the church of St. James-the-Less, Ancoats; for the removal of the choir organ and seats and other alterations at St. James's, Oldham; to erect a chancel-screen at St. Mary's, Balderstone, Rochdale; to place three stained-glass windows, with Scriptural subjects, in the chancel of St. Anne's, Edgeside; to remove and replace the roof of the church of Heapey, near Chorley, put in a window, and erect a new porch; to place a stained-glass window on the north side of St. Mary's, Crumpsall; to erect a gallery for the ringers in the tower of the parish church of St. Lawrence, Chorley, and a wooden screen, and to remove portions of pews; to replace choir seats in the chancel of St. Paul's, Withington, and erect a sedilia and choir-organ; to place a marble tablet on the wall of the north side of the church of St. John the Evangelist, Hurst; and to erect a credence in the north wall of the chancel of St. Edmund's, Falinge.

Newcastle-on-Tyne.—A new Exchange is about to be built at the centre of the Quayside, on the site of the Three Indian Kings and other properties, with a frontage of 50ft. The entrance leads to a vestibule, 20ft. wide by 39ft. long, the height being 18ft., from which one door opens to the newsroom and another to the exchange. The newsroom will be 28ft. wide by 44ft. long by 18ft. high, and will have four large windows facing the Quayside, in addition to which north light and ventilation are obtained over the telegram recess. The exchange hall occupies the major portion of the site, having a floor area of 5,115sq ft. The proposed height is 30ft. to the ceiling; the domes spring from this line 10ft. higher. The lighting will be principally from the top, by means of three large domes, 24ft. diameter, each surmounted by automatic ventilators, to prevent down draught. In addition to this there will be large windows at each end of the hall, near ceiling, so that expensive mechanical arrangements for ventilation can be dispensed with. There are no columns in the centre of the hall, and the floor is level throughout. The secretary's office opens out of hall, through the clerks' office, which is top lighted. A door at north end of hall gives access to the board-room, 28ft. by 17ft. and 16ft. high, with top light and ventilation, and having an open fireplace. This room could be used during 'Change as a conversation or smoke-room if desired. A smoke-room or luncheon-room, and with a service-pantry, with lifts, are also provided. Mr. Charles T. Marshall, M.S.A., 4, Northumberland-street, Newcastle, is the architect.

Swansea.—The Vicar writes that "the parish building committee have made preparation to go on with stage 2 (the chancel, tower, and vestries) at once. The total sum paid in is £15,000, being £14,000 to cover the nave and £1,000 towards stage 2. In order to go on without a break in the rebuilding, £2,000 must be paid in immediately, in order to complete the £3,000 which the chancellor of the diocese requires to be in hand before he signs the permission to take down the old chancel." The new nave was opened by the Bishop of St. David's yesterday (Thursday).

A new bridge, which has been constructed at Port Sunlight, across a tidal arm of Bromborough Pool, was formally opened on Wednesday week by the Right Hon. George H. Reid, Premier of New South Wales. The new bridge, which connects a portion of Port Sunlight Village with the high road running from Birkenhead to Chester, has been named the Victoria Bridge, and is in one arch of masonry of 100ft. clear span. It has been built from plans by Mr. William Owen, and will add greatly to the convenience of the inhabitants of the village, in which there is now a population of 952 living in some 350 model cottages.

A Local Government Board inquiry on the Cheltenham Municipal Buildings Scheme was held on Thursday and Friday in last week. Mr. E. R. Robson, F.S.A., of London, architect to the Education Department, who prepared the plans, said the buildings would be in one block, with a frontage of 120ft., and have four public entrances. The whole of the eastern side and nearly half of the front would be for administrative purposes, and the remainder for a kursaal and pump-room, which was estimated to cost £24,000—pump-room £21,000, and winter-gardens £3,000. The objections submitted by Mr. Gibbons on behalf of the opponents to the scheme were that the building was not to be erected on a proper site, and was extravagant, and that the majority of the ratepayers were against the scheme.

The contracts have just been signed for the north block of the new Admiralty buildings at Spring-gardens. It was to make way for this block that the clearance of the greater part of New-street was recently made. The new block, which will be occupied by the clerical staff, will be of about the same dimensions as that already completed, and of similar design, being from plans by Messrs. Leeming and Leeming, the architects of the first portion; but, as some of the ornamental features are to be omitted, it will be even plainer than the portion recently erected. All that now remains of New-street are some temporary Admiralty offices and the chapel.

Engineering Notes.

Hudson River Improvements.—Lieut.-Col. William Ludlow, Corps of Engineers, U.S.A., has reported to the United States Government regarding improvements in the Upper Hudson River. Before the improvements began, the navigable depth in the channel between New Baltimore and Albany was 7½ft. at mean low water, and between Albany and Troy 4ft. The result of the dredging has been to increase the width and depth of the shoalest portions to 250ft. and 11½ft. respectively. Between the railroad bridges at Albany the 12ft. channel was widened to about 400ft., then to the Breaker Island rocks the 12ft. channel is from 200ft. to 400ft. wide. The channel from Breaker Island Rock to the lower side cut of the Erie Canal, at Fort Schuyler, is 12ft. deep at mean low water for a width from 40ft. to 120ft. The cost of the improvement under the present project is about 2·3 per cent. of the value of the commerce benefited.

CHIPS.

The memorial window to the late Bishop Thorold in the Lady Chapel of Winchester Cathedral, which is being filled with stained glass, from designs by Mr. C. E. Kempe, will be dedicated to-morrow (Saturday) afternoon by Bishop Barry.

On Saturday afternoon a new Primitive Methodist church and schools in Park-road, Blackhill, were opened by the Mayor of Newcastle-on-Tyne. The total cost of the building (exclusive of the site) is about £3,000. The church, which will seat 200 people, measures 67ft. by 43ft., its height from floor to ceiling being 31ft. In the schoolroom adjoining there is provision for 400 children. The designs were prepared by Mr. George Race, of Westgate, Weardale, and the work carried out under his supervision. Mr. William Whitfield, of Elm Park, Medomsley, was the main contractor; the joiner work was done by Mr. Race; plumbing, Mr. L. Urwin, Shotley Bridge; painting, &c., Mr. Surtees Leslie, Shotley Bridge; and the plastering, cementing, &c., Mr. David Ormerod, Blackhill.

The park which has been presented to the borough of West Bromwich by the Brothers Kenrick will be opened on August Bank Holiday. The total area of land, which is situated near the boundary dividing Smethwick and West Bromwich, is about 20 acres. The land has been inclosed with an iron fence. Provision has been made for cricket and football, two separate spaces having been prepared and set apart for those games. Trees and shrubs have been planted somewhat plentifully, and a number of walks have been made. In the centre of the grounds a space has been reserved for the erection of a band-stand. The work has been carried out from plans prepared by Mr. J. T. Eayrs (formerly surveyor to the corporation), and under the supervision of his successor in office, Mr. A. D. Greatorex.

The Markets Committee of the Leeds Corporation met on Monday to consider the question of the provision of a wholesale meat market and abattoir for the city. In connection with the new building schemes to be carried out in Briggate and the adjoining streets, the property known as "The Shambles" will be removed. Estimates prepared by the city and waterworks engineer, Mr. Thomas Hewson, were considered, from which it appeared that a wholesale meat market and abattoir could be erected on the ground at present occupied as a pig market and a hay and straw market for the sum of about £24,000. The land, which already belongs to the corporation, is between 3,000 and 4,000 square yards in extent, and its value is estimated at £6,000. The committee decided to ask permission of the city council at its next meeting to erect a wholesale meat market and abattoir on the site named. Should the necessary sanction be obtained, they will advertise for plans and estimates, for which they will offer premiums, and it is their intention to proceed with the work as soon as possible.

In the Fine Arts section of the Brussels Exhibition first-class medals have been awarded for painting to Mr. Dicksee, R.A., Mr. Herkomer, R.A., Mr. Hook, R.A., Mr. Gregory, A.R.A., Sir J. D. Linton, Mr. J. W. Waterhouse, R.A., Mr. Seymour Lucas, A.R.A, and Mr. Sargent, R.A.; and for sculpture to Mr. Onslow Ford, R.A. Second-class medals for painting have been awarded to Mr. Solomon, A.R.A., Mr. L. Lavery, Mr. Murray, A.R.A., Mr. North, R.A., Mr. Orchardson, R.A., Mr. Aumonier, Mr. Green, Mrs. Allingham, Mr. Ouless, R.A., and Mr. Clausen, A.R.A.; for sculpture to Mr. Frampton, A.R.A., and Mr. Drury; for engraving to Mr. Cameron; and for architecture to Mr. J. L. Pearson, R.A. One of five gold medals in the Fine Arts section has been voted to Mr. Alma-Tadema, R.A.

COMPETITIONS.

Bristol.—At their last meeting, the city school board considered the report of the sites and buildings committee. With respect to Hotwells infants' school competition plans, eight sets of plans were sent in, and, after careful inspection of same, it was decided to recommend that the set numbered 4 be adopted. The set of plans was adopted, and proved to be those of Messrs. Latrobe and Weston, 20, Clare-street, Bristol.

Cardiff.—The corporation held a special meeting on Thursday in last week for the purpose of considering the sites upon which the new municipal buildings and law-courts shall be erected in Cathays Park. It was unanimously decided to rescind the resolution, passed on the 14th of June, "That a new town-hall and law-courts be erected in Cathays Park at the southern end of the western side thereof," it being explained that since their last meeting it had been ascertained that the proposed site would not provide sufficient width for all the proposed buildings, the Marquis of Bute having stipulated in selling the park that the present double avenue of trees should not be cut down. On the recommendation of a committee, it was further agreed that it will be advisable to erect the law-courts upon the site between the western avenue and North-road, and the municipal buildings on the eastern side of the avenue. The competing architects would then have an absolutely free hand as to area and elevation and as to the arrangement of the site, so that the best designs their genuis could devise compatible with the money voted would be forthcoming. It was agreed to provide an additional room for solicitors at the proposed law-courts, and also a refreshment-room and small kitchen, a reporters'-room and deputy mayor's parlour. Alderman Carey, the chairman of the committee, said so many additions had been made that he would propose that the limit of expenditure be increased from £200,000 to £225,000. The borough engineer, Mr. W. Harper, thought £200,000 was sufficient, and the motion was then withdrawn. The instructions for architects were amended slightly, the time for sending in designs being extended, on the recommendation of the assessor, Mr. A. Waterhouse, R.A., from October 31st to December 4th, and the 5 per cent. commission to the successful architect will not include travelling expenses, and the committee's minutes were then approved with the alterations made therein.

New York.—About one hundred designs were received in the preliminary competition for the New York Public Library. Twelve of these are to be selected by the judges, who are Prof. Ware, of Columbia University, Dr. John S. Billings, the director of the new library, and Mr. Bernard R. Green, of the Congressional Library. The authors of the six of these twelve designs which are adjudged the best will compete a second time, and six architects of reputation, who have not entered the first competition, will be invited to compete with them. From the twelve designs of the second competition the judges will select three, and the trustees will choose, from these three, the person to whom they wish the execution of the building to be entrusted. It is estimated that the cost of the building will be about £340,000 sterling.

The Local Government Board have formally approved the scheme of drainage for the north-end district of Gloucester, prepared by Mr. J. Fletcher Trew, M.S.A., and a loan of £10,000 has been acquired to carry out the work. The engineer for the disposal works is Mr. E. W. Ives, C.E., of Derby.

Considerable improvements, necessitated by the great increase in traffic, are in course of progress at the Midland Railway Goods Station, Coventry. Increased accommodation has long been wanted in the offices, cattle-docks, furniture-van, carriage, and horse departments. The offices are being brought into line with those of the London and North-Western Railway Company; they will have a substantial brick frontage, and the clerical staff will have improved facilities for the discharge of their duties. Mr. Charles G. Hill, of Coventry, is carrying out the alterations.

The Birmingham Corporation have approved plans for public baths in Green-lane, Small Heath, on a site adjoining the free library. The estimated cost is £25,000, and the first-class and second-class baths will each have a water area of 81ft. by 33ft., and there will also be 17 private bath-rooms in each department, and a swimming club room.

PARLIAMENTARY NOTES.

The National Gallery. — Dr. Farquharson asked the First Lord of the Treasury on Friday whether his attention had lately been directed to the danger of fire to the National Gallery from its close proximity to other buildings; whether, following the precedent in the case of South Kensington Museum, he would obtain a report from some well-known expert as to the nature and extent of that danger; and when the long-promised removal of St. George's Barracks would take place. Mr. Balfour: The answer to the first part of the question is in the affirmative. The answer to the second part is in the negative, as Sir J. Taylor has recently made an exhaustive report on the subject. The plans of the new barracks at Millbank have been approved, and will be proceeded with. Upon their completion, the removal will take place. Mr. Arnold-Forster: Will that include the recruiting depot as well as the barracks? Mr. Balfour: I understand that it will not.

South Kensington Museums.—Sir. S. F. Powell asked the Secretary to the Treasury on Monday what steps the Government proposed to take with reference to the recommendations of the Select Committee on Museums for securing the buildings at South Kensington against danger from fire. Mr. Hanbury: This question would be more properly addressed to the First Commissioner of Works than to me. But I may state that the additional Estimate circulated some days ago provides for the immediate expenditure of £5,000 for the removal of the more dangerous structures on the east side of Exhibition-road, for the removal of the boilers and electric-lighting plant, the displacement of the occupants of the official residences, and the reconstruction of the entrances to the Southern Galleries, on the west side of Exhibition-road.

At Stonehouse, a hall has been added to the Free Church buildings at a cost of £1,000. Mr. George Coutts, of Aberdeen, was the architect.

Further improvements are about to be carried out at the Birkenhead docks, the Mersey Board having at its last meeting voted a sum of £2,300 for the repavement of a portion of the Tower-road.

A special meeting of the Herefordshire County Council was held on Saturday afternoon, for the purpose of considering a request from the committee of visitors to the lunatic asylum at Burghill, that they be allowed to engage the county surveyor (Mr. Wakelam) when they considered his services would be useful, and to remunerate him for such services. The requests were acceded to.

A large co-operative wood pulp and paper mill is about to be constructed at the Angerman River in North Sweden. All the larger sawmills in the district are interested in the concern, and it is intended that the plan shall also comprise kindred manufactures, which can utilise the residue from the sawmills, and in the manufacture of turpentine and briquettes, &c.

The Roman Catholic Church of St. Francis Xavier, Oldbury, has lately undergone a complete renovation. A scheme of decoration has been carried out, after the designs of Mr. J. A. Pippet, of Messrs. Hardman, Birmingham. The walls and ceiling have been frescoed; the painting in the sanctuary consisting of a high dado of terracotta and dark red with gold *fleurs de lis*, while the upper part of the wall is powdered with lilies interwoven with the motto of St. Francis Xavier, *Satis est, Domine, satis est.* A Rood beam has been erected with a Crucifix and figures of Our Lady and St. John, while on either side of the entrance to the sanctuary are placed, in canopied niches, images of the Sacred Heart of Jesus and of the Blessed Virgin with the Divine Child. These figures are all carved in wood and richly decorated, and were made to order by Ferdinand Demety, of St. Ulrich, Gröden, Tyrol. The church has also been adorned with a new set of Stations of the Cross.

A dedication service of the newly-decorated chancel of St. Luke's Church, Barton Hill, Bristol, was held on Friday evening. The chancel was erected three years ago in commemoration of the jubilee of the church, but remained in an unfinished state. The chancel has now been decorated in a unique manner, on account of the central window of the apse being more than two-thirds blocked by buildings immediately behind. The stone tracery is seen complete in the interior, as in the two side windows, and the lower portion, which is unpierced for glazing, contains a picture of the Supper at Emmaus. Above this picture and still in the blank portion of the window are panels of canopy-work, also with gold background and labels containing the text, "Abide with us." The remaining third of the window which is open to the light, is filled with stained glass, consisting of two angels holding the text, "Peace be unto you." Above is depicted the Descent of the Holy Spirit. The walls are decorated with borders and patterns. In the space below the windows is painted arcading introduced to take the place of a reredos.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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NOTICE.

Bound copies of Vol. LXXI. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LIV., LVIII., LIX., LX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

*** IN response to complaints from readers that they are unable to get the BUILDING NEWS at Messrs. W. H. Smith and Son's bookstalls, we can only suggest that they should order the paper of some other newsagent. Messrs. W. H. Smith and Son recently requested us to allow them an extra discount beyond that allowed to the general trade, and because we declined they have ceased to send the paper out to their bookstalls. We have, of course, no remedy; but we do not think the demand was a fair one.

RECEIVED.—O. J.—A. D.—T. B. and Co.—D. H.—W. S. W.—D. N. L.

Intercommunication.

QUESTIONS.

[11728.]—**Legal.**—A detached house, A, has its southern flank wall on the boundary of its own plot on that side. The passage to the rear of the adjoining premises, B, runs along this flank wall its whole length. Down this passage a new drain was laid. The passage being only 4ft. 6in. wide, the drain—assuming it to be in the centre, as it no doubt is—would be less than 2ft. away from the flank wall, whilst it is known to be 5ft. deep at the rear of the premises and 8ft. deep at the front. The drainage work was delayed by frost, and this kept the trenches open longer than it otherwise would have been. Very shortly after the drainage work was complete, cracks of considerable length and number appeared in the plastering and papering of ceiling and walls on the inside of the house A. This house had only just before had its ceilings whitened and walls repapered throughout. This operation would have necessitated the stopping of any old cracks, supposing any existed, so there is no question as to when the new cracks appeared. I am told that the owner of house A cannot proceed against the owner of the house B and get compensation, because: (1) house A has not been erected a certain number of years (20, I think); (2) no house has the right of support from adjoining land. Is this correct? I believe I saw a case reported not very long ago in which it was held (*re* point 2) that work done on land adjoining a house, and causing damage to that house, made the owner of the land (or he who did the work) liable for damage to the house. Am I right? And, what was the case?—C. H. B.

[11729.]—**St. Mary-le-Bow Church, Cheapside.**—Of what stone is the upper order of the steeple built? When viewed on a bright day, this portion has a slight pinky appearance.—S. T. M.

[11730.]—**Portland Cement Plaster.**—Will any of your readers inform me of their experience in regard to plastering Portland cement ½in. thick over a layer of concrete composed of broken brick or stone and lime mortar? I have seen this work frequently done for the flooring of bungalows, and noticed that after a short period the cement plaster cracks and breaks off, and that there is no affinity between the chunam and cement. I hear that Mr. R. F. Chisholm, F.R.I.B.A., now of Baroda, has always insisted that a layer of brick or tile should be placed over the concrete and then plastered with cement. I wish to invite attention to this because I see what I think is an objectionable practice recommended in page 198 of the new edition of Jones's "Manual of Sanitary Engineering," which contains much valuable information in other respects.—G. D. D., Madras.

[11731.]—**Specifications.**—Are there any practical treatises on specifications from which one can obtain the proper clauses for such work as plumbing, leadwork on roofs, heating apparatus, and other subjects? Those published in Gwilt and other books are too general or out of date.—YOUNG ARCHITECT.

[11732.]—**Strains on Structures.**—Which is the best elementary handbook on this subject, suitable for a beginner?—A STUDENT.

[11733.]—**Glazed Roofing.**—There are so many systems in the market and advertised, that it is bewildering to select the one that is found to be reliable in all points, allowing for expansion by heat and security against wet. Will any practical reader give his experience?—CONSERVATORY.

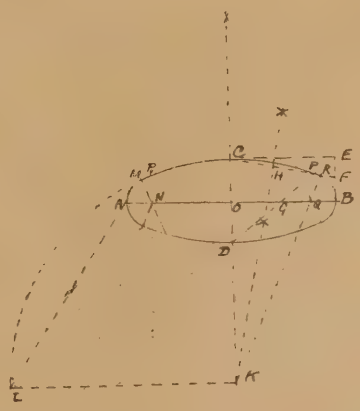
[11734.]—**Repairing Buhl Table.**—I have become possessed of a card-table of a make known, I think, as "Buhl." It is covered with inlaid work of thin brass fastened down with cement, and very thin tortoise-shell laid on a scarlet cement. Parts of the brass are missing, and I want to replace them. I can cut out the brass sheet for this, I think, but should be glad of any hints on this, and on engraving the scroll-work on it. What cement is used to fasten down the brass on the wood of the table? When originally made, was the brass polished bright and lacquered, or how was it and the tortoise-shell finished? What is the red cement backing the tortoise-shell, and how is it applied?—J. BROWN.

[11735.]—**Sawing Stone.**—Will some reader help me out of a difficulty? I am often sawing stone with sand and water, and my man cannot go down square although the stone is level. What I thought about is putting a piece of iron or steel each side of the saw and at each end; but I want to know how to fasten it there as the stones vary in thickness from 3in. to 1ft., and I want it so as it can be taken on and off quickly.—MASON.

REPLIES.

[11691.]—**Party Walls.**—I am sorry my reply to "H. E." was of no use. To say "What are the privileges of either party as to raising or otherwise with the wall or chimney-stacks," would be to write a treatise on a rather difficult question. Where the ownership of party-wall is not known, the two parties are tenants in common. Acts of ownership establish this tenancy. Either of the owners of a party-wall, where each has a moiety exclusively, can pull down that part of wall standing on his own land where the wall is not common property. In many instances there is an easement of support, and in this case he would be liable The owner of dominant tenement can build on the wall so long as he does not endanger its stability. The third meaning or definition given—*i.e.*, when the wall belongs to one of the adjoining owners, but is subject to an easement on the other to have it maintained—is that which is generally the meaning in the Building Act. With regard to two tenants in common, one tenant may pull down and rebuild; but he may be subject to an action for damage.—G. H. G.

[11683.]—**Elliptic Arch.**—Let A B, C D, be the axes of an ellipse, of which O is the centre; draw B E parallel to O C, and C E parallel to O B; bisect B E in F and O B in G; then the intersection of C F and D G gives a point,



P, on the true ellipse, which has the given axes. Bisect C P perpendicularly by the line H K, meeting C D at K; then K is the centre of an arc of a circle which will pass through C, P, and a point, P_1, similarly situated on the other side of O C; describe this arc, and continue it to L to meet K L, drawn parallel to O A; join L A, and produce to meet the arc P C L at M; join K M, cutting O A at N; with N as centre, and N M as radius, describe an arc; this will pass through A (since N A = N M), and will, with the arc M C, make up the quadrant C P_1 M A of the approximate ellipse. The remainder of the curve may be drawn by symmetry. It should be noticed that the points P, P_1 are not necessarily the points at which the large and small arcs join. The proof that N A = N M is simple; for the triangles M K L, M N A are similar; therefore N M : N A : : K M : K L. But K M = K L; therefore N M = N A. This will show "J. W. S." how to find geometrically the centres which he says he finds by trial. The above will give a result which differs but little from that obtained by "J. W. S.'s" construction. Lack of time prevented an earlier reply.—J. C. PALMER.

[11709.]—**Slates.**—If the querist will communicate with us, we can give him the information he desires.—J. DUCKETT AND SON, LTD., Blannel-street Works, Burnley.

[11712.]—**Trigonometry.**—Let the height of the tower be h feet, and the distance at which it was first observed x feet; and let $\theta°$ be the angle of elevation at the first observation. Then we must have—

Distance for second observation ..... = $(x-a)$ feet
Distance for third observation..... = $(x-a-b)$ feet
Angle of elevation for third observation = $(90-\theta)°$

Now, the second observation gives—

$$\frac{h}{x-a} = \tan. 45° = 1;$$

$$\therefore\ h = x - a$$

$$\therefore\ x = h + a \quad \ldots\ldots\ldots\ldots (1)$$

The first observation gives—

$$\frac{h}{x} = \tan. \theta° \quad \ldots\ldots\ldots\ldots (2)$$

The third observation gives—

$$\frac{h}{x-a-b} = \tan. (90 = \theta), = \cot. \theta°, = \frac{1}{\tan. \theta°}$$

$$\therefore\ \frac{x-a-b}{h} = \tan. \theta° \quad \ldots\ldots\ldots\ldots (3)$$

(2) and (3) give $\frac{h}{x} = \frac{x-a-b}{h}$.

$$\therefore\ h^2 = x(x-a-b).$$

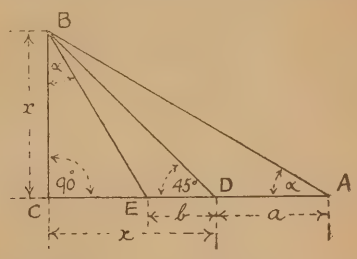
In this equation, substitute for x the value obtained in (1). Thus—

$$h^2 = (h+a)[(h+a) - a - b]$$
$$= (h+a)[h-b]$$
$$= h^2 + ah - bh - ab.$$

$$\therefore\ (a-b)h = ab. \qquad \therefore\ h = \frac{ab}{a-b}. \text{—}Q.E.D.$$

—J. C. PALMER.

[11712.]—**Trigonometry.**—Let B C = height of tower = x, let A be the first station, D the second, and E the third, A D E C being a straight line, and A C B being 90°;



then by hypothesis A D = a and D E = b. Also, since B D C is 45°, C D = C B = x. Let angle B A C = α = C B E, since C B E is the complement of B A C. Now tan. B A C = tan. $\alpha = \frac{x}{x+a}$; also tan. C B E = tan. $\alpha = \frac{x-b}{x}$.

Hence, equating the two expressions for the value of tan. α—

$$\frac{x}{x+a} = \frac{x-b}{x}$$

$$\therefore x^2 = (x+a)(x-b)$$

whence—

$$x(a-b) = ab$$

and—

$$x = \frac{a.b}{a-b}$$

which gives the required height of tower.—H. BUSBRIDGE.

[11714.]—**Measuring Stonework.**—The method shown in sketch of block of stone, showing how they are cut out, appears a reasonable mode of cutting the mullions. If the stonemason adopts a more wasteful method, he is responsible. As a method of measurement, I think the stonemason's contention is right, as he might have cut each from a block of stone, and this is the way he would probably go to work.—A READER.

[11716.]—**Overflowing Cistern.**—I think the ball-tap is out of order; most likely the leather is worn out, or the lever may have become fixed. A plumber would soon mend matters.—G.

[11718.]—**Spires and their Construction.**—I think "Pro Re Nata" will find the subject treated in Gwilt and any recent book on masonry. Sometimes the joints are horizontal, forming so many rings divided by horizontal planes, but there are spires in which the joints are cut at right angles to the taper of spire. I should prefer the latter plan, as then each course forms a self-tied ring.—G. H. G.

[11719.]—**Drain-Pipe Joints.**—Get particulars of Doulton's "patent self-adjusting joint." The pipes can be laid in any sort of ground, as any subsidence will not affect the water-tightness of joints. No cement is required. Stanford's joint is a good one.—G. H. G.

[11720.]—**Gauged Brick Arches.**—A cut key-brick is generally used, the soffit being cut to a point. For setting-out gauged arches, see the treatise on "Brickwork" in Crosby Lockwood's series.—SUB.

[11721.]—**Dry-Rot in Timber.**—It is doubtful whether any remedy will arrest the dry-rot short of cutting out the timber and the affected plaster-work. A solution of corrosive sublimate in water, in the proportion of 1oz. to a gallon, used hot, is recommended; or a solution of sulphate of copper, ½lb. to a gallon, applied hot. Paraffin oil is said to stay the rot. If the decayed timber can be removed, the best remedy is to cut it out. The subject is a difficult one, and even experts are as uncertain as to the best treatment of this disease as the

medical man is in his treatment of cancer. The preventive rule is the safest: "Season and ventilate."—A. Z.

[11723.]—Flushing Cisterns.—I know of no flushing cistern equal to the one recently patented by a Mr. Thos. Clark, of Orchard-street, Weston-super-Mare. It is a lead-lined and lead siphon, wood-cased; the water is siphoned direct from the cistern without passing through any other connection, and it will work with the handle held down or let go. This cistern has been selected by the architects in the recent alterations of our town-hall, schools, and dwelling-houses in the town and district. I have heard and seen letters speaking very highly of them, and at a reasonable cost.—Charles Lake.

CHIPS.

Mr. Edward L. Lutyens, architect, of 16, Onslow-square, S.W., son of Captain Charles Lutyens, of Thursley, Godalming, and 16, Onslow-square, was married on Wednesday to Lady Emily Bulwer-Lytton, youngest daughter of the late Earl of Lytton, and sister of the present peer, of Knebworth House, Stevenage, Herts. The ceremony took place at St. Mary's Church, Knebworth.

Two blocks of richly carved and traceried seating and a prayer desk, all in handsomely-figured English oak, have recently been fixed in the chancel of the parish church of Stoke Gabriel, Devon, for the Ecclesiastical Commissioners, from designs by Messrs. Christian, Caröe, and Purday. The work has been satisfactorily carried out by Mr. W. Dart, Ecclesiastical Art Works, Crediton.

The town council of Stirling have under consideration an offer by Mr. Andrew Carnegie to provide £6,000 for building a suitable free library building if they see fit to adopt the Public Libraries Acts.

At the half-yearly meeting of the Metropolitan Railway Company, held last week, Mr. Bell, the chairman, stated that the company had a considerable amount of land at Willesden Green and Pinner, and they thought the time had arrived when this could be developed for building purposes. If they were able before long to make arrangements for building on the land, it would make a very considerable increase to their annual revenue. The committee had now been in office for 10 years, and during that period their rental had increased from £69,800 to £78,000, an increase of about £8,000 per annum.

Mr. W. O. E. Meade King, inspector of the Local Government Board, held an inquiry at Cheadle, on Friday, touching the urban district council's application to borrow £2,150 for private street improvement, and £500 for furnishing a public recreation ground with shelters, seats, swings, &c. It was explained that the ground had been presented to the council, and that this was the first expenditure of public money upon it. There was no opposition.

Some important further discoveries of Roman remains have been made in Shoemakers'-row (Northgate-street), Chester, where some old property has recently been pulled down. Close to the moulded base of a Roman column (*in situ*) and a detached portion of its shaft, mentioned by us last week (p. 134), Roman tile fragments have also been discovered, a heap of coins, and still more interesting the fragment of an altar bearing the letters G E N I O V·V·E·T·VET. The supposition is that the altar was dedicated by a veteran of the 20th Legion to Valeria Victrix. Another find is a carving in red sandstone, showing the face of a Roman, with antique headdress.

A largely attended meeting of architects, builders, and others interested in the building trade, was held at Sunderland last week to consider the action of the building committee of the corporation with respect to the framing of new by-laws. Mr. Robt. Hudson, builder, presided. Mr. Wm. Milburn, architect, secretary to the Architects' and Builders' Committee, explained what had been done, and what concessions had been made, and on the motion of Mr. J. W. White, builder, seconded by Mr. James Henderson, architect, and supported by Mr. Foster, solicitor and secretary of the Land Owners' Property Association, it was resolved "That this meeting of architects and others interested in the by-laws as proposed by the building committee to apply to new buildings and streets, strongly urge upon the corporation to agree to the amendments unanimously adopted by the committee of architects and builders of this town."

The urban district council of Llandudno have decided to apply for power to borrow £8,633 for carrying out the first portion of the scheme for the extensions of the water-mains. They have also resolved to proceed with the erection of the new municipal buildings in Lloyd-street, instructions being given to the architect to keep the outlay as near £12,000 as possible.

Mr. John Lee, son of Mr. Wood Lee, architect, Bramley, has just passed his second examination at the Royal Academy, and has been duly admitted as an art student for three years. Mr. Lee was formerly a pupil of Mr. Alfred J. Sturges, architect, of Town Hall Chambers, Guildford.

LEGAL INTELLIGENCE.

Breach of Building By-Laws.—At Plymouth Police-court, on July 28th, Anthony R. Lethbridge, contractor, Tracey-street, Plymouth, a member of the board of guardians, was summoned by the Plymouth Corporation for five breaches of the building by-laws.—The town clerk said the offence was deliberately committed and persisted in under circumstances which aggravated it materially. The defendant was summoned for erecting premises at the rear of five houses in Britannia-terrace, and not leaving the 15ft. of open space from the houses to the boundary wall required by the regulation. In March, 1896, defendant submitted plans of the proposed erections, but they were not passed, as they did not provide for the proper amount of open space. Defendant proceeded with the work, and an action was brough against him. As defendant said it was a test case, and he intended to appeal, he (the town clerk) agreed to the infliction of a merely nominal penalty. Defendant did not appeal, but altered the lane to the requisite width, but the yard space was still inadequate. On the 19th July, when the inspector visited the premises, defendant used most disgraceful language. Under these circumstances he (the town clerk) was bound to ask for an adequate penalty. The case was proved by Charles John Read, building inspector; Ernest Scown, borough surveyor's department, and Mr. Paton, borough surveyor. Defendant was fined £2 and costs in each of the five cases.

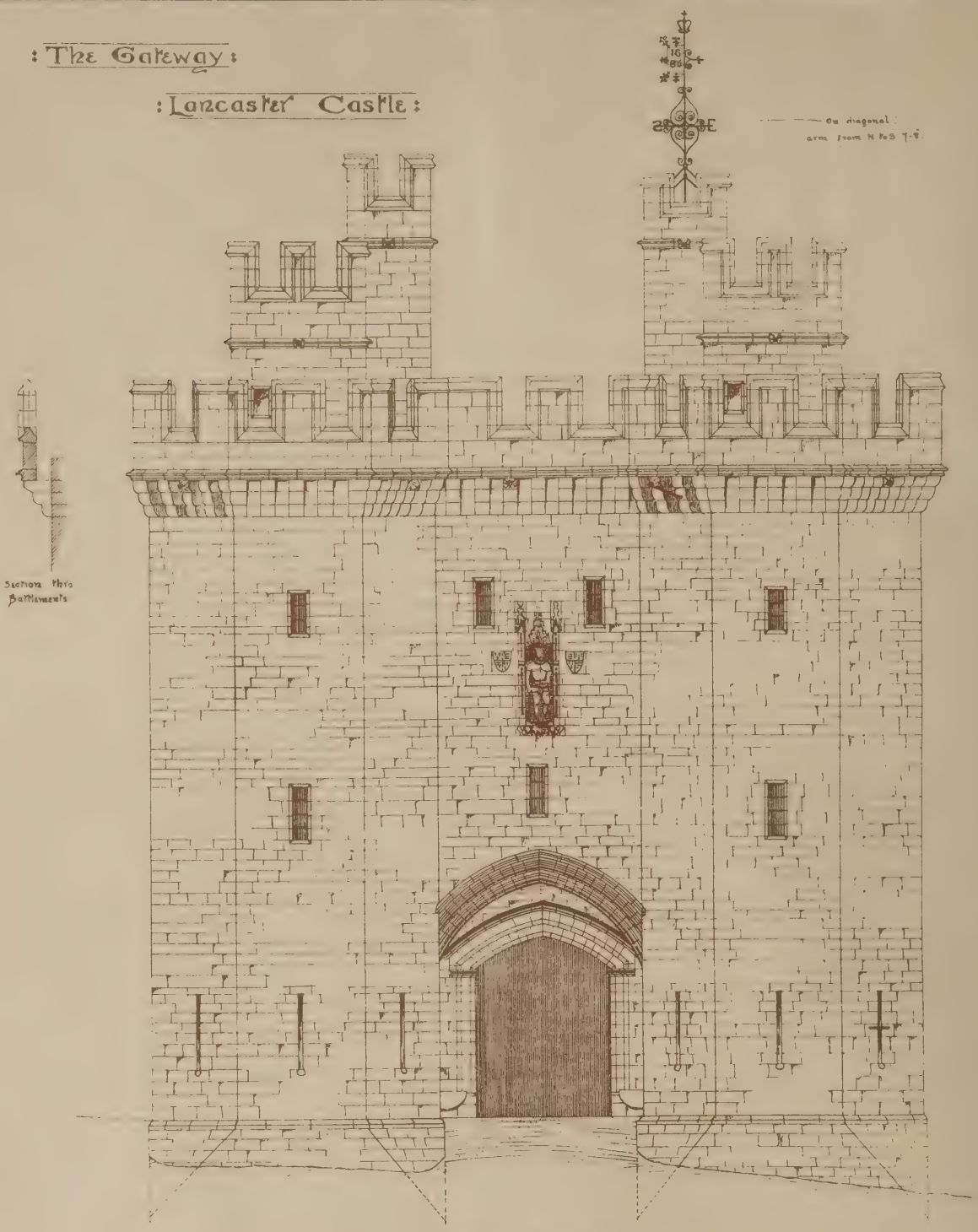
The International Society of Auctioneers and Valuers.—A sitting for the public examination of the directors and others connected with this company was held on Friday before Mr. Registrar Hood at Bankruptcy Buildings, Carey-street, W.C. The society was registered under the Companies Act, 1862, as the Institute of Auctioneers and Valuers, on November 12, 1895, for the purpose of providing an organisation for auctioneers and valuers with the view of promoting the interests of both professions, and doing all such things as from time to time might be thought necessary or advisable to elevate the *status* and tend to the advancement of these professions. The liability of members of the society is unlimited. Mr. J. H. Wilkinson was the promoter of the undertaking. Mr. Samuel Wheeler attended as Official Receiver. Mr. B. A. Spaull, who described himself as an inventor, said he became a director of the society at the request of Mr. Wilkinson. He was neither an auctioneer nor a valuer at the time of the incorporation of the society, although he had had about three years' experience. He felt satisfied that the institution was a bonâ-fide one, and felt that it satisfied a great need. By the Registrar: To a certain extent he joined the company in order to get his fees. Continuing, witness said he did not know at the time he became a director that the liability was unlimited; he did not make any inquiries in connection with that subject. He knew that Mr. Wilkinson had promoted several institutions for the benefit of other professions. Witness had no personal interest in the society, and was not even a member. He adopted an agreement dated November 19, 1895, under which Mr. Wilkinson, who was appointed president of the society for 20 years, at a salary of £250 a year, was entitled to a payment of £5,000 by way of liquidated damages, should he be discharged by the society on any ground other than that of gross misconduct, or should the society go into liquidation. On March 25, 1896, an agreement was entered into, whereby Mr. Wilkinson agreed to resign his position, and to accept from the society £500 in debentures, in lieu of the £5,000. Witness thought both agreements were reasonable. He understood that if less than 2,000 members joined the society, the amount payable to Mr. Wilkinson would be reduced. Previously to August, 1896, three prospectuses were issued by the company. The Official Receiver: Would any person reading any one of those three documents find any statement to the effect that the liability was unlimited? Witness said they would not. Mr. Wilkinson retired because Mr. Luwee Harris, another director, desired to be appointed president, as he could bring the society into a stronger position. By Mr. Forbes: The redemption of the debentures for £500 issued to Mr. Wilkinson was spread over a period of ten years. Mr. H. F. M'Dowell was next examined, and in reply to the Official Receiver stated that his business consisted of acting as secretary to public companies. When the society was formed he was in his 22nd year. He denied that he was practically a clerk in the employ of Mr. Wilkinson, but he admitted that there was an arrangement between that gentleman and himself whereby he was to have the option of accepting secretaryships offered to him. He resigned in March, 1896, and during the time he occupied the post of secretary no prospectus was issued showing under which section of the Companies Act the Society was registered. The Official Receiver: Did you ever insert the word "limited" upon a member's certificate? Witness said he had never done so, nor had he any knowledge of such an act being committed. Mr. Luwee Harris, in reply to the Official Receiver, stated that he was an architect, and was asked by Mr. Wilkinson to become a director, and he consented to do so. He did not become aware that the liability was unlimited until the early part of last year. Witness succeeded Mr. Wilkinson as president of the society. The society did not then number more than 50 members. Some further evidence having been given, the proceedings terminated.

Extras and Delays.—At the Wellington, Salop, County-court, on Tuesday week, his Honour Judge Harris Lea held a special court to hear an action in which Charles Davies, builder, Wellington, sued Mrs. F. A Newbould for the sum of £74, balance in repect of a contract for erecting two houses on Constitution-hill, and there was a counter-claim for £136 for defective building. Mr. Daniel represented the contractor, and Mr. Burke appeared for Mrs. Newbould. Mr. Daniel explained that the contract for the building provided that Davies was liable to a penalty of £3 each week the work was continued beyond the time specified. The houses were to have been completed by the 31st August last year, but there were extras ordered, which accounted for delay, and possession was not given until October. Mrs. Newbould's original claim against the contractor amounted to about £19 10s., but since the commencement of these proceedings a claim was made for the penalty to which he contended Davies was not liable after he had been requested to undertak extra work. Plaintiff stated that last year he contracted to build two houses for Mrs. Newbould on Constitution-hill for £758. A specification was drawn up and an agreement entered into providing that the building should be completed within four months, Immediately after commencing the foundations, the architect instructed him to do something to them that was not provided for, and he was allowed the sum of £5 10s. for the extra work, which occasioned two or three days' delay. There were other extras which caused the completion of the work to be postponed about a fortnight, and Mrs. Newbould herself was the cause of further delay by frequently interfering with the men. She was constantly on the ground, and nearly lived there, and he was obliged to ask her to desist. From time to time the architect called his attention to certain defects, and on July 31, in reply to a letter from witness, he stated he could not give a certificate then, but would do so if the work progressed during the following fortnight. He attended to the defects complained of, and later he received £150. In February Mrs. Newbould was willing to pay the balance on the contract subject to a deduction of £19 10s.; but he would not consent to it. The defects were such that were likely to occur in any new house, and especially those in question, which were very much exposed. Some of the defects were not pointed out to him until he received particulars of the counter-claim. In cross-examination he admitted receiving complaints from time to time from the architect as to the woodwork, &c. Mr. H. Goddard, Wolverhampton, architect and surveyor, stated that he had examined the premises, and had seen some defects, but they were only such that would be occasioned in any new house after several months' occupancy. He estimated that £3 6s. would cover them all. William Dainty, foreman joiner for Mr. Nailer, Wolverhampton, who supplied the timber for the doors, &c., said it was in good condition when it left Wolverhampton. He thought £4 or £5 would cover all the defects. Mr. Burke, in addressing his Honour, drew attention to a long list of defects, and said that in consequence of the contract being broken in point of time his client was compelled to incur further expense. Mrs. Newbould stated that the contractor did not commence the work at the proper time, and she denied interfering with the workmen. She admitted, however, going often to see the progress of the work, as her garden was hard by, and complained of the conduct of Davies and his men towards her. Mr. W. Scott Deakin, architect, Shrewsbury, under whose superintendence the houses were erected, gave evidence as to the inferior quality of some of the work, on account of which he had complained to plaintiff both verbally and by letter. Mr. Spaull, architect, Oswestry, stated that he had inspected the houses and prepared a list of defects mentioned in the particulars of the counter-claim. He considered their value reduced by £100 in consequence of the inferior work complained of. On the conclusion of the evidence, his Honour intimated that he should reserve his decision.

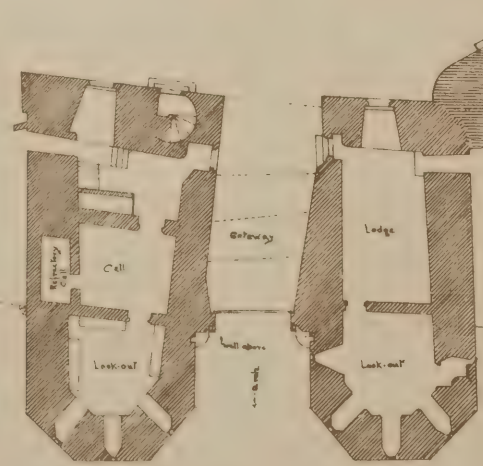
The churches committee of Glasgow Corporation recently received an application from the kirk-session of Tron parish church to have the outside and the inside of the building put into a seemly condition. After carefully inspecting the property, the committee were of opinion that in view of the large sum which would be required to put the building in a proper condition, the most expedient course would be to entirely reconstruct the fabric on a smaller scale and with an entrance from Chisholm-street. A sub-committee was appointed to confer with the Presbytery and to report.

: The Gateway :

: Lancaster Castle :



: Front Elevation :



This Gateway was mainly built by John of Gaunt about 1380. Battlements & Turrets were rebuilt at a later period. The figure was placed in Niche in 1822.

: Ground Plan :

: 2nd Floor Plan :

Scale for Plans.

Scale for Elevations.

DRAWN BY T. BAINES

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

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REMODELLING OF BURTON INFIRMARY.

The accommodation in this building having of late years become inadequate to the requirements of the town and district, the land in the rear through to New-street was purchased with a view to the enlargement of the buildings. The hospital, originally built for some 17 beds, had gradually been enlarged till 60 beds were reached, the kitchen, out-patients', nurses', and servants' departments remaining much as before, and necessarily becoming most cramped and inconvenient. The general arrangement of the old building will be seen by the small plan. It was decided to retain the main-ward block, remodelling the interior and sanitary blocks, and altering the windows to suit the spacing of the beds; to rebuild entirely the kitchen in a detached block in the rear, with nurses' and servants' dining-rooms and nurses' bedrooms over, and in another block, towards New-street, new out-patients' and dispensary departments, with servants' rooms over; the mortuary and post-mortem room in another detached block. In order to insure a complete circulation of air round the old wards, it was also decided to rebuild the front block, detaching it in the same manner from the ward block, and on the ground floor of this block are the matron's and house-surgeon's rooms, committee and waiting rooms, while over is a women's ward for 10 beds, with duty-room and sanitary block complete. This front block is the gift of the Misses Ratcliffe, while Lord Burton, the late Mr. Worthington, and others have been most generous subscribers. The hospital, when complete, will accommodate 83 patients, 14 nurses, nine servants, and house surgeon and matron. As the work of the hospital is being carried on during the alterations, they have to be carried out in sections. The arrangement of the blocks in the rear allows a good space open to the south to be laid out as a garden for the use of the nurses and convalescents. The buildings are being carried out in red brick and tiles, with a little stone in the Duke-street block. The work is being very well carried out by Messrs. T. Lowe and Sons, of Burton-on-Trent, Mr. James Rice acting as clerk of the works.

ARCHITECTURAL ASSOCIATION EXCURSION SKETCHES.

(See descriptive article on p. 176.)

The enormous values which have been placed on hotel property in Blackpool recently have induced the corporation of that watering-place to apply at the forthcoming brewster sessions for a provisional order for the erection of a large hotel. The plans have been passed, and the hotel is to be built on land south of the promenade at South Shore, bought from the ex-Mayor.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Hampshire Field Club.—The members of this club held a meeting in the Isle of Wight on Wednesday week. Meeting at Newport, brakes were taken to the foot of Mottiston Down, near Calbourne, and the party went up the valley to the Black-barrow, concerning which Mr. T. W. Shore gave information, derived from a Saxon charter, dated A.D. 826. In this document the Barrow is mentioned as one of the boundaries of Calbourne parish, and is called the Gemotburh. The visitors went on to the Longstone, an erect monolith, supposed to be of Celtic origin, standing on the side of Mottiston Down. There are, in fact, two stones, one being *in situ* and the other prostrate, and Mr. Shore expressed the opinion that both were at one time erected. Mr. Dale suggested that as these two stones were so close together, there was probably a third, the three being placed to form a dolmen. Mr. Shore stated that Sir Henry Englefield made a good drawing of the Longstone; but there was no modern view of it, not even a photograph, existing, so far as was known. Father Davis, of Cowes, read a short paper on the antiquarian features of the neighbourhood, particular reference being made to the Longstone, the Black-barrow, the entrenchment on Castle Hill, and the Saxon cemetery on Chessel Hill close by. The party proceeded to Mottiston Church, where they were received by the Vicar of Shorwell, the Rev. G. E. Jeans, F.S.A., who read a short paper. Mottiston Church dates from the 12th century, but was ruthlessly "restored" in 1863, nearly all its old features being destroyed, except a Jacobean pulpit. Mottiston Manor House was next visited, by permission of Mr. Charles Brown. The house dates from the early part of the 16th-century, and consists of two distinct buildings. The date 1567 is cut in stone over the entrance-porch; but this apparently refers to a remodelling of the house. There are some fine old oak doors and a stone staircase, and a stone cheese press, which stands in the yard near the dairy. The house was formerly the residence of the Glamorgans, and afterwards of the Cheke families. The party then drove on to Brighstone Church, which dates from the 13th century, returning to Newport, through Shorwell.

Royal Archæological Institute.—The summer meeting of this Institute commenced at Dorchester on Tuesday. There was a large attendance of members, including Sir Henry Howorth, M.P., Professor Boyd Dawkins, Professor Clark, Mr. Mansel Pleydell, the Rev. Sir Talbot Baker, and General Pitt Rivers, the president for the year. The proceedings opened with a formal reception at the town-hall by the mayor of Dorchester, who welcomed the society to Dorchester. General Pitt Rivers, in his presidential address, made special reference to the exhaustive researches which he has personally carried out at Rushmore and the neighbourhood, dealing particularly with the bronze age; also to discoveries of flints in Egypt. In the afternoon the members perambulated the town under the guidance of Mr. H. J. Moule, the able curator of the Dorset County Museum, and visited the Roman amphitheatre known locally as Maumbury Rings, the oldest of the local churches, and the county museum. In the evening the antiquarian section was opened by Professor Boyd Dawkins with a paper on the "Present Phase of Prehistoric Archæology." On Wednesday the institute visited Wareham and Corfe Castle, and yesterday (Thursday) the members were received at Sherbourne Castle by Mr. Wingfield-Digby, M.P. Last evening the members were entertained at a soirée by the Dorset Field Club. To-day (Friday) will be spent in the neighbourhood of Dorchester, when the interesting earthworks at Maiden Castle and Poundbury will be visited, and in the evening an architectural section is to be opened by the Rev. Dr. J. C. Cox on "The Treatment of Cathedral Churches in the Victorian Age." The hon. secretary of the Dorchester meeting is Mr. Mill Stephenson, and the hon. local secretary is Mr. H. J. Moule.

Somersetshire Archæological Society.—The annual meeting of this society is being held at Bridgwater this week. The proceedings commenced on Wednesday morning, when the president-elect, Mr. E. J. Stanley, M.P., delivered an address, and the general business of the society was transacted. Subsequently, the Mayor of Bridgwater received the society at luncheon, and after visits to the parish church, the Castle, and Water Gate, and Admiral Blake's house, the members met in the town hall for papers on local subjects and discussion. A second meeting was held for a similar purpose in the evening. Yesterday (Thursday) the members proceeded to Stoke Courcy, where the church and castle were visited, and thence to Dodington to inspect the Manor House. The entrenchments and the site of Stowey Castle having been examined under the guidance of the Rev. W. H. P. Grenwell, the party drove to Quantock Lodge, the residence of Mr. E. J. Stanley, M.P., who entertained the society to luncheon. Spaxton Church, Blackmore Farm, Brymore, and Cannington Church were afterwards visited, and on returning to Bridgwater in the evening Mrs. Holland gave a reception to the members. To-day (Friday) will also be devoted to excursions, and among the places to be visited are Chedzoy (traversing a district of special interest, owing to its being the site of the Battle of Sedgmoor), Weston Zoyland, Middlezoy, Othery, the site of King Alfred's Monastery, Lyng, and North Petherton. The excursions are under the direction of Lieut.-Col. Bramble, F.S.A., honorary general secretary, and Mr. E. Buckle has described the architectural features of the churches visited.

CHIPS.

A bust of the late Earl of Derby has been presented to the House of Lords by Earl Stanhope, and will be placed in the library.

The first wooden church built in Norway since the 13th century is that at Balholm, in the Sogne Fiord, which has just been dedicated.

At Cork a new church added to the Convent of St. Vincent, St. Mary's-road, has just been dedicated. It consists of nave and aisles, 75ft. by 52ft. across, side chancels, and sacristies. Mr. W. H. Byrne, of Dublin, is the architect, and Messrs. O'Flynn, of Cork, are the builders.

The new cottage hospital, Accrington, is being warmed and ventilated by means of Shorland's patent Manchester grates, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

The Countess of Warwick opened, on Friday, her new secondary and technical school at Dunmow. The school is well situated, and fitted up to accommodate 100 pupils.

A Parliamentary paper has just been issued giving an additional Civil Service Estimate, Class I., for 1897-98. The amount is £10,000, and it is in respect of art and science buildings of Great Britain. The British Museum and the Science and Art Department buildings receive £5,000 each for new works, alterations, and additions. The total original net estimate for 1897-98 was £26,000, and this has been increased to £36,000. The increased grant to the Science and Art Department is on account of the cost of carrying out certain urgent works and services at South Kensington, designed to give effect to the recommendations made in the first report from the Select Committee on the museums of the Science and Art Department.

The committee of the Kirkdale Industrial Schools have appointed Mr. Edmund Kirby, of Liverpool, as architect for the proposed cottage homes. It is proposed that 14 cottages be erected, eight for girls and infants and six for boys, each cottage to accommodate 15 children; also a small infirmary for 30 children, and a schoolroom to accommodate 60 infants and 200 elder children.

On Wednesday week Archdeacon Stevens performed the service of benediction at the new vicarage house recently built at Chadwell Heath, near Ilford, Essex.

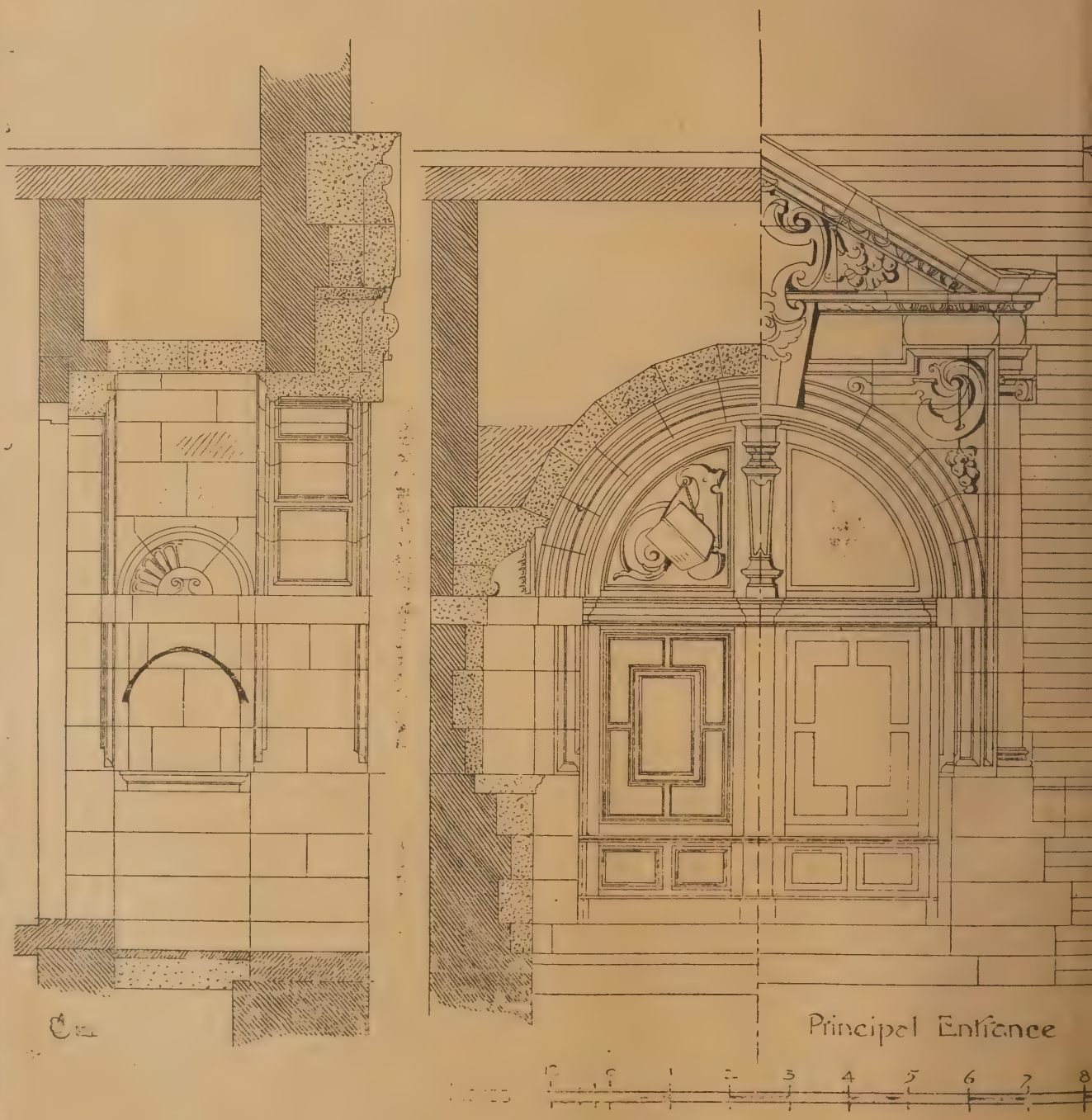
Colonel R. W. Slacke, R.E., an inspector from the Local Government Board, has held an inquiry at Ripley relative to the application of the urban district council to borrow the sum of £2,750 for the purposes of water supply, and £450 for private street improvement. It was proposed to supply Marehay, Hartshay, Waingroves, and Street-lane with water. There was no opposition.

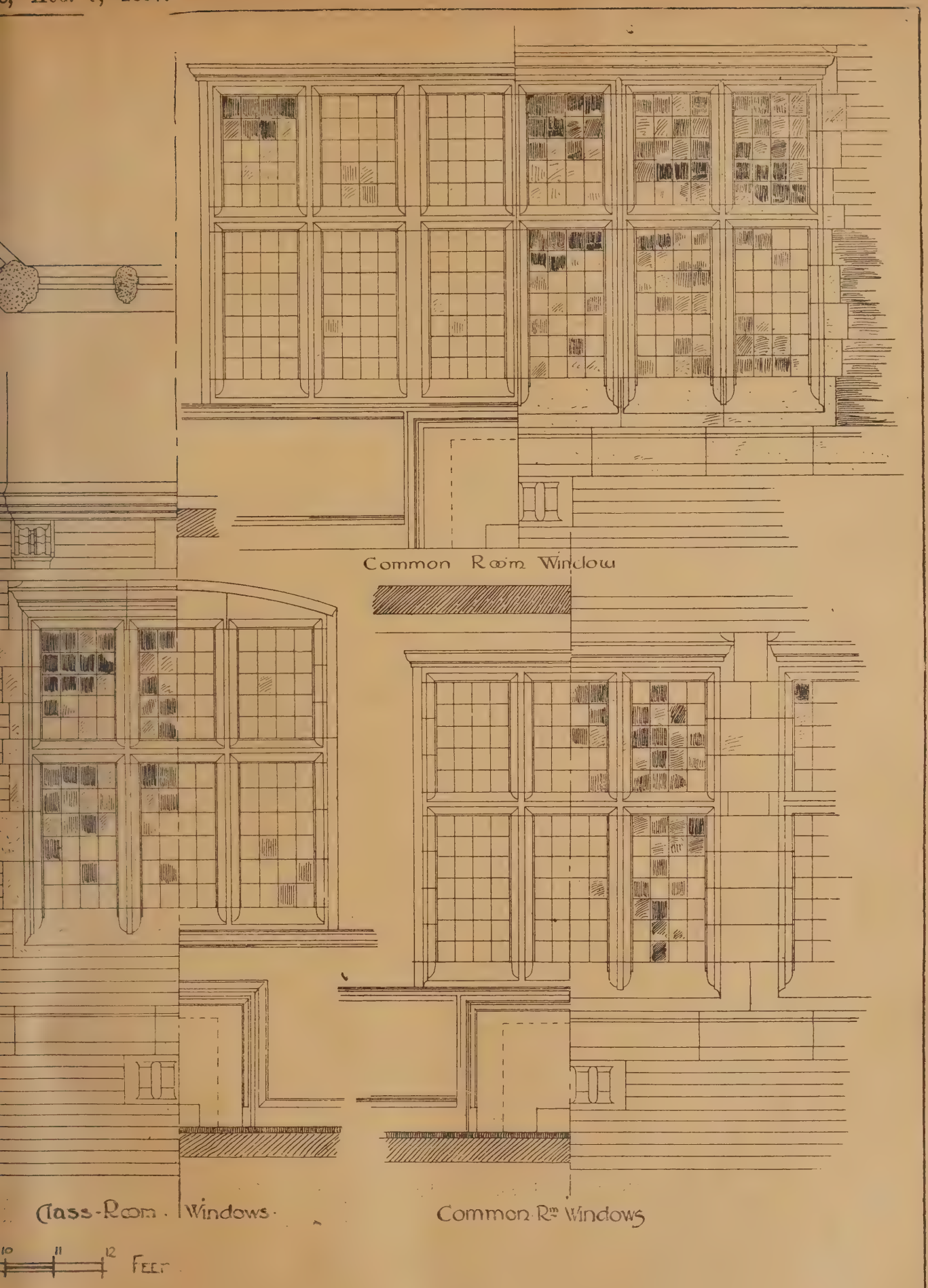
At the last meeting of the Battersea Vestry a letter was read from a firm of solicitors with reference to the unequal distribution of the London hospitals, stating that one of their clients is prepared to contribute to the provision of a large general hospital the sum of £10,000, upon condition that the site of the hospital shall be in either of the parishes of Camberwell, Lambeth, and Battersea; that the contract for the erection of such hospital shall be entered into by a date not later than Aug. 1, 1899; and that no medical school shall at any time be formed or carried on in connection with the proposed hospital. The reading of the letter was received with applause, and it was resolved to refer the matter to the finance committee.

PRESBYTERIAN - THEOLOGICAL · COLLEGE - CAMBRIDGE

H·T·HARE·A·R·I·B·A· ARCHT

Detail - of - Library - Block · Ground - Floor




Common Room Window
Class-Room Windows
Common Rm Windows
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12
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WATER SUPPLY AND SANITARY MATTERS.

Eastbourne.—In consequence of the increase of the resident population of Eastbourne, as well as that of the summer visitors, an additional supply of water for the town became necessary, and the existing water company applied to Parliament this year for further powers to obtain a supply at Friston. The corporation at the same time promoted a Bill for acquiring the water company's rights, and for obtaining a new supply at West Dean. The preamble of this Bill, however, was not proved, and the water company's Bill was proceeded with. As the necessity for a fresh supply was most urgent in view of the approaching season, the committee gave a provisional intimation that the water company's Bill would be passed subject to the company giving an undertaking, under heavy penalties, that the new supply should be brought into Eastbourne by Aug. 1. The committee, moreover, consulted Sir Frederick Bramwell, F.R.S., upon the possibility or otherwise of this being done. In the result, Sir Frederick reported to the committee that it was possible for the company to carry out their undertaking, and on May 11 the preamble of the Bill was declared to be proved. The company at once entered into a contract with Messrs. John Aird and Sons for the construction of the necessary works. The contract was settled on May 19, and the works were started forthwith, and were carried out under the superintendence of Mr. Frank Stileman, M.Inst.C.E. The new supply is obtained from a well at Friston, which had already been partially sunk in the chalk. The present yield of this well is about 1,000,000gal. per day; but by sinking it deeper, and by driving galleries the yield can be increased to 2,000,000gal., or even 3,000,000gal. The pumping machinery at Friston consists of two pairs of engines and pumps. One is a compound condensing Worthington pump, fixed about 100ft. down the well, and which delivers the water into a tank at the surface. The second engine is a triple cylinder condensing Worthington pumping-engine, capable of delivering 1,000,000 gallons in 24 hours against a head of 500ft. of water. This engine is at the surface, and it pumps the water from the tank in which it is deposited by the first engine to Eastbourne through a 21in. main. This main is four miles in length, which is laid over Friston and Beachy Head hill, which route involves some very steep gradients. Arrived at Eastbourne, the water is delivered into two reservoirs at Mead's Hill, whence it is distributed to the town by gravitation. The pumping-engines have been fixed and tested and the mains laid by Messrs. Aird and Sons a week within contract time. The formal opening of the works is to take place to-day (Friday), when the mayor and corporation of Eastbourne will be present in state, and the new supply will be turned on by the Duke of Devonshire.

Killin, Perthshire.—Sewerage and Sewage Disposal Works.—These works, which have been under construction during a year past, are now completed. The town has been re-sewered throughout, and the sewers are provided with manholes, flushing-tanks, and all the most recent improvements in sanitary practice. The sewage is treated by the International process, and the works are erected in the river-side park belonging to Lord Breadalbane, and situated south of the Killin Railway. The sewers are designed to deliver their contents by gravitation only, and every advantage has been taken of the ground for this purpose. The effluent passes into an open concrete channel, and thence by a system of outfall pipes into Loch Tay, so as to preserve the continuity of the grazing lands. Great satisfaction is felt at the successful result of these works, as they are a first instance of the treatment of sewage according to this system in the West of Scotland. The construction and design are of a novel character. The precipitation-tank is of brick, and is fitted with Condy's sludge-lifting apparatus, and the various chambers and the filter-cases are of concrete. The completion was commemorated by a ceremonial on Friday last, when the works were formally declared open by the convener of the county, Colonel Hope Drummond. The whole scheme has been designed and carried out by Mr. Woulf Brenan, C.E., of Oban, whose plans were preferentially selected by the district committee. The contractor was Mr. Bremner, of Portingall, Aberfeldy, and Mr. R. Cameron, of Edinburgh, was the clerk of works.

Worcester.—A special meeting of the City Council was recently held at the Guildhall, the Mayor presiding, to receive a special report of the Water and Sewerage Committee upon the question of the disposal of the city's sewage. The committee reported that they had had an interview with Messrs. Beesley and Sons with regard to their scheme, which was awarded first premium in the recent competition, and recommended its acceptance, if the Local Government Board sanction to a loan of £48,000 could be obtained. Alderman Ernest Day, M.S.A., proposed the adoption of this recommendation, which was carried, with the substitution of £52,000 for £48,000.

STATUES, MEMORIALS, &c.

Wells Cathedral.—The Bishops attending the recent Pan-Anglican Conference journeyed on Wednesday from Glastonbury to Wells for the purpose of attending the unveiling of a monument in the south aisle of the choir to the late Bishop, Lord Arthur Hervey. The monument is in the form of a tomb of veined alabaster polished, and stands upon a plinth of red marble. The body of the tomb is arcaded in five foliated and crocketed arches on the side and two at each of the ends, separated by traceried panels and buttresses canopied and crocketed; three of the side panels contain shields, the centre one bearing the arms of the see, those to the right and left respectively the arms of the Bishop impaling the arms of the see and the Bishop's arms impaling those of his wife. The base of the tomb is deeply moulded and enriched with carving; the top is a massive slab of alabaster richly moulded, and with elaborately carved pateræ and bears a dedicatory inscription. Upon the tomb rests a recumbent effigy of the late Bishop by Mr. Brock, R.A. The inscription runs round the cornice of a slab of Derbyshire alabaster, which is the pallet on which the figure lies. The tomb was designed by Mr. J. L. Pearson, R.A.

CHIPS.

In the House of Lords, on Wednesday night, the Public Health (Scotland) Bill was read a third time, and passed.

The Queen has purchased at auction the riverside estate near Datchet known as Sandlea, comprising a residence and about 16 acres, for £11,500. The gardens and pleasure grounds are among the best in the locality. The property is within two miles of Windsor.

A recent office-building fire at Pittsburg, Penn., has occasioned a renewal of the controversy as to the respective merits of terracotta and concrete as a filling between iron beams for fireproof floors. In a recent report on the fire, made to the insurance companies, one set of experts expresses much satisfaction at the behaviour of the terracotta filling actually used, while a second set finds that the terracotta did not do what was required of it, and regrets that more stiffness was not given to the structures by the use of some form of concrete filling.

In connection with the Hygienic Congress at the Brussels Exhibition, the Sanitary Inspectors' Association have arranged to visit Belgium early in September. M. Buls, the Burgomaster of Brussels, has invited the members to a reception at the Hôtel de Ville on the evening of September 6, and has also placed the Militia Hall at their disposal for their meetings.

Through the efforts of the fire-engineers, a clause has been introduced into the new building ordinance of St. Louis, providing that no mercantile building shall have a greater unbroken area in any story than 7,500sq.ft. Complaint is made in the local journals that the restriction "hinders the growth of business-houses," and it is proposed to amend it by providing, in place of the limitation of the area, that spaces more than 7,500sq.ft. in extent must be equipped with automatic sprinklers, and that elevator-shafts must be of fireproof material.

At a meeting of the sewerage committee of Aberdeen Town Council on Tuesday, a tender was accepted for the construction of an outfall sewer from Palmerston-road to near Victoria Bridge. The successful contractor is Mr. George Pirie, and the cost of the work will be £8,072.

At the Leeds Assizes on Friday, before Mr. Justice Grantham and a jury, Tom Crowther, farmer, Darton, near Barnsley, recovered £120 damages for assault from George Taylor, builder and contractor, of Mapp'ewell. During an altercation after a sale defendant threatened to knock plaintiff's eye out. This was followed up by a violent blow on the right eye, which was burst and had to be removed afterwards.

At South Shield on Wednesday week, the foundation-sone of a new Unionist club was laid. The building will be four stories in height, with a frontage to Catherine-street of 40ft., and a depth of 55ft., and the main façade will be of red brick with terracotta dressings. Mr. J. H. Morton, F.R.I.B.A., is the architect, and Mr. W. J. Robertson, also of South Shields, the contractor.

The Bishop of London consecrated the new church of St. Peter, Lower Edmonton yesterday (Thursday). The church is to be the parish church of a new district as soon as an endowment has been found. The cost of the building has been £3,800, but towards this sum only £2,400 has been raised.

Mr. E. J. Purnell, formerly city surveyor of Coventry, and now waterworks engineer, has been presented by the employés of his former department with an illuminated address, a cigar-case, matchbox, and snuffbox of considerable value. There were eighty signatures to the address.

Three stained-glass windows in memory of the late Lord Lilford were unveiled on Thursday afternoon in the church of Thorp Achurch, Northamptonshire, by the Dean of Peterborough.

The City Corporation have agreed, on the recommendation of the cattle market's committee, to spend £9,000 for providing additional lairage accommodation at the Foreign Cattle Market at Deptford.

The will of the late Mr. George Gilbert Scott, M.A., F.S.A., the well-known architect, described as of the Midland Hotel, St. Pancras, has been proved, the value of the personal estate being £41,710.

The will of Mr. David Kirkaldy, of the well-known testing works for building materials at 99, Southwark-street, and 45, Carleton-road, Tufnell-park, engineer, who died on January 25, was proved on July 23 by Mr. William George Kirkaldy, the son, and Miss Isabella Miller Kirkaldy, the daughter, the executors, the value of the personal estate being £8,453 8s. 3d. Subject to a few legacies to servants, clerks, and workpeople, he leaves all his property to his said son and daughter.

The work was commenced at Darfield parish church on Friday by Mr. Kent, of Sheffield, of taking out the choir-stalls and clergy-pews, laying a marble floor in the chancel, and erecting a carved oak screen. The latter is the work of a number of ladies and gentlemen in the parish, who have worked for the last two years, under the supervision of Mr. Kent. The work will take about six weeks to complete. The bells are also to be rehung and the tower pointed. Mr. J. D. Webster, of Sheffield, is the architect.

Next session is the Jubilee of the Liverpool Architectural Society. The council of the society propose to establish a travelling studentship to be awarded at the end of each session.

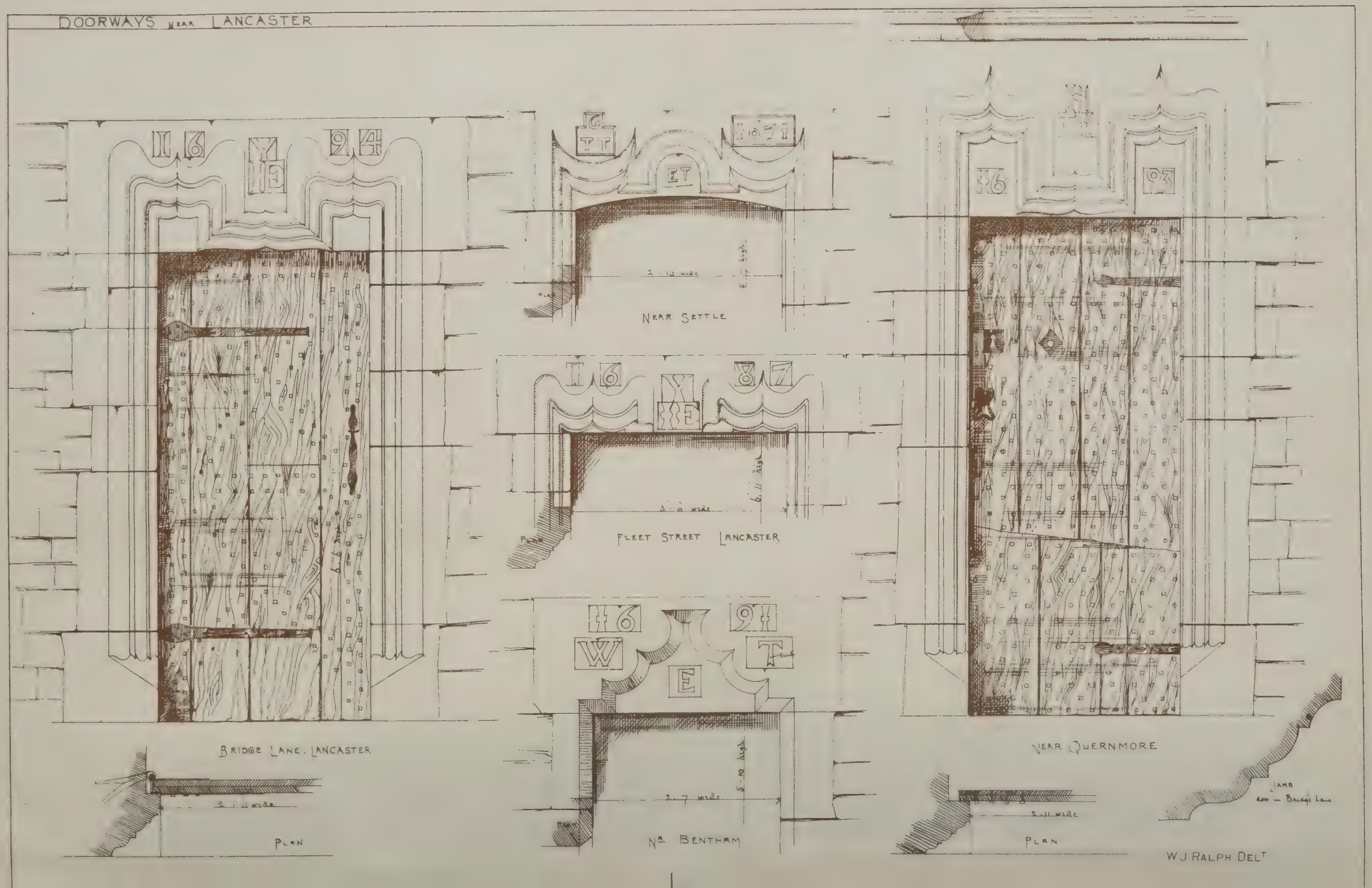
On Wednesday week the foundation-stone of the new parish church of St. David's, at Exeter, was laid. The church, when completed, will seat about 850, and will have a massive square tower of 100ft. in height. The style of architecture is of the Transitional period, from the Decorated to the Perpendicular, in the 14th and 15th centuries. Mr. W. D. Caröe, M.A., is the architect, Mr. W. Dart, of Crediton, the contractor, and Mr. F. Powell the clerk of works.

A special meeting of the Tyne Improvement Commissioners was held on Friday for the purpose of receiving a report from the committee appointed to consider and define the duties, qualifications, and salary of an engineer, in succession to the late Mr. Messent. Applications, with recent testimonials, will be received up to Sept. 1. The engineer will be responsible for the designing and the execution of all the engineering works of the commissioners; will be required to devote himself exclusively to the service of the commissioners, and to reside in the district. The salary will be £1,200 per annum.

The West Penwith Rural District Council, at their meeting on Thursday in last week, decided to ask Mr. Maddern, architect, Penzance, to prepare plans, &c., for the new cemetery at St. Erth.

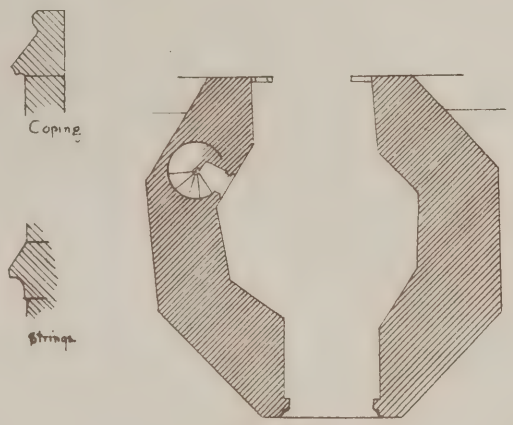
At a meeting of the subscribers to the Wellington College Memorial to Archbishop Benson, held last week, the committee presented their report, which showed that a sum of about £2,000 had been subscribed, and that the governors of the college had offered to add the further sum of £500 to make up the amount estimated to be required to build a new aisle to the school chapel, which is to be carried out in commemoration of the services of Dr. Benson, the first headmaster of Wellington. It was resolved that a further effort be made later to raise funds sufficient to place in the new aisle a statue of Dr. Benson.

At the half-yearly meeting of the City and South London Railway Company the chairman reported that measures were in progress for extending this short line both northwards and southwards. The Finsbury-pavement Station, adjoining the Moorgate-street Station of the Metropolitan Railway, was proceeding very satisfactorily. The shafts had been sunk, and the tunnels had been started. With regard to the St. Mary Woolnoth Church site, they had deposited the required security and had taken possession. From the outside appearance of the church they supposed it was a substantial building, but they had found it a very poorly-built and flimsy structure, with a good deal of scamped work about it, and they would have to take extreme care to prevent it from falling down. The platform of the St. Mary Woolnoth Station would be connected with the underground platform in the Exchange Station of the Central London Railway. Good progress had been made on the site close to the London-bridge railways in Denman-street; the shafts were down, and the construction of the underground station was now being proceeded with. With respect to the Clapham extension, notices had been served for the sites of the two stations, the one near Clapham-road Stations and the other facing the Common. The company were negotiating for obtaining the buildings on both sites.

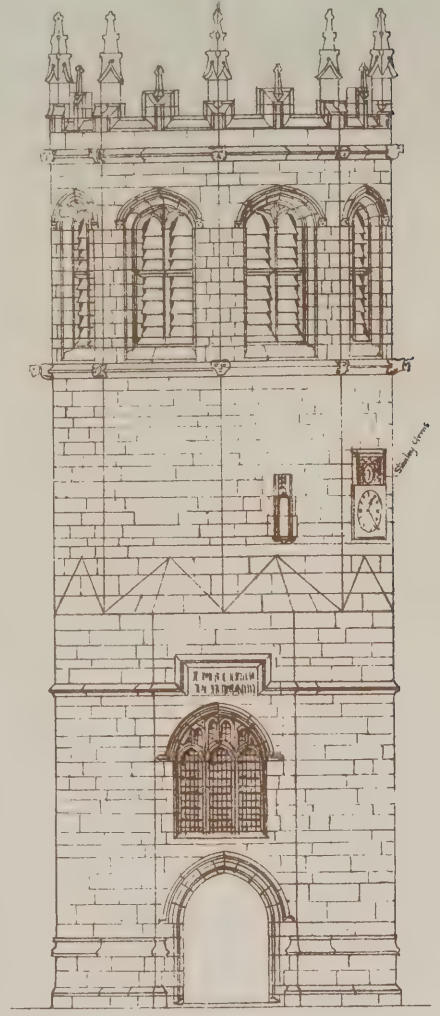

DOORWAYS NEAR LANCASTER
BRIDGE LANE. LANCASTER
PLAN
NEAR SETTLE
FLEET STREET LANCASTER
Nr BENTHAM
NEAR QUERNMORE
PLAN
JAMB
W J RALPH DELT

CHURCH TOWERS NEAR LANCASTER:

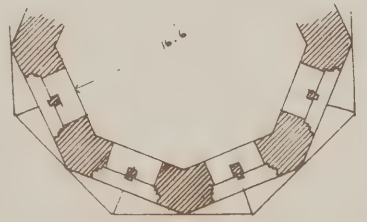
HORNBY: (dated 1514).



GROUND PLAN.

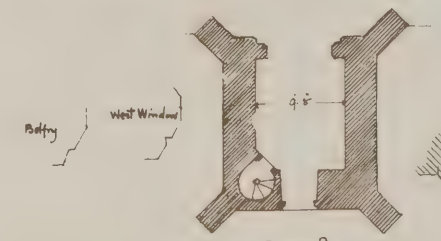


WEST ELEVATION:



PLAN OF BELFRY STAGE.

THORNTON: (The Aisles and Tower roof are modern.)

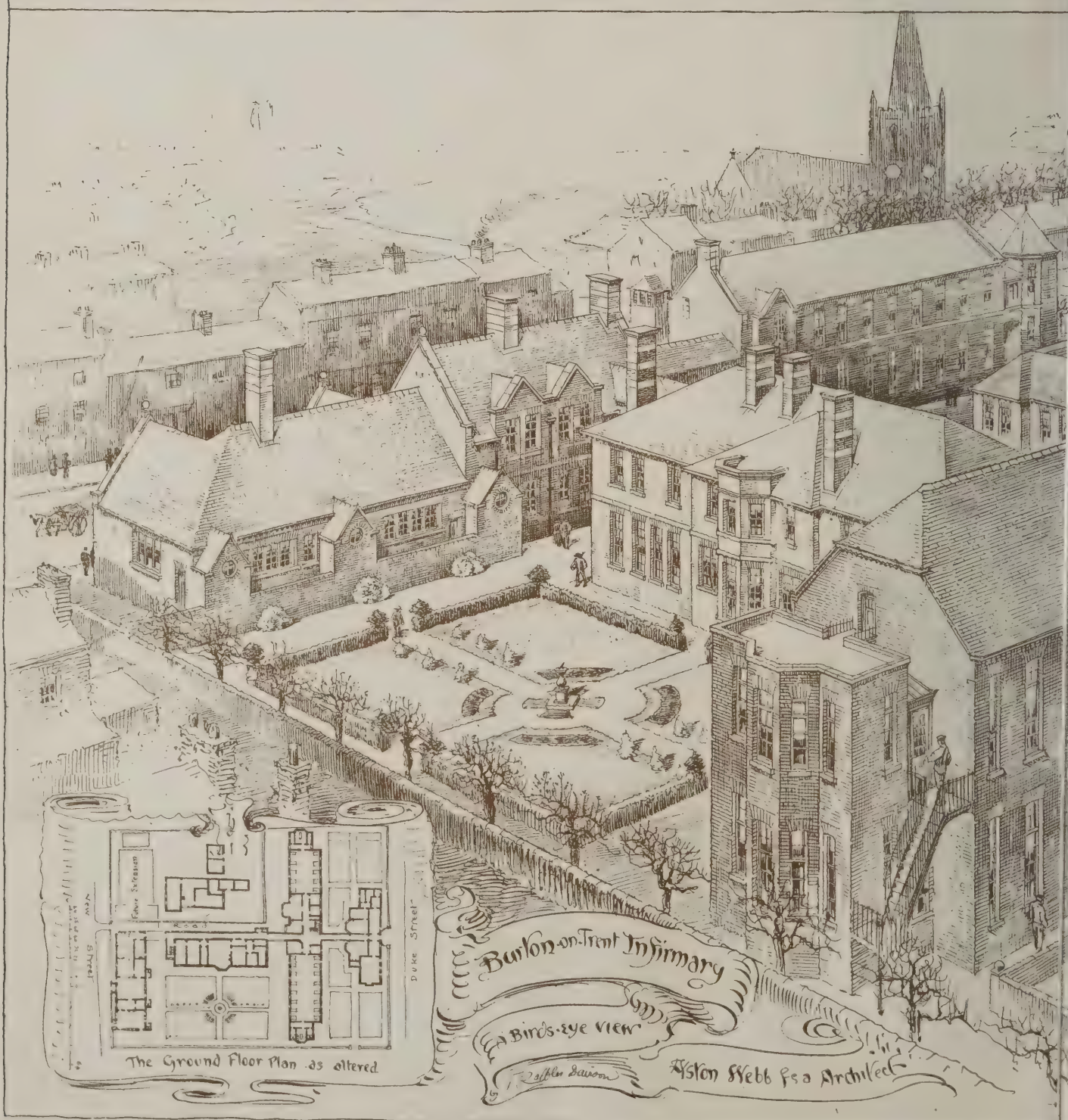


GROUND PLAN
Scale 12 feet to one inch

S. WRIGHT, DEL.T.

Photo-Lithographed & Printed by James Akerman, 6 Queen Square W.C.

ARCHITECTURAL ASSOCIATION EXCURSION, 1897.



The Ground Floor Plan as altered

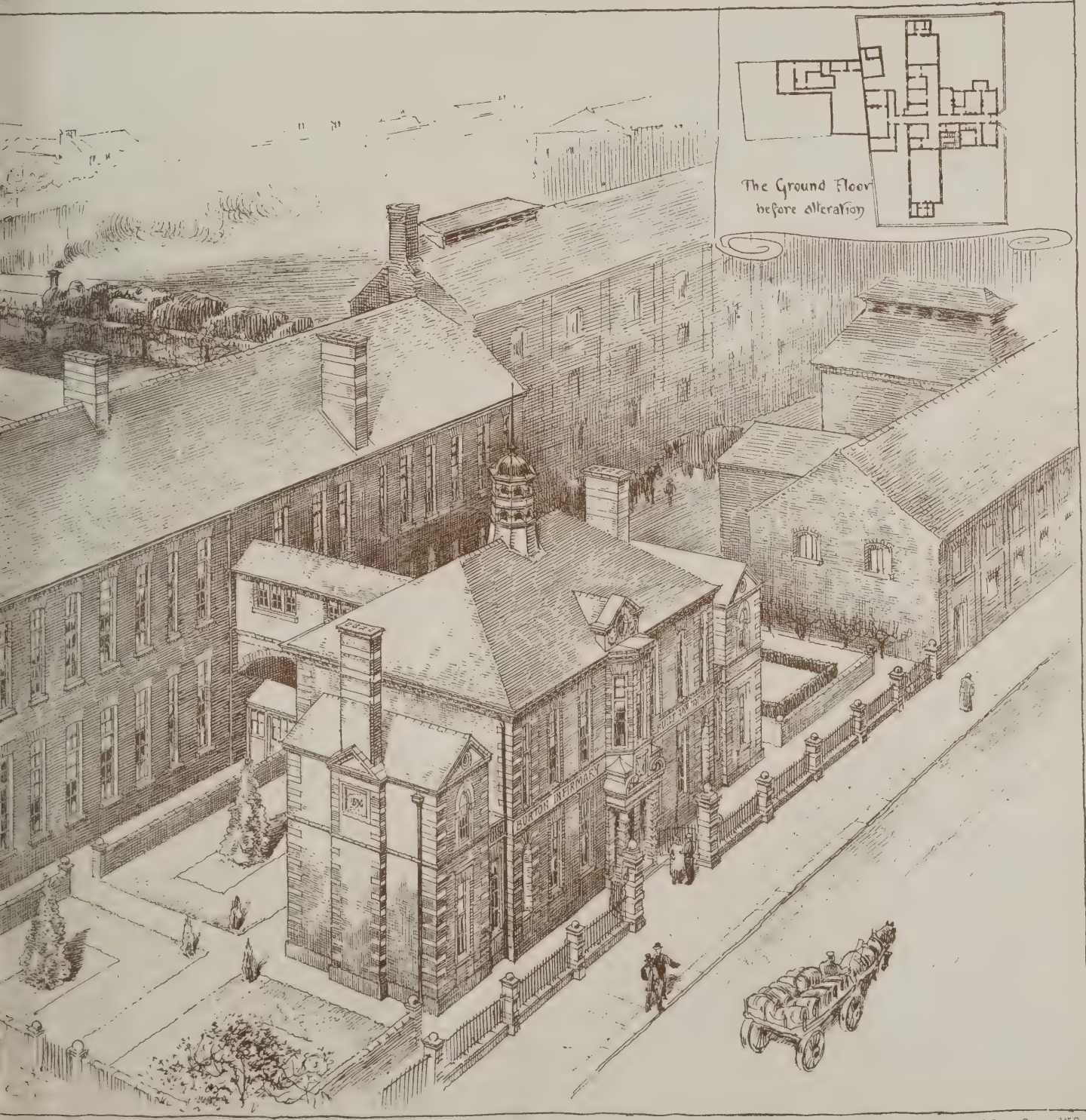


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

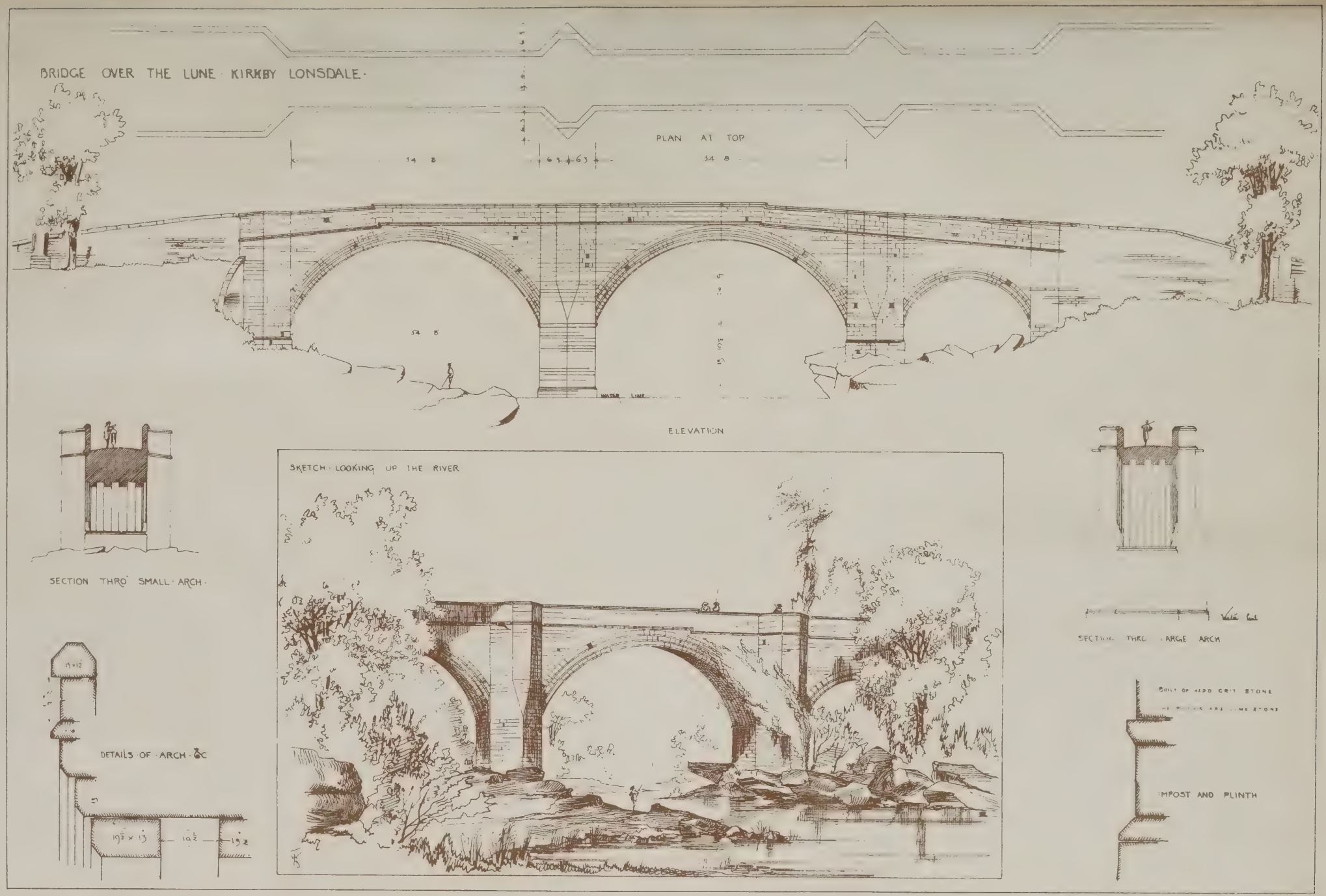
"PHOTO-TINT" by James Akerman 6 Queen Square London W.C.

LEVENS HALL · DRAWING-ROOM DOOR ·

FROM PHOTOS BY F. TURNER · MORECAMBE ·

LEVENS HALL · LITTLE · DRAWING-ROOM ·

ARCHITECTURAL ASSOCIATION EXCURSION, 1897.



DRAWN BY W. TALBOT BROWN

ARCHITECTURAL ASSOCIATION EXCURSION, 1897.

Our Office Table.

An International Congress of Architects and Retrospective Exhibition of Architecture, organised by the Société Centrale d'Architecture of Belgium, will be held at Brussels from Saturday, August 28, to Thursday, September 2, next. The following are some of the questions to be discussed:—1. Instruction in architectural art: should it be eclectic, or should it be limited to the principles of a school? What should be the programme? 2. Is an architectural diploma necessary? 3. Must one in the restoration of monuments (*a*) respect or correct mistakes of construction or errors of the ancients; (*b*) finish the portions of a work they did not finish; (*c*) suppress parts like construction or furniture for unity of style? 4. What steps should be taken to insure to architects proprietorship of their designs? 5. By what means can a general fund be raised by architects for the protection of their common interests? There will be an exhibition of architectural drawings and models, which will remain open to the 30th September; receptions, excursions to places of interest, and a banquet.

The annual gathering of the members of the Society of Art Masters for England and Wales took place on Friday at South Kensington Museum. Mr. S. J. Cartiledge, the chairman, in his opening address, congratulated the society on its growth during the past twelve months. It was to be deplored that the matter of appointing art masters of experience to inspectorships had made practically no headway with the authorities. It was the duty of the society to persevere in this regard. He regretted that the institution of a degree or diploma for art masters had not advanced further than an expression of willingness by the Science and Art Department to grant a title on the same lines as that granted to the Associates of the Royal College of Science. The council, in their report, stated that, prominent amongst the matters that had engaged their attention was the scheme formulated by the Science and Art Department for substituting attendance grants for grants on examination results. They had informed the authorities that it was their belief that the proposed new alterations would be absolutely pernicious, and respectfully suggesting the desirability of withdrawing them. Mr. Walter Scott, one of the promoters of the society, was elected chairman for the ensuing year, and Mr. Walter Wallis, vice-chairman.

In a gossiping article on the late Barney Barnato in the current issue of the *Contemporary Review*, Mr. Harry Raymond says that the Chairman of the De Beers Mines "had to the full the old prejudice against house-building, and if he indeed had any superstition, it was in this. He yet made many announcements of building of palaces from motives of policy. At Johannesburg many plans were prepared and sites selected, but it was only within the last two years that work was really commenced in laying out thirteen acres of gardens. Even this was solely for the purpose of booming the villa lots he owned in the vicinity. When he was in Johannesburg a little more than a year ago, I showed him a print of the elevation of his Park-lane house, which had been issued with, I think, the Building News. [Yes, the *perspective* and plan appeared as a double-page illustration in the Building News for May 8, 1896.—Ed.] "I shall have the finest entrance-hall, stairs, and dining-room in London," he said. "So you are really building at last?" "Building?" he queried, sharply. "Oh, yes, I am building—I must."

The council of the Whitworth Institute, at Manchester, in their third annual report, just published, state that during the year two new galleries, known as the north and the central, have been completed, and that in the same period the council received gifts of the following oil-paintings:—"Interior of the Prison of Chillon," an early work by Clarkson Stanfield, R.A.; "Temple of Jupiter," by J. M. W. Turner, R.A.; "Springtime" and "Autumn Sunset," by J. T. Linnell; and "View of Rome from the Barbarini Gardens," by David Roberts, R.A.; "Cittara, Gulf of Salerno," and "Oude Scheld, Texel Island," by Clarkson Stanfield, R.A.; and "The Emigrants" and "A Roadside Nibble," by John Linnell. Professor Flinders Petrie has presented a fine series of old Egyptian textiles (about 600 A.D.) in 52 small cases. The collection of coins has been augmented by a series given by Mr. T. P. Hall. The library has also received some interesting and valuable additions. The council having received a further donation of about £27,000 in shares from the Whitworth bequest, they decided upon proceeding with the erection of a third gallery, corresponding in position and dimensions with the north gallery, and, like it, accessible from the central gallery, with an extension of the temporary corridor alongside of the old house. As this new gallery will front on to the park, it is proposed to construct, with material removed from the new foundations, a terrace, which will at once add dignity to the edifice, and provide a promenade walk overlooking the park towards the south. The erection of the new buildings will be carried out, as have been the present galleries, under the direction of Mr. J. W. Beaumont, of Manchester, by Messrs. Neill and Sons, of the same city, at a cost of about £7,000.

At the National Eisteddfod, which is being held this year at Newport, Mon., the prizes in the architectural competitions were awarded by Mr. Beresford Pite, F.R.I.B.A., the ex-president of the London Architectural Association. A prize of £10 and a silver medal had been offered for the best design for a national museum and art gallery for Wales, the cost not to exceed £20,000. The subject, Mr. Pite remarked, in making the adjudication, was an exceedingly difficult one, for the reason that to ask for a national museum and art gallery for Wales and to limit the cost to a paltry £20,000 was a contradiction in terms, and it had hampered the competitors very seriously. The result was that one competitor had designed a national building, and had left out the museum and art gallery, while other competitors had designed a museum and art gallery, without having any national aspiration about them at all. The prize was awarded to the design sent in by "Red Dragon" (Mr. John Bain, Newport, Mon.) In the competition for designs for a hall fire-place, Mr. Pite awarded a £5 prize to the work sent in by "Ingle," whose proper name was not disclosed; while the work of Mr. T. P. Burrows, of Caerphilly, was commended. For the best drawing from actual machinery, the winner was Mr. W. C. Davies, of Aberystwyth. All the adjudicators spoke in commendation of the drawings sent in by Mr. W. E. Mathews, of Newport.

The Treasury have appointed a committee of nine members, including Lord Rayleigh, Sir J. Wolfe Barry, and Mr. W. C. Roberts-Austen, to consider and report upon the desirability of establishing a National Physical laboratory for the testing and verification of instruments for physical investigation, for the construction and preservation of standards of measurement, and for the systematic determination of physical constants and numerical data useful for scientific and industrial purposes, and to report whether the work of such an institution, if established, could be associated with any testing or standardising work already performed, wholly or partly at the public cost.

Among the subjects selected for discussion at the 16th annual congress of the Sanitary Institute to be held at Leeds from the 14th to the 18th September are:—Disinfection of rooms; sanitary law: suggestions for codification and amendment; collection of refuse: its destruction or utilisation; the disposal of slops and excreta in rural districts; the scientific bases of sewage disposal; water supply for rural districts, and the means of protecting it from contamination; purification of trade effluents, and utilisation of factory waste products; the Acts of Parliament in reference to the pollution of rivers; sanitary aspect of wood paving; the abatement of smoke; geological stratification and disease; and geology in reference to water-bearing strata. The proceedings will be conducted in three sections, to be held in the Town Hall and adjoining rooms, viz.: I., Sanitary Science and Preventive Medicine; II., Engineering and Architecture; and III., Chemistry, Meteorology, and Geology.

In the tower of Grace Chapel, New York, electricity has replaced the weights of the tower clock, and not only turns its wheels, but also strikes the quarters and the hours and plays a curfew hymn at the close of the day. The weights by which the tower clock and chimes were actuated have been replaced by a small electric motor. The current is furnished from a storage battery which is charged by the Grace Chapel dynamo, and has sufficient capacity to run the clock for two weeks in case it should be necessary to shut down the dynamo. The motor shaft carries a small grooved pulley from which a coiled wire belt runs to a friction pulley on the arbour or shaft of the escapement gear, which is thus subjected to a steady pull, answering to the pull of the weights in an ordinary clock. Every movement of the escapement allows the shaft to rotate the required amount, and the resulting movements of the clock are transmitted by light hollow shafting to the tower clock dials. The chime consists of ten Meneely bells, the largest of which weighs about 3,000lb. and the smallest 250lb. The cost of the current for running the motor is estimated at $1\frac{8}{10}$ cents per day, and the clock has proved to be a reliable timekeeper. The electrical action has been carried out under the supervision of Mr. George F. Atwood, who designed the clock, and Mr. McCullough, the engineer of the Grace Church Settlement plant.

A shipment of 200,000 bricks was recently made to South Africa, says the *Canadian Architect*, by the Union Brick Works, of Tacoma, W.T. The purchasers were the Lingham Timber and Trading Co., of Delagoa Bay. The price obtained is said to exceed by three or four times the cost of production, hence a handsome profit will be realised. As this is believed to be the beginning of an extensive and profitable foreign trade, the attention of Canadian brick manufacturers, especially those of British Columbia, is directed to the subject. Shipments of Canadian dry pressed bricks have been made to South Africa; but our contemporary has not heard that any ordinary stock bricks have as yet found their way to that country.

At Hawthornden, Tyndall's Park, on Tuesday week, the members of the reception committee of the recent visit of the National Association of Master Builders of Great Britain to Bristol waited upon Mr. Krauss for the purpose of presenting him with an engraved silver salver. Mr. W. Church, the vice-president, in making the presentation, said he did so with great pleasure, as a slight token of the indefatigable services the president had rendered in connection with the visit of the National Association to Bristol, a most auspicious event in the annals of the local association. Mr. George Humphreys, the treasurer, also bore testimony to the harmonious manner in which Mr. Krauss had worked with the committee. Messrs. C. A. Hayes, G. Wilkins, F. N. Cowlin, and E. Walters, the secretary, also added a few congratulatory remarks, whereupon the president returned thanks for the handsome present. The silver salver bore the following inscription:—"Presented to Augustus Krauss, Esq., president of the Bristol Master Builders' Association, in recognition of the successful meeting in connection with the visit of the National Association of Master Builders of Great Britain, in the Diamond Jubilee year, 1897, by the members of the reception committee.—W. Church (vice-president), G. Humphreys (treasurer), C. A. Hayes, G. Wilkins, E. Walters, F. N. Cowlin, H. J. Spear (secretary)."

A statue of Benjamin Franklin, the first postmaster-general of the United States, is to be placed on the Chestnut-street front of the Philadelphia Post-office. The statue is the work of Mr. John Boyle, the architectural part being by Mr. Frank Miles Day. The site is appropriate, for, according to tradition, it was on the site of the present Post-office that Franklin stood when he brought down lightning from the clouds by means of a kite, and the spot was also formerly occupied by the house built for the official residence of President Washington. The statue shows Franklin seated.

Considerable interest is being shown in America in the long-span bridge across the St. Lawrence River at Quebec, the construction of which has for many years been discussed. Since the suggested sites have become better known to engineers by the recent visit of members of the American Society of Civil Engineers to Quebec in attendance upon the last convention, two of the leading plans have been distributed for re-examination. One of them, by E. S. Shaw, C.E., Boston, is designed to span the river a few miles above Quebec, and is a thorough cantilever, 3,360ft. in extreme length, with a 1,440ft. centre span and two 560ft. side spans, all of cantilever construction. The roadway is 153ft. above high tide, the towers 310ft. above the piers, and the suspended centre span 480ft. long and 80ft. high. There are two railway tracks and two carriage ways in the same plane, with a total width of

58ft., and the estimated cost is from three to three and one-half million dollars. The other project, by Mr. C. Baillargé, city engineer of Quebec, and essentially the same as proposed by him forty years ago, is for a structure from directly opposite the Chateau Frontenac to Point Levis, and consists of a superstructure 4,800ft. long, suspended from continuous cables in three 1,200ft. intermediate and two 600ft. end spans. The two middle piers are to be built in pneumatic caissons surrounded by large protective cribwork. The railroads, street-cars, carriage ways, and promenades will occupy two decks, and although Mr. Baillargé states that he cannot exceed the 18 hours a day that he now works to undertake the construction of the bridge, he believes that it can be built for not more than £2,000,000 more than the other design.

M. A. F. Gall, in *La Nature*, says that up to the present time the method employed for staining glass consists in adding a metallic oxide to the glass, and melting together the whole mass. M. Gall colours his glass on the surface without melting; he simply impregnates the glass with the colouring, and then applies to a piece of glass some silver salt, placing it in a furnace at a temperature of from 500° to 550°. After a time, when it is cooled down and the free surface salt removed, the glass will be found stained yellow. According to the composition of the glass the stain may vary from pale yellow through orange to red. A very slight quantity of silver salt only is needed. A piece of lace dipped into a one-tenth purest solution of nitrate of silver, and afterwards into one of sulphide of potassium, placed on a piece of glass and heated, leaves an imprint of deep yellow. The intensity of colour is dependent upon the strength of the silver salt applied, and the depth of penetration upon the time of "cooking."

The Architectural Club of Boston, Mass., has sent abroad a young architect for three months of study, and the event has attracted attention by reason of the novelty of the means whereby the scholarship was awarded. Instead of holding examinations and awarding the scholarship or fund to the man who should get the highest percentage, it was decided, the *Engineering Record* explains, to select a young member whose work in the club classes showed promise, and whose application and ambition were of a kind to attract the attention of the older members, and vote him the sum of 200dol. without any examinations, and with simply the stipulation that he devotes himself to a certain line of study while abroad, which is outlined by the club, and shows the results of his work on his return.

Complaints have been made by the Manchester and Salford Sanitary Association as to the growing practice of mixing water-gas with coal-gas on account of the large quantity of carbon monoxide (a positive and very subtle poison) which is contained in the water-gas and even in the water-oil-gas. Very serious results have followed the employment of water-gas for illuminating purposes in America, notably in Boston, Mass., and the gas committee of municipalities undertaking the supply of gas have a great responsibility, especially if they are obliged to use water-gas because they cannot otherwise keep up the supply.

The London County Council have purchased Fortune Green, West Hampstead, which is to be used as a recreation-ground, for £8,000. The green comprises about three acres to be maintained as an open space by the Hampstead Vestry, which has agreed to contribute £3,000 towards the purchase, a similar sum having been given by the Council, and and the remainder raised by subscription.

Mr. Arnold Boyle, C.B., one of the inspectors appointed by the medical department of the Local Government Board, held an inquiry at the offices of the urban district council, Sevenoaks, on the 26th ult., with reference to the proposed purchase of a site at Roundabout Wood for the erection of an infectious hospital for the district.

New board schools at Weston-super-Mare were formally opened by Lady Kekewich on Friday. Messrs. Hans F. Price and Wooler, of Weston, were the architects, Mr. C. Addiscott, was the contractor, and Mr. T. W. A. Hayward, the clerk of works.

The foundation-stone of the science and art buildings, which are being added to the Grammar School at Morpeth, was laid on Friday. The buildings are being erected by Mr. T. W. Middlemiss, from designs by Messrs. Boolds and Hardy, architects, of Morpeth.

Trade News.

WAGES MOVEMENTS.

Edinburgh.—All the operative masons in Edinburgh and Leith, with the exception of those employed in three or four small yards, came out on strike on Monday for an eight hours' day. With the exception of the smaller yards, the masters were unanimous in refusing the demands. Over 2,000 men are out.

Rochdale.—The local branch of the Society of Operative Plasterers have asked the employers for an advance of one penny per hour in their wages and a decrease of one hour per day in their working hours. The plasterers' labourers have asked for an advance of a halfpenny per hour, and the same reduction in their hours of work. If this is refused, the men will come out on strike. The present wages are: plasterers, 8½d., and labourers 6d., per hour.

Scarborough.—The bricklayers of this town have gone on strike for 9d. an hour. They have refused to compromise the matter by accepting 8½d., the same terms as those upon which a dispute with the plasterers was settled last week.

CHIPS.

Mr. Florian B. Dicharry, who died in St. James, La., last month, was an architect who had built several churches and convents in Louisiana.

The Holden wing of the Rochdale Infirmary, opened last week, has been built by Messrs. J. and J. Coates, of that town, from plans by Messrs. Butterworth and Duncan, architects, of South-parade, Rochdale.

At Chester Consistory Court on Friday the vicar and the wardens of St. Mark's, Dukinfield, obtained permission to form a baptistery in the north-west angle of the church, to remove the font thereto, to insert two windows in the west wall, and to place stained-glass windows in the south aisle of the church as a memorial. The incumbent of St. Augustine's, Brinksway, obtained permission to place stained glass in the east window of the morning chapel as a memorial.

An inquiry was held at Okehampton on Wednesday week by Mr. W. W. Tuckett, Local Government Board Inspector, with reference to the application of the town council for leave to borrow £935 for street improvements and sewage purposes, and £140 for fire-brigade purposes. The borough surveyor explained the proposals.

Herr Johann Trenwald, the historic painter and a professor in the Vienna Academy of Fine Arts, died on Wednesday in last week near Vienna, aged 73. Besides many historical pictures, he painted a considerable number of church frescoes and other religious pieces.

A peal of six bells, cast by Mr. James Barwell, of Birmingham, has just been placed in the tower of Knowle Church, to commemorate the Queen's record reign. The dedication service takes place to-morrow (Saturday).

Princess Henry of Battenberg, on Saturday, laid the foundation-stone of the eleventh block of the Ventnor Royal National Hospital for Consumption. The new block, which is being erected in memory of the late Prince Henry of Battenberg, will consist of three houses, accommodating 21 patients, and in addition there will be the usual apartments for the staff. The contract price for the block is £9,134. A guard of honour was provided by a detachment of the 5th Isle of Wight (Princess Beatrice's) Volunteers, under the command of Major Theodore R. Saunders, who is architect of the new building.

The arbitration to settle the price to be paid by the Ashford (East Kent) Urban District Council for the purchase of the local gas undertaking from the Ashford Gas and Coke Company, Ltd., was commenced on Monday, July 26, the arbitrator being Mr. J. Shiress Will, Q.C. The proceedings took place at the temporary premises of the Surveyors' Institution, Savoy-street, Strand. The arbitrator's award has just been made known, the total sum being fixed at 24 years' purchase on a profit of £1,420 per annum, in all £34,080, besides £2,400 for fixtures.

The members of the Southampton and District Builders' and Decorators' Association held their second annual outing on Wednesday week, when Marlborough was visited. At the dinner, held in the evening, the president, Major Brinton, of the firm of Brinton and Bone, presided, and was supported by Mr. Doggrell, hon. secretary, and a large number of members.

The foundation-stone of new buildings, being a considerable enlargement of St. Anne's Schools, Bishop Auckland, was laid yesterday. Messrs. Clarke and Moscrop, Darlington, are the architects, and the estimated cost is £2,000.

LATEST PRICES.

IRON, &c.

	Per ton.		Per ton.
Rolled-Iron Joists, Belgian	£5 15 0	to	£6 0 0
Rolled-Steel Joists, English	6 0 0	„	6 10 0
Wrought-Iron Girder Plates	5 15 0	„	6 10 0
Bar Iron, good Staffs	7 0 0	„	8 0 0
Do., Lowmoor, Flat, Round, or Square	17 0 0	„	17 0 0
Do., Welsh	5 15 0	„	5 17 6
Boiler Plates, Iron—			
South Staffs	7 17 6	,	8 5 0
Best Snedshill	10 0 0	„	10 10 0
Angles 10s., Tees 20s. per ton extra.			
Builders' Hoop Iron, for bonding, &c., £6 15s. 0d. per ton.			
Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.			
Galvanised Corrugated Sheet Iron—			
	No. 18 to 20.		No. 22 to 24.
6ft. to 8ft. long, inclusive	Per ton.		Per ton.
gauge	£10 15 0	...	£11 0 0
Best ditto	11 5 0	...	11 10 0
	Per ton.		Per ton.
Cast-Iron Columns	£6 0 0	to	£8 10 0
Cast-Iron Stanchions	6 0 0	„	8 10 0
Cast-Iron Sash Weights	—	„	4 2 6
Cast-Iron Socket Pipes—			
3in. diameter	5 10 0	„	5 15 0
4in. to 6in.	5 5 0	„	5 10 0
7in. to 24in. (all sizes)	4 15 0	„	5 0 0
[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]			
Pig Iron—	Per ton.		
Cold Blast, Lilleshall	105s. to 110s.		
Hot Blast, ditto	57s. 6d. to 62s. 6d.		
Wrought-Iron Tubes—Discount off Standard Lists f.o.b.			
Gas-Tubes	75p.c.	Fittings	77½p.c.
Water-Tubes	70	„	72½
Steam-Tubes	62½	„	65
Galvanised Gas-Tubes	60	„	62½
Galvanised Water-Tubes	55	„	57½
Galvanised Steam-Tubes	45	„	47½
	10cwt. casks.		5cwt. casks.
Sheet Zinc, for roofing and working up	Per ton.		Per ton.
	£22 10 0	to	£23 10 0
Sheet Lead, 3lb. per sq. ft. super.	14 0 0	„	15 0 0
Pig Lead, in 1cwt. pigs	13 10 0	„	14 10 0
Lead Shot, in 28lb. bags	16 5 0	„	17 5 0
Copper Sheets, sheathing and rods	59 0 0	„	60 0 0
Copper, British Cake and Ingot	50 5 0	„	51 5 0
Tin, Straits	61 17 6	„	62 7 6
Do., English Ingots	66 15 0	„	67 15 0
Spelter, Silesian	17 5 0	„	17 10 0
	Per ton.		Per ton.
Cut Clasp Nails, 3in. to 6in.	£8 15 0	„	£9 15 0
Cut Floor Brads	8 10 0	„	9 10 0

Wire Nails (Points de Paris)—

0 to 7	8	9	10	11	12	13	14	15	B.W.G.
8/6	9/0	9/6	10/3	11/0	12/0	13/0	14/9	16/9	per cwt.

TIMBER.

Teak, Burmah	per load	£14 10 0	to	£16 10 0
„ Bangkok	„ ...	10 10 0	„	15 0 0
Quebec pine, pitch	„ ...	—	„	—
„ yellow	„ ...	2 0 0	„	4 0 0
„ Oak	„ ...	5 10 0	„	6 10 0
„ Birch	„ ...	4 5 0	„	6 0 0
„ Elm	„ ...	4 0 0	„	5 5 0
„ Ash	„ ...	3 5 0	„	4 10 0
Dantsic and Memel Oak	„ ...	2 10 0	„	3 10 0
Fir	„ ...	2 15 0	„	4 10 0
Wainscot, Riga p. log	„ ...	2 0 0	„	3 15 0
Lath, Dantsic, p.f.	„ ...	4 10 0	„	5 10 0
St. Petersburg	„ ...	5 0 0	„	6 10 0
Greenheart	„ ...	8 0 0	„	8 10 0
Box	„ ...	4 0 0	„	15 0 0
Sequoia, U.S.A. ...per cube foot		0 1 8	„	0 1 10
Mahogany, Cuba, per super foot 1in. thick		0 0 5	„	0 0 6½
„ Honduras	„ ...	0 0 5	„	0 0 6½
„ Mexican	„ ...	0 0 4	„	0 0 5
Cedar, Cuba	„ ...	0 0 4½	„	0 0 5
„ Honduras	„ ...	0 0 4	„	0 0 5
Satinwood	„ ...	0 0 7	„	0 1 0
Walnut, Italian	„ ...	0 0 3½	„	0 0 7
Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 11in.:—				
Quebec, Pine, 1st		£20 10 0	to	£26 10 0
„ 2nd		15 0 0	„	17 10 0
„ 3rd		7 10 0	„	11 0 0
Canada Spruce, 1st		10 10 0	„	12 0 0
„ 2nd and 3rd		8 0 0	„	9 0 0
New Brunswick		7 10 0	„	8 0 0
Riga		6 10 0	„	7 10 0
St. Petersburg		8 10 0	„	12 10 0
Swedish		9 0 0	„	15 10 0
Finland		8 0 0	„	8 10 0
White Sea		9 10 0	„	16 0 0
Battens, all sorts		5 0 0	„	20 0 0
Flooring Boards, per square of 1in.:—				
1st prepared		0 8 6	„	0 15 6
2nd ditto		0 7 0	„	0 12 0
Other qualities		0 5 0	„	0 6 6
Staves, per standard M:—				
Quebec pipe		—		—
U.S. ditto		35 0 0	„	42 10 0
Memel, cr. pipe		230 0 0	„	240 0 0
Memel, brack		200 0 0	„	210 0 0

OILS.

Linseed	per ton	£14 5 0	to	£14 15 0
Rapeseed, English pale	„ ...	27 10 0	„	28 5 0
Do., brown	„ ...	23 10 0	„	25 10 0
Cottonseed, refined	„ ...	15 10 0	„	16 10 0
Olive, Spanish	„ ...	28 0 0	„	30 0 0
Seal, pale	„ ...	23 10 0	„	24 0 0
Cocoanut, Cochin	„ ...	26 15 0	„	27 15 0
Do., Ceylon	„ ...	23 5 0	„	23 10 0
Palm, Lagos	„ ...	21 10 0	„	22 10 0
Oleine	„ ...	18 15 0	„	19 15 0
Lubricating U.S.	per gal.	0 6 3	„	0 7 6
Petroleum, refined	„ ...	0 0 4¾	„	0 0 4⅞
Tar, Stockholm	per barrel	1 2 0	„	1 5 0
Archangel	„ ...	0 12 6	„	0 15 0
Turpentine, American	per ton	21 0 0	„	21 10 0

LIST OF COMPETITIONS OPEN.

Neath—Schools (950 places), Gnoll Park-road	£21	A. Russell Thomas, Clerk, 38, Queen-street, Neath	Aug.	7
Kirkham—Fylde Union Workhouse (500 inmates)	£150 (merged), £100, £50	Wm. Thompson, Clerk, Union Offices, Kirkham	,,	10
Surbiton—Council Chamber and Offices (£5,000 limit)	£30, £15	J. Bell, Clerk, Council Offices, Victoria-road, Surbiton	,,	13
Barmouth—County Schools	No premium	John Lloyd, 1, Glanywersedd-terrace, Barmouth	,,	24
Bury, Lancs—Art Gallery and Public Library (£16,000 limit)	£75, £50, £25	John Haslam, Town Clerk, Bury, Lancs	,,	31
Wadhurst—Memorial Hall, Club, and Library (£2,500 limit)	£20, £10	W. Larcomb, Hon. Sec., Wadhurst	,,	31
Ludlow—Electric Lighting Scheme	£20 (merged)	John H. Williams, Town Clerk, Ludlow	Sept.	1
Ipswich—Higher Grade School, Tower-st. (local Competition)	No premium; 5 per cent. com.	J. Hepburn Hume, Clerk to School Board, Ipswich	,,	14
Battersea—Baths and Washhouses, Battersea Park-road	£100 (merged), £50, £25	W. M. Wilkins, Vestry Clerk, Municipal Bldgs., Lavender Hill, S.W.	,,	22
Blaenau Festiniog—County Police Buildings	£15 15s.	J. Morris Jones, County Surveyor, Trawsfynydd, Merioneth	,,	25
Morecambe—Sewerage Scheme	£100	Jno. Bond, Surveyor, U.D.C., Morecambe	Oct.	1
Mexico—Legislature Palace (1,500,000dol. limit)	15,000dol. Mex.	Secretary Public Works, Mexico City	Nov.	30
Cardiff—Town Hall and Law Courts (A. Waterhouse, R.A., Assessor—£200,000 limit)	£500 (merged), £300, £200	J. L. Wheatley, Town Clerk, Town Hall, Cardiff	Dec.	4
Newcastle-on-Tyne—New Infirmary (local Architects)	(No first) £150, £100, £50	Secretary, Building Committee, Newcastle (1898)	Jan.	1
Carlton, Victoria—Children's Hospital	£100, £50, £25	J. Nicholson, Hon. Sec., Pelham-street, Carlton, Australia (1898)	,,	30
New York—Sun Dial (Plaster Model)	500dol., 250dol.	Sec., National Sculpture Soc., 215, West 57th-street, New York (1898)	Feb.	28
Brighton—Artisans' Dwellings (local Architects only)	£75, £25	F. J. Tillstone, Town Clerk, Brighton	—	
Boscombe—Hospital Enlargement, Shelley-road		J. Pratt, Assistant Sec., 126, Christchurch-road, Boscombe	—	
Tottenham—School Board Offices		J. F. Adams, Clerk, School Board Offices, Tottenham, N.	—	

LIST OF TENDERS OPEN.

BUILDINGS.

Hereford—Residence, Hampton Park		Nicholson and Hartree, Architects, Hereford	Aug.	7
Jarrow—Additions to Sheds, Willington Quay	Corporation	J. Petree, Borough Surveyor, Jarrow-on-Tyne	,,	7
Fryston—Lodge		J. G. Kelly, West View, Pontefract	,,	7
Grimsby—Club and Shop in Rutland-street	Aaron Guttenburg	Mitchell, Son, and Co., Surveyors, 112, Cleethorpe-road, Grimsby	,,	7
Thornton—Five Houses		J. Drake and Sons, Architects, Queensbury	,,	7
Scotswood-on-Tyne—Schools (400 places)	Rev. F. Kuyte	J. C. Parsons, Architect, Grainger-street, Newcastle	,,	7
York—Additions, County Hospital		Demaine and Brierley, Architects, 13, Lendal, York	,,	7
Rhostyllen—Three Houses	Baptist Chapel Trustees	Wm. Jones, Brymbo	,,	7
Lochetiveside—Shepherd's Cottage		George Matthew, Manager, Barcaldine	,,	7
Middlesbrough—Shop Front, 207, Linthorpe-road	W. Ridgway	W. C. Roberts, Architect, 61, Albert-road, Middlesbrough	,,	7
Port Knockie—Hall		J. Sutherland, Port Knockie, N.B.	,,	7
Doncaster—New Workhouse, Balby	Board of Guardians	J. H. Morton, F.R.I.B.A., 50, King-street, South Shields	,,	7
Evenwood—Two Houses	J. Lynas	F. A. Livesay, Architect, Market-place, Bishop Auckland	,,	7
Swindon—Addition to Queenstown Club		R. J. Beswick, M.S.A., Swindon	,,	7
Nelson—Additions, National Schools	Rev. Dr. Leigh	William Dowdeswell, Architect, Treharris	,,	7
Newcastle, Co. Down—Shop and House	T. A. Newell	Young and Mackenzie, Donegall-square, Belfast	,,	7
Knaresborough—Enlargement of Catholic Schools		John Gavin Brown, Architect, Knaresborough	,,	7
Elgin—Double Servants' Cottage	Knockdhu Distillers' Company	W. Monro Macbey, C.E., Elgin	,,	7
Howden—Vagrant Wards at Workhouse	Guardians	A. J. S. Shaw, Architect, 27, Queen-street, Oldham	,,	7
Inveresk—Additions to Combination Poorhouse		William Constable, Architect, 20, George-street, Edinburgh	,,	7
St. Stephen's-in-Branwell—Board School	School Board	Wm Bennetto, Clerk, Churchtown, St. Stephen's, Grampound-road	,,	7
Dorchester—Stand	Dorchester Agricultural Society	H. A. Huxtable, Hon. Secretary, Dorchester	,,	7
Swindon—Additions and Alterations to Queenstown Club, College-street		F. W. Ponter, Secretary, Swindon	,,	7
Peterborough—House and Bakehouse at Buckle-street	J. W. Tirrell	J. G. Stallebrass, Architect, Peterborough	,,	7
Morecambe—St. Barnabas' Church, West End	Rev. A. Jackson	Austin and Paley, Architects, Lancaster	,,	7
Croft, Carmarthen—Farmhouse		J. P. M. George, Rhydgarnwen	,,	7
Llandaff—Stabling and Greenhouse at Netherwood	C. J. Smart	John W. Rodger, Architect, 14, High-street, Cardiff	,,	7
Llansypyddid—Additions and Alterations at Board School	U.D. School Board	W. Williams, Clerk, Glanrhyd, near Brecon	,,	9
Great Horton, Bradford—Four Terrace Houses		Samuel Robinson, Architect and Surveyor, Cheapside, Bradford	,,	9
Kinson—Infants' School	School Board	H. W. Dibben, Clerk, Matlock House, Upper Parkstone	,,	9
Middlesbrough—Additions to Seamen's Mission		J. M. Bottomley, Architect, 28, Albert-road, Middlesbrough	,,	9
Glasgow—Three Tenements, Stobcross-street	Corporation	J. D. Marwick, Town Clerk, City Chambers, Glasgow	,,	9
Auchindachy—Distillery at Towiemore		John Alcock, Architect, Keith	,,	9
Cavan—Labourers' Cottages in Various Electoral Divisions	Guardians of Cavan Union	Joseph D. Grier, Clerk, Cavan	,,	9
Heighton, Newhaven—Chimney, 120ft. high	Sussex Portland Cement Co.	The Manager, Newhaven	,,	9
Chester—Infectious Diseases Hospital, Sealand-road		Saml. Smith, Town Clerk, Town Hall, Chester	,,	9
Aberfan, Merthyr Vale—Two Cottages	Ralf Dowdeswell	William Dowdeswell, Architect, Treharris	,,	9
Eccles—Pavilion, Recreation Ground	Parks Committee	G. W. Bailey, Town Clerk, Town Hall, Eccles	,,	9
Croxdale—Wesleyan Church		J. B. Foster, Station-terrace, Croxdale	,,	9
Bridlington Quay—9, 13, 17, 21, or 25 Houses north side of Richmond-street	W. Battle	J. Earnshaw, M.S.A., Architect, Wellington-rd., Bridlington Quay	,,	10
Millbay, Plymouth—Enlargement, Passenger Station	Great Western Railway Co.	G. K. Mills, Secretary, Paddington Station	,,	10
Dover—Alterations, Workhouse Hospital	Board of Guardians	Eugene Carder, Clerk, 17, Market-square, Dover	,,	10
Galway—Alterations to County Court House		Jas. Perry, M.E., County Surveyor, Galway	,,	10
Boston—Additions to Farmhouse	Corporation	R. W. Staniland, Town Clerk, Boston	,,	10
Lexden—Alterations, Workhouse	Guardians of Lexden & Winstree U.	Chas. H. Thompson, Clerk, Victoria Chambers, Colchester	,,	10
Highgate Hill—Infirmary (800 beds)	Islington Board of Guardians	E. Davey, Clerk, St. John's-road, Upper Holloway	,,	10
Southend-on-Sea—Primitive Methodist Chapel and Schools, Pleasant-road		Rev. T. Jackson, 8, Rushmore-road, Clapton, N.	,,	10
Cardiff—Alterations to 16, George-street, Docks, Cardiff	William Jones	W. H. Dashwood Caple, Architect, 1, St. John's-square, Cardiff	,,	11
Quaker's Yard—Twenty Cottages	Woodland Building Society	Wm. Dowdeswell, Architect, Treharris	,,	11
Cardiff—Converting 46, Cowbridge-road, into Business Premises		W. H. Dashwood Caple, 1, St. John's-square, Cardiff	,,	11
Ferryhill—Repairing Four Farmsteads	Col. Surtees	F. A. Livesay, Architect, Market-place, Bishop Auckland	,,	11
Gorleston—Six Cottages, Church-road	Jas. Tidman	W. B. Cockrill, Architect, Gorleston, Yarmouth	,,	11
Bradford—Alterations to Premises in Bridge-st. and Vicar-lane	Provident Industrial Society	Secretary, 65, Sunbridge-road, Bradford	,,	12
Gawthorpe, near Ossett—Church		Tom H. Farrar, Architect, Fountain-street, Halifax	,,	12
Runcorn—Enlargement of Board-room	Board of Guardians	John Ashton, Clerk, Runcorn	,,	12
High Ham—Villa	Representatives of late H. A. Gillett	Jos. Spire, Architect, Glastonbury	,,	12
Aghalee—Dispensary at Folly Hill	Guardians of Lurgan Union	Edwin Jas. Donaldson, Clerk, Lurgan	,,	12
Scarborough—Eight Coastguard Houses	Lords of Admiralty	Director of Works Department, 21, Craven-street, W.C.	,,	13
Falmouth—Reseating Wesleyan Chapel		H. W. Collins, Architect, Penryn-street, Redruth	,,	13
Clones—Upper Part of Tower and Spire at the Catholic Church		Very Rev. L. J. Canon O'Neill, P.P., Clones	,,	14
Carnkie—New School	Illogan School Board	F. W. Blamey, Clerk, Portreath	,,	14
Carlisle—House and Cottage at Curthwaite Mill		George Armstrong, Architect, 45, Lowther-street, Carlisle	,,	14
Ballyhaise—Two One-Story Cottages	Great Northern Ry. Co. (Ireland)	T. Morrison, Secretary, Amiens-street, Terminus, Dublin	,,	16
Pontypool—Alterations & Additions to Workhouse, Griffithstown	Guardians	T. H. Atkins, Clerk, Club Chambers, Pontypool	,,	18
Carlow—Additions and Alterations to Lunatic Asylum		Secretary, Board of Control, Custom House, Dublin	,,	20
Sunbury-on-Thames—Engine House	Urban District Council	John Austie, C.E., Engineer, 17, Victoria-street, Westminster	,,	23
Trimdon Grange—Enlarging and Reseating Wesleyan Chapel		W. R. Woodhead, Trimdon Grange, Co. Durham	,,	24
Everton—Chimney Shaft, Refuse Destructor, Cobb's Quarry	Liverpool Corporation	Town Clerk, Municipal Buildings, Liverpool	,,	24
Parc Gwyllt Asylum—Temporary Block		T. T. Lewis, Solicitor, Bridgend	,,	25
Dinas Powis—Truant Industrial School	Cardiff and Barry School Boards	John J. Jackson, Clerk, School Board Offices, Howard-gdns., Cardiff	,,	28
Dewsbury—28 Houses, Hill Head, Malkroyd-lane	Pioneers' Industrial Society, Ltd.	Holtom and Fox, Architects, Westgate, Dewsbury	,,	30
Reading—Repairs to Four Houses		Heron and Heron, Auctioneers, 135, Victoria-st., Westminster, S.W.	—	
Briton Ferry—House		J. C. Rees, Architect, St. Thomas's Chambers, Neath	—	
Mount Pleasant, Mon.—Eight Workmen's Cottages	Griffiths Building Club, Cwmtillery	Lansdowne & Griggs, Archts., Metropoltn Bnk Chmbrs, Newport, Mn.	—	
New Wortley—Four Houses		Crown Hotel, New Wortley	—	
Catford—Three Terrace Houses, Two Shops, and Stable, Bradgate and Silvermere-roads		Phillips and Norfolk, Architects, Catford Bridge, S.E.	—	
Woking—Conservative Club, Commercial-road		F. W. Austin, Secretary, 20, Cheapside, E.C.	—	
Harrogate—Stables at the Victoria Hotel	Bentley and Co.	Albert E. Kirk, A.R.I.B.A., 13, Bond-street, Leeds, architect	—	
Killamarsh—Six Houses		W. H. Wagstaff, Architect, Chesterfield	—	
Clacton-on-Sea—Shops, Residences, and Stables, Wellesley and Carnarvon roads		J. W. Martin, Architect, Station Chambers, Clacton-on-Sea	—	
Catford—Eight Terrace Houses, Beechfield-road		Phillips and Norfolk, Architects, Catford Bridge, S.E.	—	
Grimsby—Store, Fish Dock	Ocean Steam Fishing Co., Ltd.	E. De Lacey Read, Secretary, Fish Docks, Grimsby	—	
Shaw—Congregational Schools, Rochdale-road		W. Dixon, Architect, Trevelyan Building, Manchester	—	

BUILDINGS—*continued.*

Castleton—Wesleyan Chapel		H. W. Lockwood, Architect, Palatine Chmbrs, Pinstone-st., Sheffield	—
Arnside—Two Villas	T. Dobson and Sons	Jno. Stalker, M.S.A., 57, Highgate, Kendal	—
Hyde—Alterations, St. Paul's R.C. Schools		E. Kirby, 5, Cook-street, Liverpool	—
Bradford—12 Houses, Barker-end-road		G. C. Gamble, Architect, Parkinson's Chambers, Bradford	—
Dundrum—Premises and Residence	J. M'Clafferty	J. J. M'Donnell, Architect, 27, Chichester-street, Belfast	—
Attercliffe—Four Houses at Broadoaks		Walker Bros., Architects, 76, Carver-street, Sheffield	—
Newlay, Leeds—Alterations to Houses	S. Whitaker	J. Peakman, Architect, Hopwood Bank, Horsforth, Leeds	—
Leeds—Eight Houses & Two Shops, Upper Accommodation-rd.		J. R. Conyers, 159, East-street, Leeds	—
Kirkby-in-Ashfield—Stores	Working Men's Co-operative Society	Ball and Lamb, Architects, 5, Hounds-gate, Nottingham	—
Killamarsh—Six Houses		Wm. Hy. Wagstaff, Architect, Chesterfield	—
Leavesden—Alterations to St. Pancras Schools	Guardians of St. Pancras	C. P. Ayres, Architect, 14, High-street, Watford	—
Gateshead—Fourteen Small Self-Contained Houses		J. Morris, Millicent-terrace, Gateshead	—
Leeds—Infants' School at Hunslet Carr	Leeds School Board	W. Packer, Clerk, School Board Offices, Leeds	—
Marylebone—Rebuilding No. 90, High-street		J Randall Vining, 89, Chancery-lane, W.C.	—
Kingston-upon-Thames—Electric Light Works Extension	Lighting Committee	Harold A. Winser, Town Clerk, Clattern House, Kingston-on-Th.	—
Mumbles, Swansea—Rebuilding the Mermaid Hotel		H. Tudor Thornley, Architect, 100, St. Mary-street, Cardiff	—
Wood Green, N.—Higher-grade Schools	Tottenham School Board	A. M. Butler, Architect, 16, Finsbury-circus, E.C.	—
Leeds—Workshop		J. C. Warriner, Carlton Hill, Leeds	—
Griffithstown, Mon.—House and Stables	Dr. O'Keeffe	Lansdowne & Griggs, Archts., Metrop. Bank Chmbrs., Newport, Mon.	—
Belfast—Repairing Castlereagh Presbyterian Church		C. A. Aicken, Architect, Rosemary-street, Belfast	—
Harrogate—Additions and Alterations, Victoria Hotel	Bently and Co.	Albert E. Kirk, A.R.I.B.A., 13, Bond-street, Leeds	—
Bedlington—House, West-end		Nicholas Stoker, Shop-row, Bedlington	—
Draycott—Extension to Victoria Mills	Ernest T. Hooley	G. S. Doughty, Architect, Britannia Chambers, Pelham-st., Notts	—
Cadoxton Barry—Hotel and Stables, Holton-road		H. Tudor Thornley, Architect, 100, St. Mary-street, Cardiff	—
Swansea—Additions and Alterations to St. Thomas's Church Schools		Wilson and Moxham, Architects, 15, Castle-street, Swansea	—
Carlisle—Operating Room at the Cumberland Infirmary	Building Committee	J. G. Howlett, Cumberland Infirmary, Carlisle	—
Audenshaw—Classroom, St. Stephen's Schools		J. H. Burton, Architect, 2, Guide-lane, Hooley Hill	—
London, E.C.—Rebuilding Rose and Crown, Bartholomew-close	Benskin's Watford Brewery, Ltd.	Dear and Winder, Archts, 119, Great Russell-st., Bloomsbury, W.C.	—
Baildon—House		Isitt, Adkin, and Hill, Architects, Prudential Buildings, Bradford	—
Peterborough—Pair of Villas in Fletton-avenue	Edmund Toms	James Ruddle, Architect, Boroughbury, Peterborough	—
Tidal Basin, E.—Alterations & Timber-work at Manure Factory		Anglo-Continental Guano Works, 15, Leadenhall-street, E.C.	—
Rawdon, Leeds—Four Terrace Houses, Apperley-lane		Fred. Mitchell, Architect, 71, Albion-street, Leeds	—
Llandrindod Wells—Hotel	Gwalia Hotel Co., Ltd.	Swash and Bain, Architects, Midland Bank Chambers, Newport	—
London, E.C.—Alterations to The Three Tuns, Fann-street, Barbican	J. Beer	G. Silvester, Surveyor, 46, Strand, W.C.	—
Gleedless—Alterations to Heeley and Sheffield House		W. T. Rhoden, Archt., Buckingham Chmbrs., St. James's-st., Sheffield	—
Ipswich—Additions Rose Hill Schools	School Board	E. F. Bisshopp, Architect, 32, Museum-street, Ipswich	—
Cork—Alterations, 6, North-mall		K. D. Roche, Architect, Marlborough-street, Cork	—
Aghalee—Dispensary, Folly Hill	Guardians of Lurgan Union	Edwin. Jas. Donaldson, Clerk, Lurgan	—
Bewdley—House and Farm Buildings		T. R. Baker, Bark Hill, Bewdley	—
Ferrybridge—Villa	John H. Shepherd	J. H. Greaves and Co., Architects, Corn Market, Pontefract	—
Barnet—Additions to Victoria College Hospital		C. P. Ayres, Architect, 14A, High-street, Watford	—
Exmouth—Railway Hotel	City Brewery Co., Exeter	Kerby and Ellis, Architects, Exmouth	—
Baildon—Residence		Isitt, Adkin, and Hill, Prudential Buildings, Bradford	—
Knaresborough—Detached House, Boroughbridge-road	W. Goodyear	Arthur A. Gibson, Architect, 8, Cambridge-crescent, Harrogate	—
Swinton—Rebuilding Parish Church		E. Isle Hubbard, M.S.A., Moorgate-street, Rotherham	—
Twerton, Bath—Schools	School Board	Silcock and Reay, Architects, College Chambers, Bath	—
Newton-in-Cartmel—House		Hy. Bispham, Newton-in-Cartmel	—
Peterborough—House and Shop, Buckle-street	J. W. Tirrell	J. S. Stallebrass, Architect, Peterborough	—
Dukinfield—Alterations, Victoria British Schools		J. H. Burton, Architect, 2, Guide-lane, Hooley Hill	—
Chatham—Rebuilding Alexandra Inn	Budden and Biggs' Brewery	—. Boucher, Architect, High-street, Rochester	—
Carlisle—Alterations to Golden Fleece Inn		George Armstrong, Architect, 45, Lowther-street, Carlisle	—

ENGINEERING.

Highgate—Culvert, Cholmeley Park Estate	Hornsey Urban District Council	F. D. Askey, Clerk, Southwood-lane, Highgate	Aug. 9
Stonehouse, Glos.—Footbridge over Line	Great Western Railway Co.	G. K. Mills, Secretary, Paddington Station, W.	„ 10
Castleacre—Bridge over the River Nar	Freebridge-Lynn R. District Council	James S. Culham, Highway Surveyor, Grimston, King's Lynn	„ 11
Morecambe—Widening East End Pier		Mangnall & Littlewoods, Architects, 42, Spring-gardens, Manchester	„ 12
Tonbridge—Carburetting Plant		James Donaldson, Secretary, Tonbridge	„ 12
Carlisle—Electric Lighting Plant	Corporation	Henry C. Marks, City Surveyor, Fisher-street, Carlisle	„ 12
Deerhurst—Repairing the Gildable Flood-Gate		S. J. Gillett, Surveyor, Deerhurst	„ 14
Brighton—Condensing Plant	Town Council	Francis J. Tillstone, Town Clerk, Town Hall, Brighton	„ 16
Salford—Electric Wiring Library and Museum at Peel Park	Corporation	Town Clerk, Town Hall, Salford	„ 17
Inverness—Waterworks, and Laying about 5,300 yards of Pipes	Town Council	Kenneth Macdonald, Town Clerk, Inverness	„ 17
Crajova—Water Supply	Mayor, &c.	The Mairie, Crajova, Roumania	„ 28
Cairo—Iron Bridge (Second Time)	Minister of Public Works	Public Works Department, Cairo	„ 31
Aberdare—Sinking Shaft at Cwmaman Colliery		W. J. Heppell, Cwmaman Colliery, Aberdare	—
Pontypool—Culvert, Manholes, &c.	Colonel Wheeley	Lansdowne & Griggs, Archts, Metropolitan Bank Chmbrs, Newport	—
Newark—Bridge Works	Rural District Council	Tom Vickers, C.E., District Surveyor, Newark	—
Ashby-de-la-Zouch—Sinking Well		Sutton and Co., Union Pottery, Overseal, Ashby-de-la-Zouch	—
London—Two Steam Hoppers	Thames Conservators	Engineer, Thames Conservancy, Victoria Embankment, E.C.	—
Selby—Sinking Artesian Well	Yorkshire Bacon-Curing Co.	E. Townsend, Secretary, 1, Abbey-place, Selby	—
Dublin—Heating Training College, Marlborough-street		The Principals, Marlborough-street Training College, Dublin	—

FENCING AND WALLS.

Lesbury—W.I. Flat Bar Fencing	Alnwick Rural District Council	H. W. Walton, Clerk, Alnwick	Aug. 9
Cavan—Inclosing Sites of Labourers' Cottages	Board of Guardians	J. D. Grier, Clerk, Cavan	„ 9
Mountain Ash—Rubble Ash Wall	Urban District Council	H. P. Linton, Clerk, Town Hall, Mountain Ash	„ 9
Stoke-next-Guildford—Oak Fence (170ft. by 6ft.) at Stoughton Recreation Ground	Parish Council	Peter Dewar, Clerk, 35, Artillery-road, Stoke, Guildford	„ 14
Mallaig, N.B.—Wire Fencing on Mallaig Section	West Highland Railway Co.	R. MacAlpine and Sons, 33, Gordon-street, Glasgow	—
Sedgefield—Concrete Retaining Walls	Asylum Committee	W. Crozier, County Surveyor, Durham	—

FURNITURE AND FITTINGS.

Crewe—Furniture, Bedding, Carpets, &c., for Fever Hospital	Corporation	F. Cook, Town Clerk, Crewe	Aug. 7
Cuddington—Furnishing Fever Hospital	Joint Hospital Board	W. O. Reader, Clerk, Lonsdale, Epsom	„ 9
Handsworth—Furniture and Fittings, Technical School	Committee	H. Ward, Hon. Secretary, Council House, Soho-road, Handsworth	„ 9
Merthyr Tydfil—Furniture for New Public Offices	Urban District Council	Gwilym C. James, Clerk, 58, Thomas-street, Merthyr Tydfil	„ 17
Hulme—Electric Light Fittings, Town Hall	Committee	J. Rison, Town Hall, Manchester	—

PAINTING.

Greenock—Smithston Lodge		Boston, Menzies, and Horton, Architects, 11, Willis-st., Greenock.	Aug. 7
Hull—Properties	Charity Trustees	E. G. Smith, Secretary, Hull	„ 7
Keighley—Dalton and Cornhill Bridges	Corporation	W. H. Hopkinson, Borough Engineer, Keighley	„ 9
Kinson, Dorset—Heatherlands Board School		H. W. Dibben, Clerk, Kinson	„ 9
Handsworth—Council House	Urban District Council	H. Ward, Clerk, Soho-road, Birmingham	„ 9
Tamworth—Fever Hospital	Joint Infectious Diseases Board	H. J. Clarson, 22, Church-street, Tamworth	„ 14
Canterbury—Workhouse and Infirmary	Board of Guardians	J. Plummer, Clerk, 36, St. Margaret-street, Canterbury	„ 16
Hulme, Manchester—Town Hall	Town Hall Committee	J. Rison, Town Hall, Manchester	—
Morley—Public Market, Morley		W. H. Jowett, Cragg Vale House, Morley	—
Greetland—Cottages at Crosshill		Joseph Peel, Mount Pleasant, Greetland	—
Audenshaw—St. Stephen's Central and Branch Schools		Rev. A. C. Bulkeley, Audenshaw Vicarage, Manchester	—

ROADS AND STREETS.

Eccles—Sewering and Paving Vernon-avenue	Highways Committee	Geo. Wm. Bailey, Town Clerk, Town Hall, Eccles	Aug. 9
Sandal Magna—Kerbing and Concrete Flagging Doncaster-road	Urban District Council	Arthur Fawcett, A.M.I.C.E., Old Town Hall, Wakefield	„ 9
Brighouse—Kerbing, &c., Rastrick Common	Highways Committee	Emerson Brooke, Borough Surveyor, Public Offices, Brighouse	„ 9
Batley—Making-up Orford-street and Great Wood-street	Corporation	J. H. Craib, Town Clerk, Batley	„ 9
Woolwich—Granite Paving and Jarrahdale Paving	Local Board	H. O. Thomas, A.M.I.C.E., Town Hall, Woolwich	„ 10
Wallsend—Street Works	Urban District Council	W. S. Daglish, Clerk, 28, Sandhill, Newcastle-on-Tyne	„ 11
Spennymoor—Footpaths	Urban District Council	F. Badcock, Clerk, 3, James-street, Spennymoor	„ 11
Pontlottyn—Laying Out Roads, Pontlottyn Estate		Gustard & Waddington, Solicitors, 13, Gloucester Bnk-chmbrs, Nwprt	„ 11
Aldborough, Yorks—Asphalte Paths at Cemetery	Burial Board	F. S. Capes, Clerk, Boroughbridge	„ 12
Halifax—Making Up Four Streets	Highways Committee	Edward R. S. Escott, Borough Engineer, Town Hall, Halifax	„ 12
Morley—Paving and Channelling, Dartmouth-avenue	Corporation	M. H. Sykes, Borough Surveyor, Town Hall, Morley	„ 16
Morley—Sewering and Kerbing, Ashfield-road	Corporation	M. H. Sykes, Borough Surveyor, Town Hall, Morley	„ 16
Morley—Sewering and Kerbing, Pawson-street	Corporation	M. H. Sykes, Borough Surveyor, Town Hall, Morley	„ 16
Burnley—Paving, &c., 25 Streets and 36 Back Streets	Highways Committee	G. H. Pickles, Borough Surveyor, Town Hall, Burnley	„ 18
Birkenhead—Flagging Passages	Corporation	C. Brownridge, Borough Surveyor, Birkenhead	„ 18

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MODERN DISGUISES.

THE word "shams" in connection with architecture came into existence somewhere about the 17th century. Before that time, building and architecture, though not convertible terms, were used as honest interpretations of facts. No one dared to dispute that an architect did anything else than to design according to existing or traditional rules, though, as a matter of fact, ever since the 15th century he had been reverting to bygone modes of building. Still, there was no reproach to his honesty intended: the architect was thought to be in possession of the traditions of his craft, and to build according to them, even although he consulted the works of the early Italian Revivalists in all he did. The word "sham" marked a sense of degeneracy which has not left us. It was applied when we sought to imitate methods of construction, and even materials. All that the architects of the Renaissance did was to imitate style, but they spared no expense in their work. Stone and brick, plaster and wood were employed in their old ways, as all our best English and foreign Renaissance buildings show; but the attempt to produce these in cheaper and inferior materials, like stucco and cement and painted work, led to shams of the worst sort, and to a very different kind of imitation. For instance, it was when we substituted stucco and cement for stone, lath-and-plaster for real vaulting, and covered up our construction with materials intended to counterfeit real masonry, that our consciences began to be troubled. We began to doubt our own liberty, and threw about reproachful phrases and words which showed the helplessness and dishonesty of our conduct. Adjectival prefixes like "quasi" and "pseudo" are profusely used in the architectural literature of the Later Revival, and other uncomplimentary adjectives may be seen in the writings of those who espoused the opposite schools of art.

We are better and more honest now because both sides begin to see the weaknesses of each, and the last decade or two has given us time to reflect, to take stock of each other's position, and to make advance on recognised principles, and to cool down our antipathies. Though far from being perfect, architects have begun to learn moderation, and to understand the difference between a sham and a substitute. While Brown protests loudly against being taken in by a fraud, he will yet submit patiently to a transaction which does not impose on his good nature or sense. If he knows beforehand that he is going to have cement for stone round his door and window dressings, or an electro-plated teapot instead of one of silver, he does not complain. And it is so with decorative substitutes. Mr. Shamhater goes to a West-end restaurant; before him, as he sits at a table sipping his coffee or lemon-squash, is a square pillar of glazed faïence, embossed and coloured. Although it looks solid, he is not offended when he knows the faïence is merely a casing to an iron pillar which carries the girder above. But suppose the pillar has the shape of an iron column—that it is disguised to look like bronze, while in reality it is merely a plaster casing painted round an iron pillar within. The fraud is apparent, and produces disgust. In painted joinery—imitations of marble and choice woods, shop-counters and doors and dadoes made to represent marble or mahogany and walnut—the artistic mind is at once offended by the imposition; but if the same woodwork is painted in flat tints, decoratively, we can hardly call it a sham: we accept the decoration as a conventional mode of treating wood; the tints do not misrepresent anything. The same principle may be extended to a variety of other things. Take a wall: we stucco it, and mark it with joints to represent stone courses. Here we commit a deliberate falsehood; but if we divide it into panels, or paint and distemper the surface, or decorate it with frescoes, we are consistently treating the material as a groundwork for coloured decoration. A jointed plaster vault or arch is a sham; but if we paint its surface or cover the vault with frescoes or mosaics, there is nothing to offend.

But although our shams are not of the glaringly dishonest kind we were wont to see in the fifties and sixties, we have a few still left. First, to take the masonry of our buildings, we still see walls built in such a manner that the amount of stone in the composition of them bears a very small proportion to their thickness. Externally the wall pretends to be all stone, with wide courses, whereas, in fact, it is really covered with slabs of stone jointed to imitate solid masonry. When, to this sort of construction, we add another item, most of our buildings must still be held answerable to the charge of being shams—we mean when such a thin stone-faced building pretends to be solidly constructed in the manner of stonework, with massive projecting pilasters and columns, entablatures, and so forth. The degree of culpability is increased by such a mode of treatment. We cannot object to a well-bonded stone-faced wall, with a sufficient number of "through" stones, and of a reasonable thickness, when it fairly represents itself as such—namely, by avoiding considerable projecting features and boldness of detail; but when these projections in stone are increased to a depth in excess of the facing stones, when cornices and window pediments and pilasters are made to project as if they were constructed of solid stone, "tailed" into the wall, and represented solid masses of stone, there is a real deceit of intention which it would be difficult to excuse. It would not be hard to find numberless shams of this kind, where common honesty would have suggested solid brick. The desire to introduce expensive materials and design at the cost of solidity is generally the origin of shams, and in proportion as we reduce the thickness of the substitute the greater is the deceit. It is true the old Romans constructed walls of concrete with a brick facing—a plan followed by the Byzantine builders; but this construction was dictated by economical reasons. It allowed the carcase to be carried on quickly without waiting for masons, and the walls were afterwards lined with marble or mosaic internally. At St. Sophia masonry construction was honestly developed. The Roman entablature gave way to an honest arched style, in which column and arch were expressed externally, and really performed their functional offices. Thus, as may be seen by anyone conversant with Byzantine feature, the capitals were shaped to receive the arches without the intervention of the entablature. Then the round shafts themselves were monolithic and bronze amulets under the capitals and above the base prevented the shafts from splitting. Our modern masonry does not follow these methods. We cover our walls with stone where brick would be much better; we prefer to adopt the Roman method of false pilasters and entablature, and build arches and columns that do not carry anything. The apologist for sham construction often refers to the masonry in many of our cathedrals where the piers at the crossing are of ashlar with rubble filling—a mode of construction derived from Roman and Romanesque buildings. But if he thinks for a moment of the circumstances which gave rise to this system, the conditions the architect had to meet, he will find out that this method bears no analogy to modern work. The inert mass of these isolated piers was essential to their stability, and it would have been impossible to build them of squared stones throughout; the walls too, especially of gables like those under restoration at Peterborough, had to be made thick, and would have consumed an immense quantity of squared stone if built solid. But modern cased masonry is often without any of these excuses; in fact, solid work and bonding is necessary in walls of comparative thinness. What are we to say of columns of stone or marble which really carry nothing, as we see in halls and vestibules of buildings, erected simply for effect? The sham column is everywhere: it seems to have become a monument more than a support—something set up as an ornament. Then we have arches constructed merely for show in the fronts of buildings, carrying nothing, which would be served much better by a plain lintel. We admit that both columns and arches may have a decorative character, and may be used ornamentally in design; but only under certain restrictions. It is legitimate to use columns as mullions of windows, or as balusters; but it is exceedingly dishonest to introduce them in a hall to carry what purports to have a weight, or a system of sham vaulting or arches. A wide arch made by cradling down from a girder or lath and plaster is simply a falsehood which no art casuistry can palliate. It may be hard sometimes to draw the line between what should be an honest piece of construction and what decoration—in other words, to say what is a sham and what a decorative feature. Take, for instance, an iron column or stanchion, cased to represent a granite or marble pilaster. We do not see anything glaringly wrong in a marble-cased support, say, to a shop-front: the casing of marble protects the iron, and brings it into keeping with the woodwork of the window, provided it is designed so as not to suggest a solid round column of granite. Still, for all that, a granite or marble-cased column supporting anything is a sham. It would be more honest to use a hard stone solid pier, or to let the iron show itself plainly. Boxing or casing in any form is not honest. A "boxed" marble mantelpiece when it represents a solid construction is a sham; so is a marble-cased beam and an arch. But if used decoratively, the dishonesty is not so great. It would be allowable, for instance, to let in slabs of marble into the interior face of a wall to produce pilasters or a "blind arcading." In this case the motive is apparent: that of decoration.

The modern shop-front is to a large extent made up of shams, from the cornice and fascia board down to the plinth. The object of making a wide plate-glass window appears to be the leading idea. All supports must be disguised or reduced to a minimum, massive construction must give place to hollow casings and decorative adjuncts. All kinds of counterfeits are invented; if the front is to present a dignified aspect to the street, a sham entablature must be cradled or bracketed out from the wall, and the floor below obscured by silvered glass or other devices. Anything is tolerated rather than the honest mode of supporting the wall by piers of substantial masonry. And these subterfuges are aggravated; they are carried up throughout the exterior;—there must be large windows above, with thin mullions and decorations of a flimsy kind. But shams are not confined to commercial buildings. We notice them in the large town or country residence, and even in the church. What is more common now than to see bay windows in which the mullions, which imitate stone, are only cement work

jointed, or if stone, they are mere pieces half a brick thick to hide ordinary deal-cased frames and sashes. The panelled ceiling, it is needless to say, is false;—made up of embossed fibrous plaster under common deal joists and plaster, the ribs, which simulate solid plasterwork, betray their origin. If the ceiling imitates one of panelled oak, it is merely matchboarded with lengths of shallow wood mouldings tacked on. Even the ornamental gables are often nothing but masks. Coming down to details of joinery, floors, staircases, and doors, counterfeits make their appearance; we have the thin make-believe parquet floor, the thin made tesselated tile in which the pattern is all at the surface; cast-iron or turned balustrades, imitating massive oak construction like Knole or Hatfield; flimsy mouldings, cheap door furniture of cased lacquered construction made to look like solid brasswork. Even the joinery of the modern Gothic church-bench or stall will be found in many instances to be devoid of the true character of the old. Many of the stone details are imitations of inner triforium arcades which now no longer exist, and the pier-shafts, instead of supporting the springers of vaults, only disguise them.

In all these imitations cheapness is at the bottom. Cheap fabrics have introduced all kinds of counterfeit. We need only take a few of these. Moulded and carved woodwork and modelled plaster-work have been imitated by embossing on wood. Heavy cylindrical dies, sometimes heated, are made to travel over laminæ of wood, producing the appearance of carved work, and door panels, architraves and friezes, enriched mouldings, bosses, and the like are produced by pressure or by charring. These counterfeit substitutes of carved wood are dishonest, chiefly because they imitate the wood-carver's craft, and the more they imitate the more of shams they become.

Mechanically-produced substitutes for plaster modelling and wood-carving are largely used in our public and commercial buildings. The ornament is embossed in relief. Leather embossed is in itself a useful substitute; but the dishonesty is in imitating patterns which are not suitable for these materials, such as a dado stamped with an arcade design or some architectural features in high relief, imitating columns, ribs, and other details which are only appropriate in stone or wood. Many of our wall decorations of a superior class are genuine and artistic, and it is only when their manufacturers forget they are substitutes and require a distinct treatment that they become dishonest.

BREACHES OF THE BUILDING ACT.

WHAT with building without license from the London County Council, proceedings taken for building beyond lines of frontage, breaches of the rules as to mortar and brickwork, the officials of the Council have all their work looked out, and they are not always without blame. We very often find that a summons is dismissed because proceedings have been taken out under the wrong section, as in a case brought before the magistrate at the South-Western Police-court the other day, or that the proceedings are not legal because the summons had issued against the wrong person. These and other irregularities committed by offenders and by those who administer the law make it more difficult than ever to bring the right parties to justice. The present London Building Act, as we have pointed out, is by no means invulnerable. There are many sections which are doubtful in their operation, others which are ambiguous. But these attempts to evade the London Building Act are not the only ones. We have recorded several instances of late of deliberate offences against local by-laws. Only the other day at Plymouth Police-court a contractor, and a member of the board of guardians, was summoned by the corporation for no less than five breaches of the local by-laws. These offences were, it is said, deliberately committed and persisted in. The defendant was summoned for erecting premises at the rear of five houses without leaving the 15ft. of open space from house to boundary wall required. Plans of these proposed erections had been submitted but not passed, owing to the want of space; notwithstanding which, the defendant proceeded with the work, and an action was brought against him. The defendant said it was a test case, and that he intended to appeal; a small fine was inflicted accordingly. But he did not appeal, but altered the lane to the required width. The yard space was, however, insufficient, and when the inspector complained, the defendant aggravated the offence; whereupon the town clerk asked for a penalty, and the defendant was fined for each case, with costs. These violations of local building by-laws are common; they show how persistent the owners of small properties are to evade the regulations as to open space when their pocket is concerned. There has been a disposition to treat owners who are also guardians of the poor, or members or officials of the corporation, with leniency and consideration; but experience has shown that delinquents of this class are the most troublesome, and require the firmest dealing with. A member of a town council who is the owner of poor tenements in a neglected part of the town, is frequently the most obstinate to yield to sanitary measures which he has helped to enforce on others. He thinks, for some inscrutable reason, that he is exempted from pains and penalties, and that the letter of the law will not be enforced in his case. It is extraordinary, indeed, that these individuals forget that they have their duties as well as privileges, and that it is their first duty to set an example by seeing that their own premises are without reproach. Building inspectors and surveyors have an arduous duty imposed on them in dealing with properties of this sort to show firmness and impartiality—a very hard task, no doubt, in small towns.

In London, one of the principal difficulties in dealing with evasive owners and builders is in finding out the particular section under which proceedings should be taken. In not a few instances the magistrate has had to dismiss the County Council summons on this or some trivial technical ground. The other day a person was summoned for having erected a building at the rear of some "mansions" near Clapham Common without a license from the Council. The defendant was fined, but continued to allow the building to remain. Another summons was taken out for the recovery of cumulative penalties; but the summons was dismissed because the magistrate thought the proceedings were taken out under the wrong section. It appears strange that such a mistake could be made; but those who know anything of Building Act are aware how easily such a mistake can occur. Another summons was issued, and the defendant's counsel raised the question that the wrong person had been summoned. It appears that the defendant had sold the property to some other person, and it would be unjust to punish a man for not doing what it was impossible for him to do. In the end the magistrate has given judgment for the Council; but it will be seen that this is one of the real difficulties that have to be met in carrying out the Act, and that upon technical legal points of this sort the operation of the Act is likely to be seriously hindered. Indeed, it is possible to foresee how very easy it is to evade the law in this way. The sooner these legal points are settled the better. The question in dispute—that of erecting a building at the rear of premises already built—is one that concerns the public welfare; but the owner of property has to consult his tenant. If he is a baker or a tradesman, who wishes to extend his shop backwards or to erect a baking-house or a workshop, and is willing to take a long lease of such premises, the owner is inclined to accede. He probably does not know the provisions of the Act at the time, and the work is proceeded with. The illegality of the erection at last makes itself manifest; he is summoned, and, of course, tries to evade his responsibilities. The temptation to erect or extend premises on open areas in London is great, and becomes more so every year, and the County Council work in preventing this encroachment is no doubt arduous. Section 41 and its various provisions are not very easy to understand. The 150sq.ft. provided at the rear of domestic buildings is little enough, and it ought to be jealously guarded. The other subsections relating to "diagonal line," irregular boundaries, abuttal on a street, corner buildings, &c., can only be understood by those who have studied the Act, and we think it would be well if those provisions were made more popularly known by plans and diagrams.

Sanitary inspectors of vestries often have to summon builders for not complying with the regulations. The question, "What is a 'new' drain?" is one of the points often raised. An old drain is found to be stopped, and the owner or builder puts a pipe drain in its place, taking up the old. Is this a repair or a "new" drain? If the latter, the sanitary by-laws require the putting in of an intercepting trap between house and sewer, and the provision of inlet and outlet shafts, in which case some extra expense is involved. A case of this kind came before the Lambeth Police Court lately. A builder was summoned for not complying with the regulations. He had taken up an old brick drain, and in the same channel had put down a pipe drain. It was contended by the vestry that the work done amounted to the construction of a "new" drain, and that this necessitated the insertion of an intercepting trap and inlet and outlet shafts. The defendant contended that it was a repair to an existing drain, and that the vestry could not enforce the extra work to be done. The work was the old drain altered and repaired, not a new drain; the same channel existed as before, Mr. Denman said the drain had been made better than before. Upon this ground he dismissed the summons, the costs falling on the vestry. According to Mr. Denman's decision, a drain was the channel along which the drainage went, and in such case he thought the drain was only altered and repaired—a conclusion which will be thought reasonable and fair by owners generally, though rather prejudicial to the authorities, who appear to wait for any alteration or repair in order to enforce their regulations. A line, of course, must be drawn somewhere between a repair and a new drain; but the decision will commend itself to all who only desire to make their old drains efficient for their purpose. Like the adjectives "new" and "old" applied to roads and buildings, the "new" drain definition is open to constant misunderstanding.

"BUILDING NEWS" DESIGNING CLUB.

A TEA AND COFFEE RESTAURANT.

THIS is the last subject given in the past session of our club, but we are not sure that the designs sent in are to be reckoned as the best of the 1896-97 series. The problem does not afford the scope which some competitors like: its limitations restrict their fancy, and the conditions necessitate thought, which means effort, and then, of course, especially in fine, warm weather, not a few begin to question as to its being worth while. No one is likely to succeed without effort, and trials of strength judiciously chosen

are seldom made without increasing the power and experience of those who undertake them. "Nap" takes the first place, "Pantile" comes second, and the third in merit is "Pickles." We are not inspired by the originality of the chosen façade, but it is by no means devoid of a common-sense suitability. The turrets would scarcely be seen, and the roof ridge would be lost. The plans show skill, and, in many respects, they are all well worked out. The w.c. window in the basement is too near that of the larder to be nice. The ash-bins would be best standing in the yard, and this w.c. could then be readily shifted. The main floor at shop level looks like what was asked for, and the service is well under control. "Pantile" has more than a notion in his elevation, which, however, is not worked out skilfully with regard to good proportion. This defect is increased by the poorly-drawn perspective, and if the author had that keen sense of relative values which go to make up what is called "good proportion" in design, he could never have crushed down the soffit of the big oriel bay into the voussoirs of the arch below in the manner in which these features show in the view. The same remark applies to the otherwise unobjectionable panel in which the sign appears. The whole thing wants lifting up. If worked out well, this elevation might be made to look very striking. The plans are not so good as those placed first. "Pickles" has hardly done his proposal justice;—his drawings are so sketchy, and the coarse-hatching to the plans makes them look confusing. The perspective redeems the sheet, and a further good point is obtained by the reserve which governs the design generally. The conditions published for the direction of competitors were as follow:—"A Tea and Coffee Restaurant for a Suburban Street.—The site has a frontage of 25ft. and a depth of 60ft. The adjoining houses are 28ft. to top of parapet, but this need not exactly limit the height of our intended building. On the ground-floor a bar and refreshment-room are to be contrived all in one apartment, as large as possible, after providing a private-way passage 4ft. wide from the street and a staircase up to the manager's rooms above, and, after allowing for a rear yard not less than 10ft. wide the narrow way, and large enough for light and ventilation to the basement, where the kitchen, scullery, and larders, &c., are to be located. A lift to run up from kitchen through the shop at rear of bar to the first floor. A men's refreshment-room is to be provided, where smoking is allowed, on the first-floor back; a ladies' room, reached by the same staircase out of the shop, is to be placed on the first-floor front. A ladies' w.c. will be required in a convenient and well-screened position. On the second floor the manager's residence, with one parlour, one bedroom, a bathroom, and w.c. to be arranged. In the attic floor above, three bedrooms for female servants are included, with a w.c. for their use. The depth of the house above the ground floor may be 30ft. from the street frontage. The shop floor to be 14ft. high, first floor 12ft., second floor 10ft. from floor to ceiling. The elevation is to be treated architecturally, with an allowance of 6ft. total space for width of piers to the ground story. The side door to be 3ft. wide in the clear, so that the shop-front opening will be 19ft. Plate-glass to be used, at any rate in the lower panels of the shop sashes. The shop doorway to be wide, and placed where most convenient. Material: Hoptonwood stone below, with brick above the first-floor level. Style optional. All cornices to stop 6in. short of the limits of the façade, and return in themselves against the wall. A wrought-iron sign may project above shop-front from the house not more than 5ft."—"Tyke" has good large windows to his façade, and some big dormers with curved tops to give contour to the skyline. The ground-floor story is treated in ashlar, with an arched shop and main entrance. The plans have some good points, but they are somewhat cramped in their contrivances. "Orb" has considered his scheme more fully, but the front shop, which he figures as "refreshment-room" is really so much waste space, and the bar is too far back for counter business, and, placed as "Orb" shows, the rear shop is crowded into half the space which it should occupy. "Ulan" has the same contrivance for the bar, with the further objection that it is out of view from the entrance, and supervision by the manager behind the counter is out of the question. The staircase coming down directly on to the staircase door is a most ill-arranged affair, which would almost always be blocked at busy times. The elevation is mean and uninteresting, a remark equally applicable to "Agon's" design. There is no comfortable corner in his ground-plan, and no sense of convenience so attractive in a well-ordered refreshment-room. We think the author would do himself more benefit if he devoted more time to his work. "Mist" sends a neatly-delineated common-place design, which gains much by the breadth obtained through leaving a blank space pierced only by a small window over the private entrance, which could not easily be mistaken for the shop or public entry. Customers, too, would not, in passing out, escape the counter and pay-box. It is of the first consequence to a shopkeeper that his customers should have his wares brought prominently before them. "Mist" fails for want of thought. Thus, to locate the ladies' w.c. off the landing of the public staircase is a very thoughtless thing to do, and, besides this, a lift of this kind ought never to be served from a semi-public lobby, as here drawn, on the first floor. "Whitefriar" is a poor draughtsman, devoid of the sense of any originality. The ground-plan of his design is the best part of his contribution. "Mannikin" includes his two chief floors within the limits of a great archway, into which project the windows of his ladies' room. Some public-houses have lately been managed in this way, but the idea is not developed satisfactorily by "Mannikin." "Look" throws out his shop-front like a bow-window into the street beyond the pavement line. This he would not be allowed to carry out. "Don't Know" comes last without a word of protest. Possibly, if he did know, he would rank higher.

THE NEW GOVERNMENT OFFICES.

THE Select Committee appointed in March last to inquire into, and report upon, the manner in which the sites available for the erection of the new buildings required for Government offices might best be appropriated for that purpose has issued its report, which says that, after having taken further evidence upon the plans laid before the Committee in 1896, in the course of which representatives of the council of the Royal Institute of British Architects and other qualified members of the architectural profession were examined, the Select Committee has arrived at the following conclusions:—

"We are of opinion that the new public offices on the 'Parliament-street' or 'Great George-street' site should be erected mainly on the lines of plan No. 1 in the appendix to the report of last year, with a frontage in a line with the frontage of the Home Office, and parallel to the east side of Parliament-street; but we recommend that the south-eastern corner of the new building should be square and not rounded. The land between this new frontage and the present west side of Parliament-street would, if this plan were adopted, become part of the public street; and, in our opinion, there is no need to make special provision for separating the traffic at this point. It appears to us reasonable, in view of the great Metropolitan improvement here to be carried out at the cost of the Government, that the London County Council should be requested to consider whether they should not put into operation the powers possessed by them under the Public Offices (Westminster) Site Act of 1896, and contribute a share of the total value of the land, which under this scheme would become part of the public street. We recommend the appropriation of this site for the Board of Trade, the Education Department, and the extension of the Local Government Board. As regards the Whitehall site, having considered the alternative schemes for the War Office which have been placed before us this year, we adhere to the recommendation made in our interim report, being satisfied that a building satisfactory in appearance and accommodation can be erected on that site within its present boundary lines; and we are of opinion that the details as to the arrangements of buildings, courts, &c., should be intrusted to the discretion of the Office of Works, in conjunction with the architect selected. We think that a subway should ultimately be formed under the street between the War Office and the Admiralty. Schemes have been submitted to the Committee by the Royal Institute of British Architects and by Colonel Edis for a widening of Charing Cross and of the northern part of Whitehall; but we cannot recommend that the taxpayers should be asked to bear the cost of this Metropolitan improvement, which, if undertaken, comes more properly within the duty of the local authorities. We, however, strongly advise that the Mall should be opened into Charing Cross on the north side of Messrs. Drummond's bank. We think that no decision should be arrived at as to building on the triangular site in Spring-gardens until the houses standing there have been removed, and the ultimate requirements of the Admiralty considered. We recommend that Nos. 11 and 12, Downing-street, occupied respectively as a residence for the Chancellor of the Exchequer and as an office for the Patronage Secretary to the Treasury, should be removed, as unworthy of the site they occupy; but we are of opinion that the principal block of No. 10, the historic residence of the First Lord of the Treasury, for reasons of practical necessity and on account of its associations, should be retained, the Downing-street front being masked by erecting a new building with a good architectural façade, and the park front being cased in stone, so as to harmonise with the north and west fronts of the old Treasury buildings, and the garden ground being inclosed with a screen or railing of handsome design. We do not recommend any further building on this site. We are of opinion that whatever other office accommodation is required which cannot be conveniently found in existing Government buildings should be provided for by an extension of the Great George-street site in the direction of Delahay-street and St. James's Park, in which case some readjustment of the arrangement at present shown in the plan of the Office of Works might have to be made."

THE PASSMORE EDWARDS SETTLEMENT.

THOUGH the new buildings which are being erected in Tavistock-place, St. Pancras, for the new Passmore Edwards Settlement will not be entirely ready for occupation till the beginning of the new year, and will not be formally opened till then, the work of the settlement will commence in October, under the newly-appointed warden, Mr. R. G. Tatton, formerly Fellow and Tutor of Balliol College. The settlement is intended to carry on and to develop on extended lines the work of the University Hall Settlement established by Mrs. Humphry Ward in Gordon-square some six or seven years since. The new buildings, towards the erection of which Mr. J. Passmore Edwards has generously contributed the sum of £12,000, will contain a concert and lecture hall, seating 450 persons, classrooms, library, gymnasium, and a large drawing-room and dining-room for the social purposes of the settlement, together with rooms for a warden and 18 or 20 residents. They are being built by Messrs. Higgs and Hill, of South Lambeth, from plans by Messrs. Smith and Brewer, and were illustrated by a plan and perspective in our issue of July 3, 1896. The exterior is of red brick with stone dressings, and a cornice of Portland cement painted white; the roofs are covered with Westmoreland slates. His Grace the Duke of Bedford, who has given most kindly help to the settlement throughout, allows the council the use of a small neighbouring piece of ground as a garden at a nominal yearly rent. Mr. G. F. Watts, R.A., Mr. Norman Shaw, R.A., Sir John Stainer, and others have given invaluable help and advice during the progress of the buildings. The council has been considerably widened, and includes among its members representatives of the University Extension Society, the Working Men's College, the Working Men's Club and Institute Union, and the London School of Economics. Mrs. Humphry Ward retains the position of hon. secretary, and Mr. A. L. Leon, L.C.C., will act as hon. treasurer. The programme for the coming session is in hand, and among the subjects of University Extension and other lectures are English history, architecture, and economics; Professor Lewis Campbell will lecture on "The Tragic Drama," and the Rev. P. H. Wicksteed will give his introductory course on "Dante." Classes in domestic economy and hygiene have also been arranged in conjunction with the Technical Education Board. The large concert-hall and fine rooms of the settlement will be used, however, not less for the social enjoyment and recreation of the crowded working-class neighbourhood on the edge of which the settlement stands than for purposes of education. A series of Sunday popular concerts is already arranged for the coming winter; orchestral and choral classes will be started at once; and arrangements have been made for the placing of an organ, when

funds permit, in the large hall. There will be an admirable gymnasium, which, apart from the use made of it by the settlement, will probably be in demand before long by the board schools of the district. The library, to which special contributions are desired, will be called the Green Library, in memory of the late Professor T. H. Green, of Balliol. The encouragement of Biblical study was among the original aims of University Hall. To place this on a permanent basis a "Jowett Lectureship" has been established, to be under the management of a special committee, for which the council has secured the services of Dr. Edward Caird, Master of Balliol, Canon Cheyne, Professor Lewis Campbell, Professor W. M. Ramsay, Rev. J. Estlin Carpenter, and Mr. Claude Montefiore. The Rev. R. F. Charles, editor of the "Book of Enoch," has been appointed the first lecturer. He will deliver a course of lectures in the spring on "The History of Jewish Religious Thought during the 200 years before Christ." The Jowett Lectureship and the settlement itself will be entirely unsectarian, and it is hoped that the new hall will become a centre of educational and social life for the west-central and north-western districts of London, such as East London has found in Toynbee Hall.

THE CARPENTERS' COMPANY AND KING'S COLLEGE.

THE winners of the medals, &c., presented by the Carpenters' Company to students in the classes conducted under the auspices of the Company and the council of the College are as follows: Building Construction Day Classes, under Professor Fletcher: Gold medal and £3, H. C. Bishop; silver medals and £2, E. F. Knight, A. J. West, and C. W. Myddleton; bronze medals and £1, G. A. Turner, W. Shelley, and A. E. Puffhead. Evening Classes: Gold medal, J. G. Wiles; silver medals and £3, F. G. Pain, S. A. Switzer, and P. C. Blow (medal only); bronze medals and £2, C. W. Beaumont, C. J. J. Dadd, H. C. Bishop, H. Gloyne, W. Marchment. Lord Mayor's medal for sanitary building construction, A. Carter. J. Kent, S. A. Switzer, T. Graves, J. Gough, W. Drake, and C. J. T. Dadd have also won money prizes. All prizes of money are given in books to the value of the prize won. Wood-Carving Classes (amateur); Silver medals, Miss Carpenter, T. Ainsworth, and John Dunn; bronze medals, L. A. Waldron and A. J. South. These medals are accompanied by scholarships, tenable at the classes at King's College. These prizes will be presented by Sir Henry Harben at a soirée at King's College on Sept. 30.

A BRIDGE WITH A HISTORY.

AMID the destructions, constructions, and reconstructions which have some time ago passed the preliminary stage, and are now in active progress under the protecting ægis of the Parisian Exhibition of 1900, is a bridge which deserves a passing notice. The first London Bridge, it is stated, was built in the 11th century, and, being constructed wholly of timber, was subsequently burned, as has been the fate of innumerable similar and dissimilar structures composed of the same inflammable material. Passing by old London Bridge, which, with its streets of houses, had a very long existence, we find that the present, or new London Bridge, was opened in 1831. We mention this date, because many people think that the present London Bridge, which is built of stone, is older than some of the iron bridges spanning our great Metropolitan river. As a matter of fact, both Southwark and Vauxhall Bridges are older than their *confrère* lower down the stream, the one being erected in 1816, and the other three years after.

In order to provide access to the exhibition for the vast multitudes which will throng to the gay French capital in about three years' time, it has become necessary to not only widen, but increase the present number of approaches, especially of the bridges over the Seine. Consequently, the reconstruction of a very old bridge, taking its pedigree into account, has been decided upon. The name of the bridge is the Pont au Change, and a brief account of the vicissitudes, the different structures bearing the same name, and erected successively upon the same site, will not be without interest. Previously to the 10th century, the ground was occupied by a wooden bridge, whose antecedents are irrecoverably lost, although during its long life it constituted the only communication between the two banks of the Seine. The bridge owed its name to the fact that Louis VII. established in its vicinity the "Exchange," and, similarly to London Bridge, the money changers, jewellers, and marine store dealers housed themselves in the dwellings ranging along both sides of the structure. Several times this bridge was seriously damaged by the flood-waters brought down by the river, but a century later saw it substantially reconstructed, partly of timber, and partly of good solid stonework.

In the 13th century it was rebuilt entirely of masonry; but owing to the preposterously large dimensions assigned to bridge piers in those times it was again swept away during a violent storm. At this stage a retrograde departure, so far as the constructive arts may be considered, was introduced. The new bridge was built altogether of timber, and while the open character of the piers preserved it from the destructive action of floods and inundations, it failed to afford it a like immunity from the devouring element, for it was totally consumed by fire about the year 1630. A period of eight years was required to erect the next structure, which had a long life, and did not retire from the performance of its ordinary duties until half a century ago, when it was replaced by the present structure, which it appears is now, in its turn, to make way for a successor. T. C.

FIRE AND RUST PROOF PLASTERING.

GENERAL W. SOOY SMITH, the United States Government Supervising Architect for Public Constructions, has issued the following note on the best means of rendering iron and steel constructions perfectly proof against corrosion and the effects of heat:—

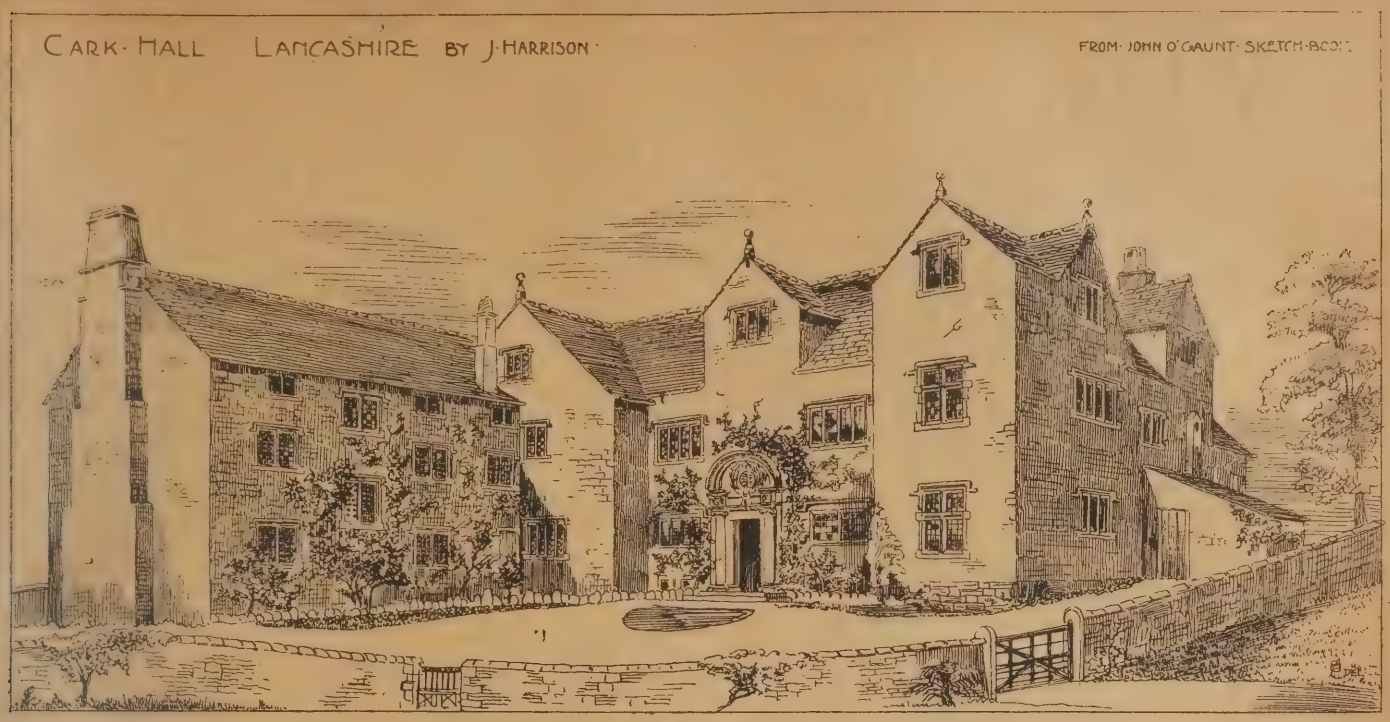
"Rust, under favourable circumstances, will eat to one inch depth in iron in eighty years. This means that the steel buildings in Chicago, as they are built to-day, may not survive more than thirty years. To make them perfectly safe corrosion of the steel must be prevented. This is a thing to be accomplished by the use of the new fireproofing material, but I will first consider the effect of fire. Owing to the combustible material in buildings, the present fireproofing as applied to modern buildings will be heated to redness very quickly. Then along come the fire engines and throw a stream of cold water upon the heated parts of the buildings. To be good, the fireproofing must be able to resist the combined action of red heat and cold water. I have tested nearly all the best fireproofing employed in this city, but not a single one have I found that can be heated to redness and plunged into cold water without cracking. Some of it literally burns up. Some will stand red heat without cracking, but none will withstand the combined action of heat and water as described. Another trouble lies in the fact that nearly all the so-called fireproofing material is a good conductor of heat, a thing which makes it valueless as fireproofing, permitting, as it does, the passage of heat to the steel. The rigidity of steel, without being heated to redness, decreases considerably when the temperature rises above 400° Fahr. In this city the fireproofing in any building containing a moderate amount of combustible material would, should the structure take fire, be heated beyond that degree, and even to redness. Then the columns would yield, and the building come down with a crash. The danger is increased owing to the fact that with a moderate rise of temperature in a steel building the beams and girders of the floor systems would expand unequally as the heat varies. These unequal expansions would throw the columns out of the vertical and into a buckling position. Instances of this are shown in the fire which destroyed the Manhattan Life Insurance Company's building in New York. The structure was destroyed, although the fire which caused the disaster was in a building 50ft. away. The building of the Chicago Athletic Association was on the point of falling from the same cause, although the fire did not last half an hour. In this case the columns of the lower stories were completely stripped of fireproofing by the action of the heat and water. Fireproofing, to be worthy of the name, must resist the combined action of heat and water, and be a non-conductor of heat. In trying to find a material that would serve the required purpose, I first tried talc, which is a good non-conductor and very refractory. Soapstone is an impure talc. By mixing this in a pulverised condition with hydraulic cement and other substances, I succeeded in making a good fireproofing material. While conducting these experiments I heard of a material in the great asbestos mine near Montreal, Canada. There is found in that quarry serpentine rock carrying a large percentage of asbestos. This rock, pulverised and mixed with good cementing materials, makes by far the most perfect fireproofing yet discovered. 'Asbestic,' as the new material is called, is invaluable for use in a general way as firepoof plasterings, in all sorts of buildings. It will prove especially so in its application as fireproofing for covering the steel parts of buildings. It may be heated to 1,100° Fahrenheit (red heat) without harming its durability. Nails may be driven into it and it will not crack. When the nail is removed, nothing but a small hole remains, which may be readily filled with putty or any other substance, in order to restore the finish of the wall. Struck with a hammer, there is no breakage—only the indentations showing. Then, again, the material is elastic. If the building settles or sinks, it stretches, and the plastering is not marred. Another point is that it will take decoration equal to canvas without danger of the picture being destroyed should the walls settle. This material is a thoroughly fireproof plastering. On this I will stake my reputation as an engineer. I have experimented for many years, and I know what I assert. Another point of interest is the weight. It is a third less than ordinary plaster covering the same area. Thus it is that the weight of this asbestic plastering will be so much less than the ordinary article that there is a large diminution in the weight borne by the columns in the building. This will allow a considerable saving in steel—more than sufficient to pay the slight excess of its cost over common plastering. —Chicago, July."

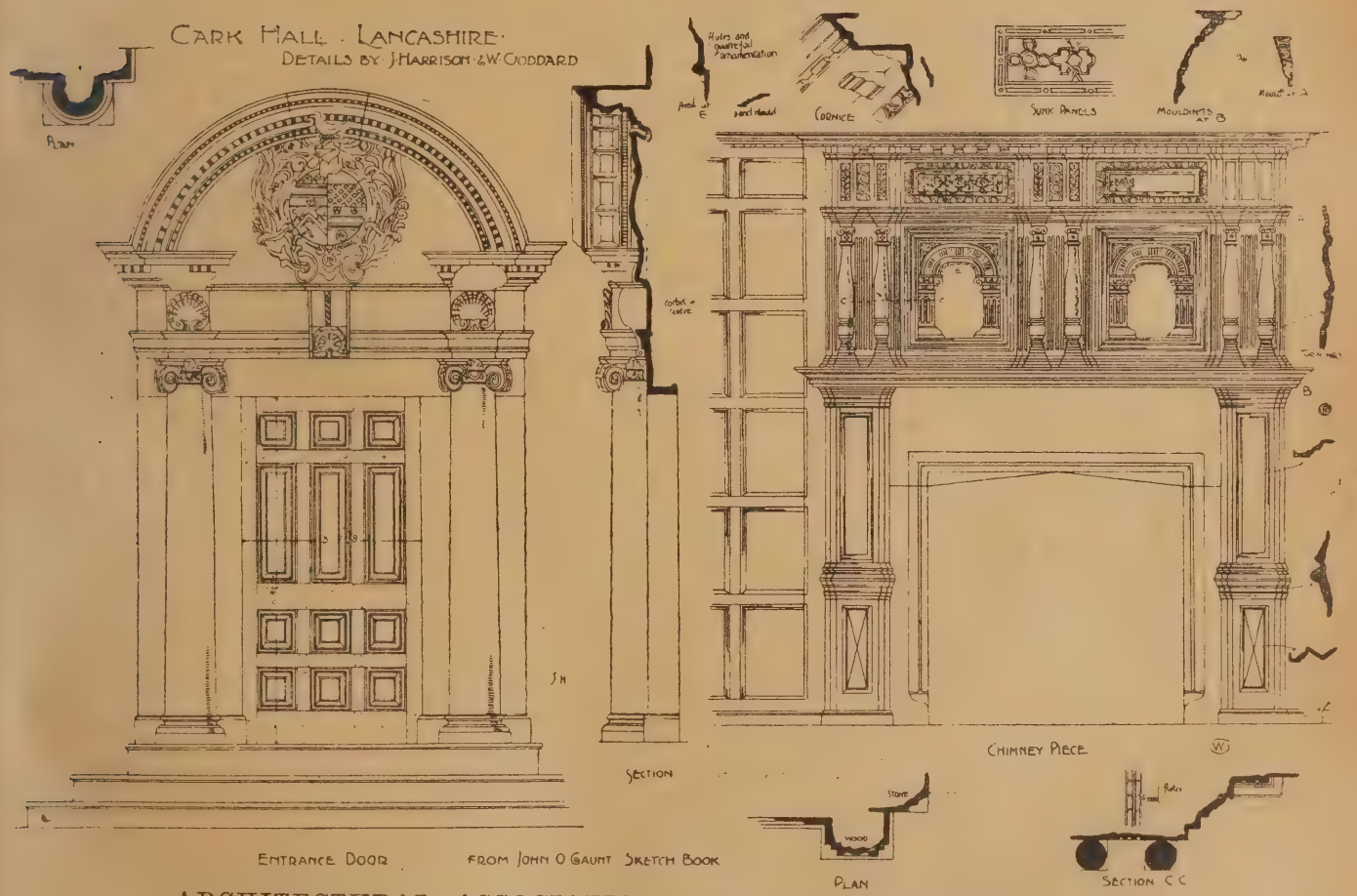
Samples of asbestic plastering on expanded metal can be inspected at the offices of Messrs. Witty and Wyatt, Ltd., 88, Leadenhall-street, London, E.C.

THE ARCHITECTURAL ASSOCIATION EXCURSION, 1897.—II.

[WITH LITHOGRAPHIC ILLUSTRATIONS.]

CONTINUING our illustrations and references to the buildings chosen for examination, we arrive at Cark Hall, which was visited on Tuesday. It is a simply-designed manor house, as may be seen by the sketch accompanying these notes, with plain mullioned windows and gables quaintly grouped, while the leading feature in the entrance front consists of a boldly-treated hooded doorway flanked by Ionic columns and capitals, an heraldic device growing out of the keystone occupying the tympanum; of this we shall give some details. Inside the hall there is a florid chimney-piece and good wainscot panelling up to the ceiling. The walls, like a good many 16th-century stone houses, are very thick, and the hall was the ancient seat of the Curwens. We reproduce Mr. J. Harrison's sketches herewith. Of Borwick Hall, the first halting place on Wednesday, we give among our plates to-day a series of drawings by Messrs. R. W. Johnson, E. Turner, and S. Wright, from the "John o' Gaunt's Sketchbook." The plans given to-day add value to the carefully measured elevations which accompany Mr. E. Turner's perspective. A drawing of Borwick Hall, by Mr. Maurice B. Adams, will be found in the BUILDING NEWS for December 31, 1886, when we also gave a block plan and other drawings. The present house was erected in 1595, in the reign of Elizabeth, but the square-built Peel, round which the building is grouped, bears evidence of an earlier date, perhaps as far back as 1559. There is a quaint old gatehouse in stone, put up in 1650, which, together with some farm buildings, forms one side of the forecourt quadrangle and face the road. The great hall is panelled in dark oak to within a few feet of the ceiling. The arms of Bindloss impaling West occur over the fireplace. Some of the other rooms are also wainscoted. The private chapel occupied the position of the apartment to the left-hand front on the first floor, and out of it was reached the priests' closet, under which was the priests' hole, still existing. Here the hunted Churchman could, by pressing a floor-board, open a trap and seek refuge, and so elude, for a time anyhow, the vigilance of his foes. Sir Robert Bindloss entertained Charles II. in this house on an August night in 1651, when that king was on his way to Worcester, a few days really before he





ARCHITECTURAL ASSOCIATION EXCURSION SKETCHES, 1897.

himself, to save his crown and his life, had to seek sanctuary in a similar hiding place to that which his host at Borwick may, indeed, have shown him. The priests' "hole" which the king used was most probably at Trent Manor, near Yeovil, in Somerset. The house has been only partly occupied of late years, which, in some ways, to the architect, may be an advantage, because it has not suffered from over repair. The detail is very simple, but the design is very broad and picturesque, with the windows admirably placed. Hoghton Tower, of which we shall give a photograph next week, was visible, and we shall reproduce some measured details and an elevation of the great hall by Mr. W. A. Waddington,* facing the inner court (in an early number of the BUILDING NEWS). The house stands on a lofty eminence midway between Preston and Blackburn, and can be seen for many miles, commanding the landscape and overlooking the Darwen, the Ribble, and the Welsh mountains in the distance. The great extent of this old mansion gives it the appearance of a village, and occupies a natural plateau about 500ft. long by 300ft. broad. Towards the west is a central gatehouse with towers right and left at the angles of the first quadrangle, all battlemented. To the north of this courtyard are the stables and kitchens, the retainers' apartments being located on the south side. The inner quad is divided off from the first buildings by a block long used as bedrooms and other family apartments. During the Civil Wars a fine tower, which stood over the second gatehouse, was destroyed. The way in which the approach to this inner portal is

* A sketch by Mr. John Langham of this part of Hoghton Hall, from the Royal Academy, appeared in the BUILDING NEWS for May 2, 1890, when he also published a view of Marple Hall, Cheshire.

contrived, with walls and piers at the top of a flight of steps, is singularly interesting, and, of course, is very well known. The great hall to the north of the inner court is approached by some circular steps, and at the east end of this hall stood the Chapel, set at an angle with the main buildings, in order to orientate the altar correctly, thus adding much quaintness to the plan. The ruins of this sanctuary only now record its position, situate at the end of King James' rooms, so called because the Scotch king was, it is said, royally entertained here in 1617 on his way to London by Sir Richard de Hoghton. The great hall has two large bays, one on either hand of the high table; these "bowers" are unusually large, being 10ft. deep and 12ft. wide, while the height is proportionate, the hall itself occupying the same space as that allotted to the two-storied building next to it. The fine inglenook on the north side, the buttery hatch, and the Jacobean minstrels' gallery greatly add to this charming hall. The oaken-panelled guinea-room is to be seen, with gilded decorations, representing, it is said, the rent-roll of the estate; it is a curious apartment in the south-west corner of the upper quad. Sir Charles de Hoghton renovated the mansion, but it was for a long time left in great dilapidation. The views from its walls are magnificent. The measured drawing accompanying these descriptive particulars shows the dining-room chimney-piece in Levens Hall referred to last week, when we gave some pictures inside the house. This delightful residence was seen on Wednesday, with its oddly-contrived gardens of cut yews, clipped hollies shaped in fantastic forms resembling birds and bottles, donjons and judges' wigs, ovens, and dumb waiters, all designed by Beaumont, the king's gardener from Hampton Court, where he planned the gardens. Inside the house there is much fine old oak furniture, and the wonderfully rich chimney-pieces, some of which figured in our last number, are a great feature. In the dining-room Samson and Hercules support the mantelpiece, and the "Four Seasons," with the "Five Senses," furnish emblematical figures in the same apartment. Holker Hall, belonging to the Duke of Westminster, is an exceedingly handsome house, containing some notable pictures by some of the best masters, including Rubens, Claude Lorraine, Hans Memling, Dürer, Vandyck, and Reynolds. Messrs. Paley and Austin greatly enlarged the house, and their work will amply repay examination, both inside as well as out, and the carved oak furniture, long in use here, adds much to the interest of the mansion, which is situate in a gently sloping park, well-stocked with deer, on the banks of the Leven, and surrounded by beautiful woods. The picturesque crag-seated village of Grange concluded Tuesday's proceedings. Samlesbury Hall, six miles from Preston, was seen yesterday. It is illustrated in Parker's "Domestic Architecture," and was originally built in 1548. The building was formerly quadrangular, but is now L-shaped, the servants' wing having fallen into decay, and the family apartments are occupied as domestic offices. The house suffered from restorations about 1835, when it had been used as a public tavern. The old minstrels' gallery, screen, and posts remain, more or less mutilated. The domestic chapel has long done duty as a parlour, and its screen was destroyed. The quatrefoil panels in the half-timbered construction of the remaining wings have a rich effect, and the upper-floor oriels are pretty, set under the deep cove below the eaves. Livesey Hall was the next place visited after an hour's stay at Blackburn for lunch. It is a small stone-built dwelling of rugged simplicity. A view of it, by Mr. J. Langham, will be found in the Building News for December 12, 1890, and another, by Mr. Harrington, on June 6, same year, from the Royal Academy exhibition, giving an excellent representation of the old place. It seems to have been erected at three different periods—the central portion in 1608, the east wing in 1666, and the other wing in 1689. The premises are occupied partly as a farmhouse, but half of the house has for a good while been dilapidated and unused, likely to go entirely to ruin. In front of the house, formerly, a formal garden within inclosing stone walls made a pleasing feature, thoroughly in keeping; but the best days of Livesey are gone, and the imagination of the visitor has to fill in the blanks of the picture. Furness Abbey will occupy the attention of the excursionists the whole of to-day (Friday). Further illustrations will appear in the Building News next week.

SCIENCE AND ART SCHOOLS.

The forty-fourth annual report of the Department of Science and Art to the Committee of Council on Education was issued on Saturday. This shows that in 1887 the science schools numbered 1,684, the classes 6,300, and the students under instruction 103,088. In 1896 the figures were 2,583, 10,300, and 196,185 respectively. Of the 2,583 schools in 1896, 144 were organised science schools with 16,654 students. This is a considerable increase on the preceding year. The number of students who came up for examination from these schools was 91,300, a decrease of 16,863 on the previous year. Besides these, 8,518 self-taught students and pupils from classes not entitled to claim payments on results presented themselves for examination. 30,066 out of the 99,818 students who were examined were successful in passing in one or more subjects, and of these 16,551 were successful for the first time. In the previous year 52,079 were successful, and 22,542 for the first time. For the year 1896, the payments to science schools, exclusive of those made to training colleges, on the results of examinations, and on attendances, &c., amounted to £157,916. The corresponding amount for 1895 was £142,542. In the art division, the report states that during the year ending August 31, 1896, 20,161 elementary day schools, with 2,250,070 scholars, were taught drawing and examined under the regulations of the department. This was an increase of 263 schools, and of 57,820 scholars, as compared with the numbers in 1894-5. Besides the scholars who were taught in the drawing standards, 18,209 pupil-teachers and ex-standard scholars were examined in drawing, of whom 8,859 were successful. The grants for drawing in 1896 to elementary day schools amounted to £176,224; in 1895, to £164,494; and the number of schools gaining the awards fair, good, and excellent, respectively, was as follows:—In 1896: Fair, 848; good, 12,850; excellent, 6,391. In 1895: Fair, 1,484; good, 13,323; excellent, 5,051. 873 evening continuation schools were also examined, in which 40,459 scholars were taught drawing, the grants earned by them amounting to £2,105. In the previous year the number of evening continuation schools taking drawing was 698, with 37,640 scholars, the grants amounting to £1,664. Classes for manual instruction in connection with 1,069 elementary day schools were examined in the year ended August 31, 1896, and earned grants amounting to £19,530, on account of 83,220 scholars. In the previous year the number of manual instruction classes examined was 910, and the grants earned amounted to £16,307, on account of 67,470 scholars. The number of art schools and classes (including 80 science schools which take art subjects) examined in art in 1896 was 1,851, as against 1,853 (which included 91 science schools) in 1895. The number of students in 1895 was 136,768, and in 1896 146,193. The number of students who were examined in 1896 was 78,139, or two less than the previous year.

ASBESTOS AND ASBESTIC.*

A new and completely remodelled edition of this exhaustive treatise on the special properties of the new form of asbestos found in Canada is of much value just now. The author, Mr. Robert H. Jones, F.S.A., mineralogist, has brought to his labours a vast amount of information; he has observed what has been done in Canada, the many important changes in machinery, and the progress made in other countries. The discoveries at Danville are reserved by the author for special description. The peculiar character and value of this mineral fibre, and the particular mine identified with its production, have developed a new industry of much promise. In a short space of time this particular mine from which asbestic comes has stepped in front of all other mines, and has revolutionised the whole industry. The "mine is situated near the boundary of the most western part of the eastern townships of Quebec, ninety-seven miles from Black Lake, and only four from the pleasantly-situated agricultural town of Danville. It is also about eighty-six miles from Montreal." It was opened in 1879, and was worked by Mr. Jeffrey for some time, but the peculiar nature and value of the mineral was not well known. Mr. Boas, of St. Hyacinthe, an epoch-making man, examined the rock, acquired the mine, introduced automatic working machinery, and in a short time the mines began to assume activity of a surprising kind. Mr. Boas soon discovered the true nature of the rock, and his first idea was to utilise the material as a plaster or cement. Every part of the fibrous rock can be utilised. Mr. Jones says, "After yielding from 20 to 25 per cent. of Nos. 1 and 2 merchantable asbestos, the whole of the remainder, which was formerly treated as waste, is now found to consist of fibrous material of extraordinary value, known under the name of asbestic, which is simply short, unweavable asbestos, the like of which is to be found in no other part of the country." The beautiful collotype plates and other illustrations in the text give the reader an excellent idea of the veins of chrysolite which permeate the rock in more or less regular lines. These veins contain the finest silky fibre. The author, who spent some time in these mines and examined the material after it was blasted, calculated that the whole mass contained at least 90 per cent. of good merchantable asbestos or asbetic, or fibrous material, which only required crushing and screening for conversion into those products. His account of the uniqueness of this material is interesting: how he rubbed some of it up in his hands like tobacco, which converted the material into a "snow-white pellet of soft elastic fibre," and that he found at Danville specimens of "a clear, light-coloured translucent serpentine, which partly covered a vein of pure silky fibre, as though protecting it with a rich delicate skin, the tint of emerald." This unique specimen is illustrated in the frontispiece. The value of asbestic as a material for building we have noticed before. As a mortar or plaster it has great claims; its fibrous and flexible nature and smooth glossy surface prevent it from cracking. It can be put round a tin pipe, or on raw brick; it requires neither hair nor sand. When once dry it is as hard as cement. Of course, too, it possesses all the valuable qualities of a non-conductor of heat and sound, and is therefore admirably adapted for music-rooms, halls, hospital wards, &c.; it is vermin-proof, noiseless, and uninflammable. As a labour-saving material it has special advantages: it can be easily mixed, has a large covering power, and saves at least 25 per cent. on labour. The officials of the leading Government departments at Washington and engineers in charge of the New York City Post Office have made a trial of this plaster. A structure was erected, the whole of the interior was plastered with the new asbestic wall-plaster, and the whole was subjected to flames and water; but the plaster remained intact after the test. In New York, Montreal and Ottawa, buildings are plastered with it. The chapter on the applications of asbestos to building and fire-preventive purposes is worth perusal; its use for boiler and pipe coverings, paint, the "Salamander" decorations of the United Asbestos Company, which are well known to all our readers, are separately treated, and those who want to become acquainted with the many valuable applications of this mineral to various purposes will find Mr. Jones's new volume of much interest. The collotype plates add much to the descriptive value of the work.

* Asbestos and Asbestic: their Properties, Occurrence, and Use. By Robert H. Jones, F.S.A., Mineralogist, &c. London: Crosby Lockwood and Son.

SANITARY IRONWORK.

We have received a new catalogue of sanitary and hydraulic ironwork issued by Messrs. Adams and Co., engineers and sanitary specialists, of York and Leeds, whose London offices are Old Queen-street, Westminster. Our readers know the many advantages of the Adams' patent automatic flushing siphon, which is extensively used, and can be adapted to suit varying conditions of locality. Several types of flushing chambers are shown, from a chamber with taper and vent flushing one sewer to other more complex forms. An inquiry by the Douglas commissioners of 79 corporations has shown the use of 64 per cent. of Adams's siphons as against 36 per cent. of other makers. The siphon is unequalled in simplicity of construction and absolute certainty in work. We may also notice Adams's patent system, license to use which is granted, free of extra charge, with each siphon sold. An important feature is that two or more siphons can be supplied to discharge simultaneously, where necessary. They are made also with rectangular outlets for distributing liquid over large areas and filter-beds. Any desired velocity of discharge can be

given, and the depth of tank may be small compared with other kinds. For lifting sewage automatically and for sewage disposal, the siphon has been applied with success. Adams and Co.'s patent "insular" valve, which serves as a flap valve or penstock, is an excellent substitute, and the patent combined penstock valve is a useful, economical water-valve. Another useful appliance for drawing off top water from settling tanks, &c., is Adams's patent floating arm and effluent float, an extremely simple contrivance, which can be adjusted to any depth of immersion. Other sanitary castings, manhole and lamphole covers, tide and flap valves, ventilating columns, and details of Adams's patent sewage lift of various forms are given in the catalogue.

REPRODUCTION OF PLANS AND DRAWINGS.

In *Ombres et Lumière* the following process is described by A. Carteron:—A well-sized paper is selected and cut rather larger than the drawing to be copied. An ink is prepared by dissolving 8 to 10 grammes of gum-arabic in 100 parts of water, and adding thereto a few drops of aniline blue or other suitable dye. The drawing is traced upon the paper with this ink and allowed to dry. The entire surface of the paper is then covered with printers' ink, by means of a roller or stiff brush, and well equalised. After a short interval the entire sheet of paper is immersed in water, and by means of a roller, or brush, passed delicately over the surface, the ink is disengaged from the traced lines. This is facilitated by the solution of the gum. The lines are thus represented by bare white paper, and the tracing may be used as a negative. If a very opaque ground is wanted, the background of printers' ink may be intensified by brushing on bronze powder with a badger's-hair brush.

CONSTRUCTION OF ARCHES IN CONCRETE.—X.

We must ask to be permitted to digress a little in our present article, before proceeding further with that particular part of our subject to which the attention of our readers was

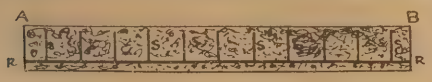


Fig. 1.

directed in our issue of July 23rd last. The digression is made for the express purpose of describing and illustrating a type of the compound system which has been very much used in Switzerland, and is known as the Hennebique system. Some recent experiments have been made with this particular arrangement of steel and concrete which confirm the results already arrived at by totally independent tests, of which the details have been recorded in preceding articles. Two of these results are that the best protection from the action of fire, water, and other deteriorating agents was obtained from the employment of concrete made with artificial Portland cement, and the second that the strength of the compound system was principally due to the exceedingly strong cohesive affinity of the different materials for one another. An elevation of one example of this method of combined construction is represented in Fig. 1, in which A B is the concrete monolith, and R R the steel rods which are buried in the lower part of the mass. In order, however, to connect the upper and lower parts of the concrete beam intimately together, these rods are set in steel stirrups, *s s*, which, while maintaining always a vertical position, are also imbedded in the cementitious matrix. These stirrups may be placed at any reasonable distance apart, usually from 2ft. to 3ft.

The object of locating the steel rods in the lower part of the beam is to effectually carry out the indispensable proviso we have always insisted upon—that is, that the steel portion of the system should support all the tensile and other stresses of all kinds, except those of compression. In this work they are assisted by the stirrups, so that there is only a stress of the last named character to be borne by the concrete. Cohesion, homogeneity, and all the other advantages claimed by every type of this mode of building beams, arches, and arched ribs, are assumed to belong to that of M. Hennebique; but as all these have been previously alluded to whenever deserving notice, we shall not recapitulate them. The number of steel rods needed to impart the requisite amount of tensile resistance to the concrete beam will depend upon the span of the latter, the load to be supported, and other conditions which will necessarily vary with the circumstances of each particular example. In Fig. 2, in which

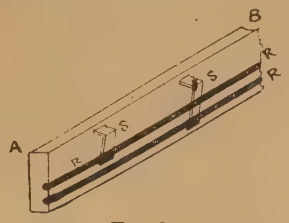


Fig. 2.

a pair of rods are shown, the longitudinal section being made through the centre of the compound mass, the manner in which the stirrups *s s* are arranged is rendered perfectly clear. It will be seen that at the upper extremity they are bent over or cranked, so as to enable them to get a better grip of the concrete. These stirrups are placed in Fig. 1 at equal distances apart, commencing from the centre of the beam—a disposition which answers well enough when the spans of the beams are comparatively limited; but where the spans become larger a more scientific method is adopted, and they are placed closer together as they approach the points of support. As the reason for this alteration in the respective distances between the rods may not be quite apparent to some of our younger readers, a brief explanation may probably not be altogether superfluous. It should be premised that, in all horizontal—or, as they are generally termed, "straight"—solid beams of any material, as well as in all horizontal girders and trusses, supported at each end, the horizontal stresses of both compression and tension increase from the supports where they are a minimum, to the centre, where they are a maximum. But with regard to the vertical shearing stresses, the very opposite conditions obtain. Instead of having their greatest value at the centre of the beam or girder, it is at the points of support where they become a maximum. At the centre, the shearing stresses are practically equal to zero, provided, as in the present instance, the total dead load may be regarded as uniformly distributed over the whole span of the beam, girder, or truss.

At present, we are not concerned about the horizontal stresses, but with the vertical or shearing stresses, and the problem before us is to prove that these stresses, under the condition of loading already prescribed, shall be equal to zero at the centre of a beam, and attain to their maximum value at the points of support. It is an axiom in the designing and construction of beams and girders that when they are under the action of a uniformly distributed dead load, the vertical or shearing stress at any point of the

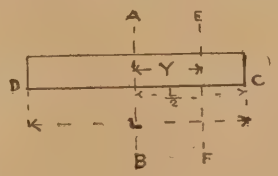


Fig. 3.

span is always equal to the total weight situated between that point and the centre of the span. Let us first investigate this statement. Let Fig. 3 represent the elevation of a solid beam or plate-girder, then, in accordance with what has been asserted, the shearing stress at any point in the line E F will be equal to the total weight distributed over that length of the girder extending from E F to the line A B marking the centre of the span, that is equal to the distance Y. Consequently, if W equal the dead load uniformly distributed per foot run, L the span of the girder, S the shearing stress at a distance equal Y from the line A B, then the assumption is that—

$$S = W \times Y.$$

It is evident, in the present instance, that the total shearing stress S_1 has the same value at each point of support, and if we put R and R_1 to equal their reactions, we have the general equation—

$$S_1 = R = R_1.$$

But the shearing stress at E F is obviously less than that at the nearest support C, by the amount of that portion of the total load which is distributed over that length of the span extending from the line E F to C, which does not affect the value of S. In order to determine, therefore, the shearing stress at any point of the span, omitting the weight of the beam itself, or, what amounts to the same thing, including it in the total dead load, as in the question before us, it is obvious that the portion of the total load situated between the point E F and the nearest point of support, must be deducted from the shearing stress transmitted to that point of support. Calling this part of the total load W_1, the general equation becomes—

$$S = (S_1 - W_1) \ldots\ldots\ldots\ldots\ldots (a)$$

From the explanation given the value of S_1 may be put—

$$S_1 = \frac{W \times L}{2},$$

and that of W_1 is equal to—

$$W_1 = W\left(\frac{L}{2} - Y\right).$$

Substituting these values in equation *a*, we obtain—

$$S = \frac{W \times L}{2} - W\left(\frac{L}{2} - Y\right).$$

Clearing of fractions and reducing, the expression becomes—

$$S = \frac{(W - W)\,L + 2\,W \times Y}{2},$$

from which, finally, we have—

$$S = W \times Y,$$

thus proving the truth of the axiom laid down. For the proof of the respective values of S at the abutments and at the centre, a reference to Fig. 3 will point out the maximum value of Y is when—

$$Y = \frac{L}{2},$$

that is when its length reaches from the centre of the span to either of the points of support. Its minimum value is when—

$$Y = 0,$$

that is when the point at which the shearing stress is required is situated at the centre of the span.

It is now, therefore, apparent why the stirrups are spaced closer together in the compound system under notice. They support the shearing stresses, and since these latter increase towards the points of support or abutments, the stirrups are put nearer each other, in order to increase their number, and so reduce the share of the load each would have had to support if the distance between them had remained a constant quantity. It is true that the same result could have been accomplished by increasing the dimensions of them *pari passu* with their gradual approach to the abutments. There are, however, several and weighty practical objections, well known to those engaged in the designing and construction of bridges and roofs, which forbid the use of a number of sections varying in scantling by a very small increase and decrease. Such a practice, which we regret to have frequently noticed, in introducing an unnecessary multiplicity of component parts, invariably leads to confusion. Simplicity is perfection, and the fewer the number of parts in any structure, the nearer is that ever desirable, but ever unattainable, goal approached. Those who have had experience in the erection of works abroad and in our own colonies know the great importance of "fewness of parts." Native workmen are too lazy or too ignorant to even notice, much less concern themselves about, whether a bar 3in. by ½in. is put in its proper place, or another bar 3in. by ⅝in. substituted for it. So long as the length fits in, and will answer the purpose, the other dimensions are of no importance whatever. When it is borne in mind that in a "straight" lattice bridge all the diagonal bars in the open web of the girders are of exactly the same lineal dimension, the disagreement between the stresses, and the amount of sectional area provided for them, is frequently beyond all powers of adjustment.

Another method of arranging the two materials

in this combined system is represented in Fig. 4. In addition to the horizontal bars shown in Figs. 1 and 2, others are added corresponding to the thick line B B B B. The exact object of these extra bars is not very apparent. They are supposed to unite with the stirrups and the horizontal bars in resisting the shearing stresses

Fig. 4.

and also the bending moment, to which all beams and girders are liable. It should be kept in view that there is, after all, a limit to the amount of the stronger material that can be introduced into the compound system, unless the dictates of economy and the question of comparative cost are to be altogether disregarded. There is nothing easier in the world than to fortify one material at the expense of another, and the process might be continued until the weaker material was abandoned altogether, and the system reverted from a compound to a simple one. It is only by properly proportioning the respective amounts of the two or more materials of which the structure may consist that the maximum strength, together with the minimum weight is correctly, and consequently economically, arrived at. We alluded to this important part of the question in a previous article, when drawing attention to the different resisting powers of steel and concrete, and we notice with satisfaction that M. Hennebique lays a great stress upon this part of the subject.* We shall find also in the further experiments relating to larger examples of the combined system, which we shall subsequently describe and illustrate, that great consideration was paid to this important detail in both the designing and execution of the examples submitted to test.

ROYAL COURT THEATRE, LIVERPOOL.

THE disastrous fire which took place in the beginning of the year at the Court Theatre suddenly stopped the progress of the performance, and on the 21st ult. the restoration was commenced with new roofing and new ceiling. Suggestions for the removal of a blot on the theatre—namely, the want of dressing-room accommodation—have been carried out, and now, instead of general dressing-rooms, as formerly, the theatre possesses thirty-six new dressing-rooms, all built on fireproof flooring. Each dressing-room has now a window and ample ventilation. Another improvement is that each dressing-room floor has two fireproof staircases as exits for the artistes. Lavatory accommodation has been provided for these dressing-rooms, and also, it may be added, for the staff and general public.

Owing to the limited area of the rooms surrounding the theatre, it was a matter of difficulty to increase the size of the old buffet; but by the removal of a staircase the accommodation of this department has been very materially increased. The buffet and the foyer have been refitted and redecorated, principally in white and gold. The only strong colouring is in the centre of the cove over the proscenium, where is inserted the Royal Arms. In addition to the above there have been many alterations under the stage and under the pit.

A new carpenters' shop and one for the engineer, with which is incorporated a fireproof braziers' shop, have been excavated out of the rock. Adjoining them will be found a new band-room. Under the orchestra and under the pit a fine new room has been made, which can be used for general storage or an additional green-room. It has, moreover, the great advantage of forming a connection between both sides of the stage. Further, to add to the comfort of the theatre, a complete hot-water system of heating has been arranged.

Fire hydrants are provided in the pit, dress-circle, and gallery, to be used as an additional protection for the public. For the lighting of the theatre gas has been superseded by electric-lighting wherever possible. The ventilation has not been forgotten, and the latest improvements have been adopted.

The work was commenced on June 21 last, and the theatre was completely ready for opening on Monday, Aug. 2 (Bank Holiday), for the first performance of the "Trumpet Call." Notwithstanding the extraordinary difficulties which have stood in the way of anything like rapid progress—for instance, the large mass of rock to be removed and the course of the new excavations, the impossibility of getting plasterers owing to the prolonged strike and consequent substitution of less pliable materials than plaster—the whole of the works have been completed strictly within the short time stipulated in the contract—viz., six weeks.

A shelter verandah has been designed to protect the public waiting for entrance to the theatre in Roe-street. The works have been executed by Messrs. W. Morrison and Sons, builders, of Wavertree, from the designs, and under the superintendence, of Mr. Edmund Kirby, F.R.I.B.A., architect, Liverpool.

WORK FOR THE HOLIDAYS.

ARCHITECTS desirous of a little vacation work may possibly be attracted by the very liberal advertisement we append below, and to which we give free circulation. We hope the successful competitor will not be unduly tempted to prolong his holidays on the strength of the handsome premium!

TO ARCHITECTS.

THE SKIPTON AND DISTRICT COTTAGE HOSPITAL COMMITTEE invite DESIGNS in competition for a COTTAGE HOSPITAL providing 16 beds, to be erected at Skipton, at a cost of £2,500. Premiums of £15 and £5 are offered for the designs *adjudged 1st and 2nd in order of merit by the Committee*. Printed particulars of the Competition, specifying in detail the requirements and conditions laid down by the Committee, with a lithographed plan of the site, may be had after Thursday, the 12th August, 1897, on application to the undersigned, *inclosing fee of* £1 1s., which will be returned on receipt of a set of plans. All designs are to be delivered on or before the 16th September, 1897.

W. H. DAWSON,
Hon. Sec., Skipton and District Cottage Hospital Committee.
Skipton, 6th August, 1897.

No professional referee is to be employed, apparently, and it really seems as if the committee are a little doubtful whether any architect will compete after he sees the conditions, if one may judge from the fact that a guinea has to be forwarded by each competitor.

SANITARY SPECIALITIES.

DISCONNECTION in some form is absolutely necessary to insure sanitary drainage. Messrs. Thos. Crapper and Co., sanitary engineers, of Chelsea, have long been known as the manufacturers of "The Improved Kenon Disconnecting Trap," a type of trap which serves admirably the purposes of disconnecting and cleaning. The new illustrated catalogue of Messrs. Thos. Crapper and Co.'s specialities shows a few applications of the improved "Kenon." One is a section of a disconnecting chamber, with the trap shown in position. Provision is made at top of trap for discharging into sewer any accummulation caused by accidental stoppage. There is an easy means for sweeping by a brass cap with screw, and the gunmetal valve suspended by chain is very easily lifted. By the egg-shaped section of open pipe just before it enters the trap the flow of sewage is quickened at the right point. The "Kenon" trap is made in five sizes, from 4in. to 12in., of glazed stoneware, with gunmetal valve, galvanised chain, &c. The 4in. size, suitable for ordinary houses, is only 29s. 6d.; but the plain trap itself costs only 8s. 3d. With the gunmetal cap screwed on the same size trap is priced 13s. 6d. Illustrations are given of special channel-pipes, white glazed, of different sections, and the registered white glazed block for inspection-chamber floors. This block supersedes cement channelling, and fills the space between the channel and the wall of chamber with a smooth, impervious, glazed surface. The sanitary air-tight frames and covers for manholes are a speciality of this firm. The cover, when fitted in groove, is perfectly air-tight, and can easily be removed. They are made in several sizes, painted or galvanised. Some of them are extra strong to bear heavy traffic; the "double seal air-tight frame and cover" has a double groove, and possesses great security. One of the patterns illustrated shows openings in the cover for ventilation. The automatic flush-tanks are of superior design and quality, and many patterns are shown. Several very excellent valve-closets with large slop top and dish in one piece are illustrated. These closets have white-ware flushing rim basins, slop top in one piece, and are fitted in the best style. The "Elastic Valve," the "Twycliffe" pedestal siphon, "improved Marlboro," with lead P-trap, in white or ivory, with raised ornament, the "Deluge," and other patterns of pedestal wash-down closets are given in great variety. A superior grease-trap is shown in several patterns, also waste-water preventers of cast iron, sinks with overflows of fireclay in one piece, lavatories and baths of fireclay and cast iron. The "Independent" baths with hot and cold valves and trapped waste are capital portable goods. We recommend our readers to get Messrs. Thos. Crapper and Co.'s catalogue of special sanitary fittings before they specify goods of this description.

T-SQUARE CLUB OF PHILADELPHIA.

THE charter applied for by the T-Square Club, the leading architectural organisation of Pennsylvania, and one of the foremost in the country, has just been granted in the Courts of Philadelphia, and the club is now, therefore, duly incorporated. Although but now entering upon its corporate existence, this club has, says the *American Architect*, been an energetic organisation and a moving factor in the field of its profession for the past fourteen years, having been organised in 1883. The following well-known architects were the founders:—Walter Cope, John Stewardson, Wilson Eyre, jun., R. G. Kennedy, Lindley Johnson, Arthur Truscott, George Paxson, Charles L. Hillman, Clement Remington, Frank Price, Louis C. Baker, and Mr. Carlton. The purposes of the club, as set forth in the charter and in its constitution, are: "To promote the study and practice of architecture and the kindred arts; to afford its members opportunities for friendly competition in design; and to further the appreciation of architecture by the public." The subscribers to the charter, who constitute the present officers of the club, all of whom are well-known Philadelphia architects or draughtsmen, are: David Knickerbocker Boyd, president; Edgar V. Seeler, vice-president; George B. Page, secretary; Horace H. Burrell, treasurer; Walter Cope, Louis C. Hickman, and Charles Z. Klauder, executive committee; and Adin B. Lacey, Percy Ash, and Charles E. Oelschlager, house committee. The T-Square Club has made its influence felt in various municipal and national affairs; has passed important resolutions on progressive, local, and other matters, and last fall conducted the architectural exhibition in connection with the regular exhibition of painting and sculpture at the Pennsylvania Academy of Fine Arts. This exhibition was one of the most successful ever held there or elsewhere, being the first in America to contain so many thoroughly representative contributions from foreign architects. This autumn will again see an architecrural exhibition held by this club, which, it is intended, shall surpass any previous one, both in the number and the interest of the exhibits. Representatives of the club are now in England and France securing the best drawings, and a number of exhibits are promised from other countries. The club has also sent Mr. Albert Kelsey to represent it at the International Congress of Architects to be held in Brussels, Belgium, in the latter part of this August. The Travelling Scholarship in Architecture, awarded by the University of Pennsylvania, has for the past several years been won in each case by a member of the T-Square Club. This club in 1889 was awarded the Hinkle Gold Medal for the best club display at the National Exhibit of Architectural Drawings and Sketches at Cincinnati, and in 1895 was also awarded the medal given by the St. Louis Architectural Club for the best club exhibit. The T-Square Club with the University of Pennsylvania, the Pennsylvania Academy of the Fine Arts, the Fine-Arts League, the American Institute of Architects, and other leading organisations, co-operate in all movements for the advancement of art and art matters, whether of local or national interest or benefit. The club meets once a month, and at each meeting has competitions among its members upon architectural and decorative subjects. At various times lectures are given, open to all members of the profession, and the season is occasionally marked by social entertainments. The club consists of 150 members, and numbers among its workers all the leading architects of Philadelphia. These men, by their lectures and criticisms at the meetings, give an invaluable assistance to the draughtsmen and

* *Vide* "Le Moniteur de l'Industrie et de Bâtiment."

younger members, who unite with them in an *esprit-de-corps* so essential to the advancement of this or any other profession or high object. The club, having recently removed from the School of Industrial Arts Building, is comtemplating the occupation of a building in the central part of Philadelphia, which it proposes to fit up for its own uses. Here it will still further increase its usefulness and continue to widen its scope of influence. An idea of its energetic policy may be obtained by the following extract from the introduction to this year's book of programmes for the competitions:—"Our membership is large. The scope of our work and influence is extending. We have reached a position which carries with it a responsibility to the community. A high standard of design and criticism among ourselves, and an enthusiastic participation in the monthly competitions, will be not only of direct benefit to the individual members, but will enable us to take an aggressive attitude as an organisation in the struggle against bad architecture."

ARTIFICIAL STONE AND MARBLE COMPOUNDS FOR BUILDERS.

THE following formulæ give the methods of preparing some of the best-known products used as artificial stones, concretes, &c., which are open for anyone to prepare.

ARTIFICIAL STONE COMPOUNDS FOR BUILDING.

No. 1.—Ingredients: 10 parts of hydraulic lime which has fallen to a powder, with water to form a paste; 25 parts of gravel, 5 parts of coal ashes or wood ashes, water q.s. Preparation.—Thoroughly mix the mass, and add sufficient water to make the mass equal to 50 parts bulk, then pour the mass into moulds made of wooden boards and allow it to set.

No. 2.—Ingredients: 125 parts of hydraulic lime which has fallen to a powder, mix with sufficient water to form a paste; then add 250 parts of ground oyster-shells and 150 parts of ground peat ashes, and sufficient water to make the whole equal to 500 parts in bulk. Then pour into mould until set, as in No. 1.

No. 3.—Ingredients: 100 parts ground quartz sand, 2 to 10 parts finely-ground plumbic oxide, water-glass (silicate of soda) q.s. Mix the solids together, and then moisten with the water-glass until thoroughly mixed, and firmly press into moulds. When set, the stone mass thus formed should be burned.

No. 4.—Ingredients: 1 part of cement (Portland), 3 parts of sand, dilute sulphuric acid (1 part acid to 50 parts water). Preparation: Mix the sand and cement into a dough with the acid fluid, and submit to a strong pressure. Then dry the stones in the air for two days, and afterwards steep them for 12 hours in water and acid (3 of acid and 100 of water), and finally dry them.

No. 5.—Ingredients: 2 parts of Portland cement, 1 part of sand, 1 part of cinders, solution of green copperas q.s. Preparation: Dissolve the green copperas in water until no more will dissolve. Separately mix the three solids together in the dry state, and then moistem them with the solution of copperas; press the mass into moulds, and allow them to dry in a warm place for two weeks; then take the blocks out of the moulds, steep them in water for 24 hours, and finally dry for four weeks.

No. 6.—Ingredients: 10 parts unslaked lime, 3 to 4 parts of water, 40 to 60 parts of dry sand, 2½ to 10 parts of hydraulic cement. Preparation: Mix the lime with the 3 or 4 parts of water, and then mix in the sand, and finally the cement. Afterwards grind the compound, and press into moulds.

No. 7.—Ingredients: One part of alum, 15 parts of water, two parts hydraulic lime, 10 parts sand, one part cement. Preparation: Dissolve the alum well, and then add the other ingredients and work up to the required consistency; press into moulds and allow to remain for 24 hours. The blocks of stone thus prepared will not be fit for use for at least 14 days; but to be thoroughly hard requires longer drying.

No. 8.—Ingredients: 30 parts of quartz sand, 1 part of oxide of lead (plumbic oxide), 10 parts of water-glass. Preparation: Mix the sand with the oxide, and then make a dough of the mass by adding the water-glass; press into moulds, and then heat the blocks at a red heat for two hours.

No. 9.—Ingredients: 4 parts of coarse sand, 1 part of cement, gravel q.s., lime-water q.s., 2 parts of fine sand, 1 part of cement, 1 part of dry metallic colouring matter. Preparation: Mix the sand, cement, and gravel with sufficient lime-water to form a paste; press this into moulds, and cover the surface with a composition made up of the fine sand, cement, and colouring matter. When the surface is nearly dry, brush it over with a solution of water-glass.

No. 10.—"Victoria" stone is made as follows: The refuse from the granite quarries is broken up into pieces of suitable size, and 4 parts of the fragments thus obtained are mixed with 1 of Portland cement, with the addition of sufficient water to bring the mass to the consistency of dough. The mass is run into moulds, in which it is allowed to remain for several days, or until it has set solid; the blocks are then immersed in a solution of silicate of soda.

No. 11.—Ingredients: 400 parts of sand, 52 parts of limestone, 6 parts of burnt clay (brick-dust), 13 to 25 parts of water-glass. Mix all together.

ARTIFICIAL MARBLE.

No. 1.—Ingredients: 8 parts marble-dust or white limestone, 2 parts zinc oxide, 1 part Portland cement, hot aqueous solution of water-glass q.s. Mix the three solid ingredients into a paste with the solution of water-glass (which should contain about 40 per cent. of the glass), and mould the paste under pressure while warm, and expose the moulded form for a week or ten days to warm, dry air before finishing.

No. 2.—Ingredients: 280 parts of granite or other stone, broken small; 140 parts of limestone or chalk, 5 parts of burned calamine, 3 parts of calcined feldspar, 2 parts of fluorspar, 2 parts of calcium phosphate, 40 parts of water-glass. Mix all the ingredients together in the dry state before adding the water-glass, then press the paste into moulds, and dry the finished pieces at a temperature gradually rising to 125° Fahr.

No. 3.—Ingredients: Alum, water, plaster of Paris. Preparation: Dissolve alum in water (cold) until no more alum will dissolve, and then gradually stir in dry plaster of Paris until the mixture is of a suitable consistence, then spread out the plaster in slabs or form into blocks, and bake it.

VARIEGATED MARBLE.

is produced artificially by mixing dry Portland cement with dry pigment that will colour the cement, and the mixture is made into a paste with the least possible quantity of water. Make a separate pasty compound for each colour, and then place each separate compound one on top of another, and press the compound from all sides, and beat it, so that the colours of the different parts impress themselves on each other without any uniformity, the result will be the production of veins penetrating the mass, which should then be sawn into plates or slabs, and these pressed in a mould for 12 days, during which time they should be kept moist as long as they are not entirely hardened. The polishing of each slab is proceeded with just like marble is polished.

IMITATION MARBLE

may also be produced from sandstone by impregnating the latter first with a solution of sulphate of alumina, and the next one of water-glass. The sandstone will thus acquire a marble-like appearance, and can be polished. The sandstone when so prepared can be submitted to a very great heat, until it is almost vitrified. It is likewise unaffected by atmospheric influences.

CONCRETES

for floors or pavements can be prepared thus:—Remove the soil to a depth of 2ft., and then lay in the largest stones or rubble you can obtain to the depth of 1ft., and on top of this shoot sufficient small stones—about the size of eggs—to fill up the interstices, and level the surface smooth. On top of this put a layer of coarse gravel 6in. thick, and well douse the whole with water, and let it remain some days until it has well settled. The stuff so laid in will form a solid body or foundation for the concrete, which should be prepared as follows:—Mix one barrel of good cement with 3lb. of clean sharp sand; well mix together in the dry state, and then make the mixture into a paste by sprinkling sufficient water on it, well stirring the whole. To the compound thus mixed add two barrels of stone chips and two barrels of coarse gravel, but only as much as the paste will readily combine with. Mix all thoroughly, and then tip it on the bed or foundation, and level it off to its proper height. Proceed with the laying of this deposit as quickly as possible, and when the whole surface is covered, ram it down by the aid of a rammer, such as is used by paviors. Finish off the surface by laying on a thin layer of pure cement mortar to bring the surface to complete evenness. Do not let it dry too quickly, but wet it occasionally so that it shall have all the water it will absorb.

CONCRETE MARBLE.

No. 1.—Ingredients: Milk of lime (prepared by steeping lime in water, allowing it to settle, and pouring off the fluid, which is the "milk of lime" required), finely-powdered marble or limestones, or else chalk; a small quantity of coarsely-powdered limestone. Preparation: Mix the marble, limestone, or chalk with the milk of lime until it acquires the consistency of paste, and to give the whole more cohesion add the coarsely-powdered limestone. Lay the compound as quickly as possible, as it dries very quickly, and becomes hard.

No. 2.—Five parts coarse sand, 12 parts pebbles, 3 parts lime.

No. 3.—Sixteen parts pebbles, 8 parts river-sand, 2 parts lime. Mix with water to a suitable consistency.

SPECIAL MORTARS.

Hydraulic Mortar.—Burn some lime (CaO, calcic oxide), and then moisten the burnt lime with water and allow it to fall into a powdery condition by exposing it to the air; this powder will be calcic hydrate ($CaOH_2O$—i.e., slaked lime). Separately prepare some kisselguhr (infusorial earth or fossil meal), by washing, drying, gently heating, and pounding up any lumps that may be formed; then mix this fossil meal with the calcic hydrate in equal weights, and mix the compound with water to form a suitable working consistence. For mortars that are not much exposed to water, mix 1 part of infusorial earth with 2 parts of calcic hydrate (by weight). Another good hydraulic mortar may be made by mixing 1 part of alum shale with 2 or 3 parts of the slaked lime. The mixture is moistened with water for use, and used as mortar. It dries very quickly; becomes hard and impermeable.

A mortar for damp places may be made by using a warm solution of green vitriol (sulphate of iron or ferrous sulphate, as it is also called), with which to slake the lime, and mixing the slaked lime with very fine quartz sand.

To make ordinary mortar harden under water, add a little manganese to it.

Turkish mortar, for use in building solidly-constructed edifices, is prepared by mixing with water to the desired consistency 1 part of powdered brick and 2 parts of sifted lime. Put this on in layers of 5in. or 6in. thick between the course of brick and stone. W. C. S.

Harrow School has become the purchaser of the late Mrs. Russell Gurney's estate of thirteen acres adjoining the town, as an addition to the playing fields.

At the Grimsby Bankruptcy Court, on the 5th inst., the public examination of George Carter, joiner and builder, of No. 106, Welholme-road, Grimsby, was opened. He commenced business as a joiner eighteen years ago, and as a builder in March, 1894, with a capital of £50. He owed to unsecured creditors £1,113 3s. 3d., while his free assets were £101, leaving a deficiency of £1,012 3s. 3d. Insolvency was attributable to bad trade and losses on buildings. The examination was adjourned.

A new reservoir, constructed by the corporation of Perth, was opened on Monday at Burghmuir, two miles from Perth, by Lord Provost Dewar. The reservoir is erected at an elevation of 320ft., which is an altitude sufficient to supply all the higher districts round the outskirts of the city for many years to come. The size of the reservoir is 121ft. square by 21ft. 9in. deep. The reservoir, when full, holds 1,956,584 gallons, being 117,300 gallons more than the existing three reservoirs hold when full.

As the result of the inquiry in the House of Commons last week, the Local Government Board instructed the chairman of the Middlesex County Council to take immediate steps to have the river Brent cleaned. Mr. Littler, Q.C. (chairman of the Middlesex County Council) has conferred with the engineers of the Willesden and Ealing District Councils, who have agreed to pay half the cost of deodorising and clearing the stream of obstructions and solid pollution down to the Hanwell district. The two bodies will pay in proportion to the rateable value of their area in the Brent watershed, and the county council will bear the half of the total cost.

OBITUARY.

Mr. Enoch Rimmer, who had sat as councillor for Scarisbrick Ward in the Southport Town Council since 1884, and who resided in High Park-road, where he carried on business as a builder, died on Monday after a long illness. Deceased, who was a Liberal and Nonconformist, enjoyed the full confidence of his constituents, and though the Conservatives opposed his re-election every three years, he always recorded an easy victory. A native of the district, he was the spokesman in the council chamber of the modern Labour party. In the election of Sir George Pilkington as the first M.P. for the Southport Division, deceased took, in his own district, a prominent part. The building operations of deceased had extended into Birkdale, and he owned house property in various parts of the ancient parish of North Meols. He was also interested in a farm at Mawdesley.

CHIPS.

At Batley, new Roman Catholic schools, built from designs by Mr. J. Burrows, architect, have just been opened by the Bishop of Leeds.

The master builders of Stirling had their annual trip on Thursday in last week, the place visited being Millport. The company, which numbered 60, left by train at 8.36 in two saloon carriages, and Millport was reached at 12.30. The excursionists drove round the island in brakes, and afterwards dined at the Cumbrae Hotel. Councillor John Govan presided, and Mr. R. Frater was croupier.

An electric tramway from Kirkstall Abbey to Roundhay Park, Leeds, was inaugurated on Thursday in last week by the Lord Mayor of Leeds. At the ensuing luncheon, the chairman of the highways committee of the Leeds City Council stated that since August, 1896, the committee had relaid 17½ miles of permanent way; it had also laid 4½ miles of extensions. At the present time they had about 1,000 men at work on other branches relaying and bonding the rails, with a view to electrical extensions in the future.

The technical education board of the London County Council invite applications for the appointment of headmaster of the new Camberwell School of Arts and Crafts. The salary will be at the rate of £400 a year. Full particulars of the duties and conditions of the appointment may be obtained during August of Dr. W. Garnett, secretary of the board, 9A, St. Martin's-place, W.C.

The new church of St. Luke at Maidstone will be opened on Friday, September 3. It is Late Perpendicular in style, is built of local ragstone, with Monk's Park stone dressings, and is seated for 600 persons. Mr. W. H. Seth-Smith, of Lincoln's Inn-fields, is the architect, and the builders are Messrs. Wallis and Sons, of Maidstone.

Tenders for the demolition of the Palace of the Liberal Arts, in Paris, one of the buildings erected for the International Exhibition of 1889, have been received. The reserve price was 158,000f., but the successful bidder agreed to give 308,000f. for the materials, to be removed, of course, at his own expense.

The parish church of Thirsk, which was restored internally about eighteen years ago, is about to be repaired externally at a cost of about £1,250. Mr. C. Hodgson Fowler, F.S.A., of Durham, is the architect, and the work was commenced last week.

A hall is being built at Guardbridge, Fifeshire, from plans by Messrs. Gillespie and Scott, St. Andrews. The building is to be of brick and freestone, and is in the English Renaissance style. It will accommodate over 300, and is lighted by large windows at the sides and ends. The roof is to be half-open, showing the timbers. There will be a platform suitable for theatricals on a small scale, and two ante-rooms. The contractors are:—Messrs. Linder, bricklayers, St. Andrew's; Alex. Smith, joiner, Cupar; Rintoul and Mackie, slaters, St. Andrew's; Alex. M'Ritchie, plasterer, Dundee; and Alex. Stewart, plumber, Cupar.

At a recent meeting of the Cheltenham Town Improvement Committee, the tenders for the Winter Garden scheme were considered. Eight were sent in, and it was resolved to recommend the town council to accept that of Messrs. A. Estcourt and Son, of Gloucester, at £46,600. The separate items in this tender (which was the lowest received) are: municipal buildings, £21,019; kursaal, 21,341; winter garden and accessories, £4,240; total, £46,600. The town council received this report last week, and adopted it after a long discussion. A proposal to divide the work between two builders of Cheltenham, and to accept the tender of Messrs. Billing at £22,199 for the municipal buildings, and those of Messrs. Collins and Godfrey at £21,540 for the Kusaal, and £4,400 for the winter gardens, was rejected by eleven votes to six.

Building Intelligence.

Brixton, S.W.—The foundation-stone of the new parochial hall for Christ Church, North Brixton, was recently laid by Sir George Williams. The existing church, a pseudo-Classic structure, is very dilapidated, and occupies a cramped area, and it was, therefore, decided to rebuild the church upon the present site, enlarged by acquiring 96, Brixton-road, and 1 and 3, Chapel-street. The leasehold interests of those properties have been purchased, and the Ecclesiastical Commissioners, who are the freeholders, have agreed to grant free of cost the freehold. The enlarged site thus secured has a frontage of 116ft. to Brixton-road, by an average depth of 235ft. The designs of the new church, which have been prepared by Mr. Beresford Pite, F.R.I.B.A., provide a building accommodating a congregation of 1,500 persons, two-thirds of whom will be placed on the ground floor and one-third in the galleries. A large hall will be built upon the rear portion of the site before the present church is pulled down, in order to provide temporary accommodation for the congregation during the erection of the new building. On the completion of the new church the hall, which is intended to be a permanent structure, will be capable of easy conversion into a parochial hall and infant school, with rooms and other accommodation for Bible classes and small meetings. The cost of the new church, including furniture, heating, and lighting, is estimated at £15,000, and the hall at £2,800, and towards these sums £5,000 has been promised.

Dunfermline.—The pended tower formerly connecting the Abbey of Dunfermline with the Palace, which has been converted into a museum, was formally opened on Friday by Mr. Andrew Carnegie. The tower, which is a massive oblong building situated at the south-west corner of the Abbey grounds, and crossing the roadway, was until recently used as a sexton's toolhouse, but through the generosity of Mr. Carnegie it has been transformed into a home for antiquities connected with Dunfermline and neighbourhood. The work of renovating the building has been carried out under the direction of her Majesty's Office of Works, the plans being prepared by Mr. Hawks, who also undertook the superintendence of the tradesmen. The alterations which it was necessary to make have been of such a character as to retain the whole building in harmony with its surroundings. There are in all four rooms of different sizes and shapes. The windows have been filled in with cathedral glass, and in the principal apartment the Scottish standard and the Dunfermline burgh arms appear in the eastern and western lights respectively, while Mr. Carnegie's monogram is shown in another.

Redland, Bristol.—The new church of St. Anselm, which has been erected in Whatley-road, Redland, as a chapel of ease to St. John's, was opened on Sunday. The church, which is from the designs of Mr. W. V. Gough, architect, Bristol, will ultimately consist of tower, nave, chancel, transepts, and aisles, and will hold about 700 worshippers; but all that has been done at present are the nave and chancel, which afford accommodation for about 400. The south aisle will for present purposes be separated from the church, and will do duty for vestry and classrooms, which eventually will be provided underneath the north aisle. The architecture is Early Decorated. The walls are built of pink stone taken from the site, with dressings of Bath stone. The seating is by means of chairs provided by Messrs. T. Miles and Co., of Bedminster-causeway. Mr. E. Walters, of Montpelier, Bristol, was the builder.

In the peristyle of a house at Pompeii recently excavated two fine wall paintings have been found, probably transferred there from some other building. One of them represents a poetess reading to a female musician; the other a young girl leaning against a pillar, and conversing with a girl seated and wrapped in a large mantle.

One of the projects which have obtained Parliamentary sanction during the session just ended is the Dearne Valley Railway Bill, a measure providing for a line in the West Riding, about 17½ miles in length, forming junctions with the Hull and Barnsley Railway, near Barnsley, and with the Great Northern and Great Eastern Railways, at Blackcarr, near Doncaster, and for a small dock in the river Dearne, at Mexborough.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Birmingham Architectural Association.—The members of this association have just returned from their annual sketching expedition, which is arranged to provide students with opportunities for studying examples of ancient and modern architecture which may be of service to them. One day was devoted to a careful study of Tewkesbury Abbey, whilst the noteworthy churches and domestic buildings in the district of Bredon, Pershore, and Upton-on-Severn were inspected during two days. The fourth and last day was devoted to Forthampton Court.

The Royal Archæological Institute.—The annual summer meeting of this institute terminated at Dorchester on Tuesday with visits to Milton Abbey and other features of interest in the district. Lord Dillon, president of the institute, was present, and took an active part in the proceedings. At the annual business meeting, which was held at Dorchester, Lord Dillon and the whole of the other officers of the institute were re-elected. The success of the summer meeting has been largely contributed to by the local committee, with Mr. H. J. Moule as hon. secretary. On Wednesday the institute went to Jersey, where they had an extra day under the guidance of the Société Jersaise.

The Cwm Baptist Chapel at Charitstoke having become dilapidated, is being rebuilt from the ground. Messrs. Davies and Son, of Newtown, Mont., are the contractors. The foundation-stone of the new building was laid last week.

The Mont Blanc Mountain Railway is in swift progress. The works along the Arve from Le Fayet to Chamounix will soon be completed, and then they will proceed with the actual mountain railway from Chamounix (3,400ft. across Montanvert, 6,250ft.) to the Mer de Glace. The length of this mountain line will be 5·5 kilomètres, and the ascent will amount to about 900 mètres. The first half of the climb of the railway carriages will be effected by the adhesion system, the other half by the cogwheel system, as on the two Rigi railways. It is anticipated that the railway to the Mer de Glace will be completed in the year 1900.

A new carbon factory for the purpose of preparing carbon in connection with the electric furnace of the British Aluminium Company's works at the Falls of Foyers, and for other minor purposes, was opened in Baker-street, Greenock, by Lord Kelvin on Friday. The factory is the first of the kind in the United Kingdom. The raw material used in it is retort carbon, a by-product of the gasworks, and it is obtained from the gasworks in Glasgow and other towns. The principal features of the process are the great pressure at which the carbons are moulded by powerful hydraulic machinery and a unique annealing furnace heated by producer gas. The power required for the process is supplied by the Greenock Water Trust through the existing conduit.

At the last meeting of the Mold Urban District Council a communication was read from Mr. Isaac Jones, the council's surveyor, resigning his position on account of advancing years. He had been 24 years in the service of the town, and he thanked the members for the kindness they had extended towards him. The chairman and other members testified to the faithful and conscientious services of Mr. Jones. It was decided to refer the question of appointing a successor to the finance committee, and to recommend the committee to consider suggestions which had been thrown out as to assisting Mr. Jones in his declining years.

An additional factory has just been completed for Messrs. James Taddy and Co., tobacco manufacturers, in the Minories, E.C. The architect is Mr. Edwin J. Sadgrove, of 22, Surrey-street, Strand, and the builder, Mr. T. E. Mitchell, of 136, Hampstead-road. It is five stories in height, and is faced with red bricks, Portland stone being liberally used for dressings. Mr. George Jennings, of Lambeth, executed the sanitary work.

The municipal corporation of Aberdeen has resolved, on the initiative of Town Councillor Boddie, to erect in Duthie Park a granite monument in commemoration of the generosity of the late Miss Duthie, the donor of the park to the community of that city. The monument will be constructed of Aberdeenshire granite, and will be 28½ft. high. At each of the four corners of the base will be carved a lion couchant. On the base stands a die for inscriptions, from which will rise a fluted column, with Corinthian capital, after the style of that in the Temple of Vesta, Tripoli, but adjusted to suit work in granite. The monument will be crowned by a figure of "Hygieia," typical of health. The design is by Mr. Arthur Taylor, sculptor, Aberdeen, and the total cost will be £400.

Engineering Notes.

Crystal Palace School of Engineering.—The award of the certificates to the students of this school took place on Friday at the Crystal Palace. Mr. G. A. Goodwin, past president of the Society of Engineers, occupied the chair. Mr. R. G. Hodson, superintendent of the school, read the examiners' report for the summer term of 1897, which is the second term of the 25th year of the school. Mr. R. J. Money, who examined in the mechanical section, noted the continued improvement shown in the work turned out since he was a student 17 years ago, and since he examined the section six years ago. Mr. A. Marshall congratulated both the students and instructors on the result of the work in civil engineering. Mr. J. G. Aldridge, reporting on the electrical section, especially commended the work of Mr. Harbord. Mr. Goodwin then presented the certificates. Mr. W. Sims was first in the mechanical engineering section (first year's course); Mr. B. O'Dowda, in drawing; Mr. F. Peach, in pattern-work; and Mr. W. J. Wood, in fitting-work. In civil engineering in the second year's course, the most successful students were Mr. O. A. St. John-Kneller, Mr. J. W. Simpson, Mr. J. M. Alvares, and Mr. R. F. Arkwright. In the electrical section, Mr. W. T. Harbord and Mr. A. T. Araujo took first places.

River Weaver Improvements.—The River Weaver Trustees have just commenced an undertaking which is intended, by an expenditure of £35,000, to greatly improve the waterway. The work includes the erection of two swing bridges worked by electricity, the making of new roads, and the removal of obstructive locks. One swing bridge will replace the fixed bridge at Northwich on the high road between Manchester and Chester. This structure is constantly sinking, and though it has been raised as high as the gradients of the road permit, salt craft returning light to Winsford have been unable to pass beneath. In order that road traffic shall not be unduly interrupted, an alternative swing bridge and road are being made 400 or 500 yards distant. As the land in the neighbourhood of both is subject to subsidence, the weight of the bridges will rest on pontoons, which will not be affected by any difference in the levels of the river in times of flood or drought. The town's gas and water will be carried under the river by a duplicate set of pipes placed in siphons. By the removal of the Newbridge Locks, two miles below Winsford, the water level will be raised, thus enabling larger craft to navigate the river and to carry greater cargoes to Liverpool and Manchester. The order for the construction of the bridges, apart from electrical connections, &c., has been placed in the hands of Messrs. A. Handyside and Co., Limited, of Derby, the contract being £16,687. Messrs. Beckett, of Hartford, are making roads at a cost of £3,018, while the remainder of the work will be carried out by the Trustees' own employés.

The Burnley Corporation have decided to seek further borrowing power for £10,000 for sewage purposes. Of this £7,452 is required for the amount overspent on Gannow and Althan sewer and the Wood End sewage farm, £1,000 for an artificial filter now in course of construction, and £1,547 for additional filters at Wood End.

The Glasgow corporation have accepted a bequest from Mrs. M'Kerracher of four pictures by the late Sam Bough, viz., "Cadzow Forest, 1855," "Dutch Luggers entering the Thames," "By the Lake, Cumberland," and "In Glen Sannox," and also a portrait of the testator's father. The works have been hung on a screen in the Corporation Art Gallery.

A memorial window to the late Jesse Simcox and family has been placed in the south chapel of St. James's Church, Handsworth, with figures of Zacharias and Elisabeth, with the angel Gabriel in the tracery announcing the promised child. The window was from the studio of Mr. T. W. Camm, Smethwick, near Birmingham.

The corporation of Liverpool have agreed to pay £95,000, in accordance with the provisions of the City Churches Act, for the land on which stand the churches of St. John and St. George, which are to be closed in March next year.

The official opening of the Lady Windsor deep-lock at Barry Dock will take place in September. The new lock admits vessels up to 9,000 tons burden, and has been constructed by Sir J. Jackson, of Westminster.

COMPETITIONS.

Bootle.—In response to the advertisements of the Bootle Corporation inviting competitive plans for a technical school to be erected at the corner of Balliol-road and Pembroke-road, at a cost not exceeding £15,000, and offering premiums of 50, 30, and 20 guineas for the three best designs, there have been received 22 sets of plans. Mr. W. E. Willink, president of the Liverpool Architectural Society, has been appointed by the Free Library and Museum Committee to act as referee to advise them in the consideration of the plans. There were 40 applications to the borough engineer for a plan of the site and instructions, and the committee has resolved that the guinea deposits of those architects who failed to compete be not returned.

Lichfield, Staffs.—Applications were received from 27 architects to advise the guardians upon the proposed alterations and extensions to the workhouse. Mr. W. H. Woodroffe, A.R.I.B.A., London, was appointed. The workhouse, which is situate in the Trent Valley-road, was erected in 1840, and was designed by Sir Gilbert Scott. It is of picturesque appearance in red brick and stone, and small windows with iron diamond-shaped casements, which for a workhouse are not conducive to healthy rooms, and though of quaint appearance, are to be removed.

CHIPS.

An Hotel Victoria is about to be erected at the eastern end of Newquay, not far from the station, from designs by Mr. John Sansom, of Liskeard. It is proposed to expend about £20,000 on the building and its equipment, a feature of the undertaking being a subway from the hotel under the cliffs to the sea-beach, reached by the passenger lift in the hotel.

The Holywell Board of Guardians are about to erect a cottage home in the field at the rear of the workhouse for the accommodation of the children. The plans have been prepared by Mr. Bibby, architect, Flint, and the contractor is Mr. Sibson, Holywell. The cost of the home will be about £1,200.

The Local Government Board have written to the town clerk of Scarborough stating that they are prepared to sanction the borrowing of the sum of £16,100 for the purchase of property comprised in the Harcourt-place improvement, which is to give better means of inter-communication between Huntriss-row and St. Nicholas Cliff.

Ground-rents amounting to £2,500 a year, secured upon blocks B, C, and D, Bedford Court Mansions, Bedford-square, have been disposed of for £82,000.

The foundation-stone of National Schools, which are being built in connection with the Radcliffe parish church, was laid on Saturday afternoon with full Masonic ceremonial. The school will cost between £2,000 and £3,000.

A new theatre is in course of erection in the High-street, Chatham, and will be opened at Christmas time. Mr. Frank Matcham, of London, is the architect.

The Duke of Connaught laid, on Saturday, the foundation-stone of two blocks of wards, each of two floors and providing 80 beds, which are being added to the hospital at Portsmouth as a Diamond Jubilee Memorial. Messrs. Young and Hill, of Bloomsbury, are the architects, and the lowest tender, that sent in by Mr. J. H. Corke, of Portsmouth, has been accepted at £19,298 for the execution of the work.

As a memorial to the late Lord Lilford, there have been erected at the church of Thorpe Achurch a stained-glass east window, and two smaller windows at the west end; they were dedicated last week by the Dean of Peterborough. The artists were Messrs. Powell, Whitefriars, London. In the centre light of the east window is a representation of the Good Shepherd, and on each side are adoring angels, with texts of Scripture in the designs above, and the smaller windows show two angels bearing scrolls, containing the first verse of the 92nd Psalm. A lych-gate is also being erected by Clementina Lady Lilford.

The town council of Helston, West Cornwall, and the committee of the Passmore Edwards Science and Art Schools in that town, have unanimously accepted the tender of Messrs. Symons and Son (contractors for the schools) for building the retaining and other boundary walls around the premises, and also the approaches thereto.

The Leeds City Council have authority from the Markets Committee to build a wholesale dead meat market and abattoir on a portion of the market estate bounded by York-street, Harper-street, and Sykes-place, at an estimated cost of £24,000, and to offer such premiums as they may think reasonable for the preparation of plans and estimates.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the Building News, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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NOTICE.

Bound copies of Vol. LXXI. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LIV., LVIII., LIX., LX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

*** In response to complaints from readers that they are unable to get the Building News at Messrs. W. H. Smith and Son's bookstalls, we can only suggest that they should order the paper of some other newsagent. Messrs. W. H. Smith and Son recently requested us to allow them an extra discount beyond that allowed to the general trade, and because we declined they have ceased to send the paper out to their bookstalls. We have, of course, no remedy; but we do not think the demand was a fair one.

Received.—W. R. and Son.—L. L.—C. S. G. A.—M. B. and Co.—D. H. A.—F. N. P.

Correspondence.

"THE PASSION" AT STRALSUND.

To the Editor of the Building News.

Sir,—I have for some time had in my possession a plate, published by you in the Building News for Jan. 22, 1892, which, according to its title, purports to represent certain "Woodcarvings of 'The Passion,' Stalshund Church, Black Forest, from photos. by Dr. T. R. Allinson, L.R.C.P." Now this plate has for a long time been a great puzzle to me. Stalshund I have been unable to find in any guide-book or geographical index of any kind. One thought, naturally, of Stralsund on the Baltic; but the expression, "Black Forest," seemed to preclude the possibility of *that* being the place referred to. I may add that there was nothing in the letterpress of the number in question to throw any light at all upon the matter.

I had long dismissed the subject from my mind, when, in the course of last month, I happened to be myself at Stralsund, and looking at a fine old altar-piece in the Nicolai Kirche of that town, I was suddenly and irresistibly reminded of the plate, and was convinced that what I was then looking at was the real original of it. And in this view I only became the more convinced when, on my return to this place, I compared the plate in question with the photo. I had secured at Stralsund of the woodcarving there.

There may still be some to whom (as so long formerly to myself) this plate and its description still constitutes an inexplicable puzzle, and who may be interested to hear the result of my late experience.—I am, &c.,

New Southgate, N. B. H. CHAMBERS.

CHIPS.

The foundation-stone of a new board school at the Camp, St. Alban's, was laid last week. The architect is Mr. F. W. Kinneir Tarte, M.S.A., of that city.

At Rusthall, near Tunbridge Wells, a village club-house is being built at a cost of about £1,100. Mr. E. Cronk is the architect.

On Friday morning, the first shovel of cement was turned over in connection with the new fishermen's harbour at Berwick-on-Tweed, and the work will now proceed apace. There were present Mr. Moncrieff, Newcastle, representing the architects, and Mr. McDonald, Hawick, contractor. Peter Young, one of the oldest fishermen, used the shovel.

The Colwyn Bay Urban District Council have approved this week plans submitted by Mr. Horton, and recently selected in competition, for laying-out and sewering the estate known as Rhos-on-Sea.

The new church of St. Matthew at Douglas, Isle-of-Man, was opened on Tuesday. It has been built from plans by Mr. J. L. Pearson, R.A., at a cost of £5,000, and replaces an edifice bearing the same dedication, consecrated in 1708 by Bishop Wilson. The old church is to be pulled down.

The high bailiff of Peel formally opened, on Friday, a new open-air bathing-place, which has been constructed at the creek known as Traie Fogog, near Peel. The construction includes a bath 140ft. long by 75ft. wide, and holding 270,000 gallons of sea-water, and also dressing-boxes and other accommodation for bathers.

On Saturday, a co-operative hall seating 700 people, together with reading-rooms, library, amusement-room, &c., in connection with the Burnopfield Stores, Co. Durham, were formally opened. The premises have cost about £3,000.

Major-General H. Darley Crozier, R.E., held, on behalf of the Local Government Board, an inquiry at Liverpool on Wednesday, concerning a proposal of the corporation to borrow £100,000 for the purposes of electric lighting, and £8,000 for those of parks and pleasure grounds.

The Bishop of London, on Thursday in last week, consecrated a new church, dedicated to St. Peter, which has been erected at Lower Edmonton. The building, which has cost £3,800, will seat 520 people.

Good progress is being made with the new marine promenade and drive at Scarborough. Mr. J. E. Everett, the resident engineer for the construction of the works, states that since his last report 208 concrete blocks have been made, containing 221 cubic yards of concrete. The foundation of the sea-wall for a length of 96ft. is complete, and a length of 54ft. has been carried up 4ft. above the level and backed up with concrete. The excavations and foundations, and the setting of blocks and backing them with concrete is now being carried on simultaneously, independently of the men who are making the blocks. The gang of men employed on the Castle Cliff are making good progress in sloping it down to a safe angle.

At a meeting of the special tramways committee of the Liverpool Corporation held on Monday, a proposal to elect Mr. Pearson as engineer for the new electric tramway was defeated by seven votes to five. Sir A. Forwood then resigned the chairmanship of the committee, and the further consideration of the engineership was deferred. Mr. Pearson is an American, and the feeling of the majority was that the work could be done by an English engineer or some one of the corporation's own staff.

The memorial stone of a new church for the Congregationalists was laid yesterday at the junction of Farrer and Crookes-streets, Barnsley. A site of 1,600 square yards has been acquired, and plans for a church and school, to cost £2,500, have been prepared by Messrs. Hemsoll and Paterson, Sheffield. At present the chapel is being built at a cost of £1,300.

The report of Lt.-Col. Samuel M. Mansfield, Corps of Engineers, U.S.A., on Boston Harbour, states that the expenditures for the improvement of the harbour and the streams that empty into it have been nearly three millions of dollars. Last year the work on the main channel was carried on, and a width of 350ft. of the 27ft. channel has been cleared of ledges. At present the main ship channel is 27ft. deep at low water, 1,000ft. wide from the entrance to Bug light, 800ft. wide thence to the passage between George and Gallop's islands, and thence 550ft. wide through the remainder of the narrows.

Intercommunication.

QUESTIONS.

[11736.]—**Defective Materials.**—I shall be obliged if any of your correspondents can inform me of any cases recently decided in which an architect has been sued for damages by the building owner for allowing (knowingly or otherwise) the introduction of defective materials or workmanship, and where such cases are reported?—LEX.

[11737.]—**Construction of Subways.**—Which is the most recent subway? I should like to be informed of the mode of construction of any recent railway or tunnel. Whether brick or concrete is found the best material for the crown, the proportion of concrete, thickness of side walls and invert, and what precautions have been taken to prevent the percolation of water. I believe a coating of asphalte has been found a good coating. The dimensions of subway are important. Is there any work on the subject?—YOUNG ENGINEER.

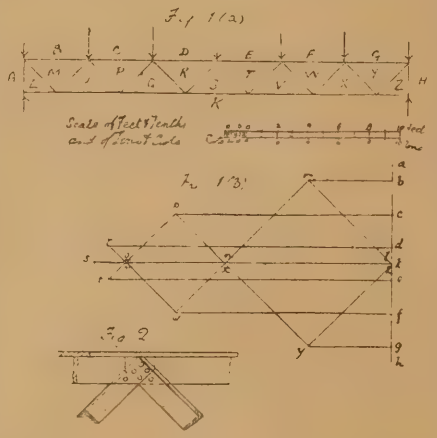
[11738.]—**Asbestos.**—Will anyone who has used this material as a plaster or covering inform querist where he may obtain information as to its use in plastering walls and ceilings, and oblige—A CONSTANT READER?

[11739.]—**A Disconnecting Trap.**—I want to know of a good trap that can be used, which can be cleaned, for a house of moderate size, and the price for a 6in. drain.—A. C.

REPLIES.

[11714.]—**Stone Measurement.**—To "READER."—I have to acknowledge and thank you for your answer in last week's BUILDING NEWS; but, as I read it, the second part of your reply contradicts the first. As the mullions were cut on the job out of blocks of stone in section of fours, as shown on my sketch, which part of your reply am I to take refers to them, and which we shall pay on?—T. M. GARROOD.

[11726.]—**Strain of Girder.**—In reply to "J. C.," I shall assume the girder to be uniformly loaded along the top, and the loading to be referred, in the usual way, to the joints; so that the weight along any bay will be borne equally by the two joints at the end of that bay. Thus, if w be the load on each bay, there will be a load w on each joint along the top, except on the end joints, and on each of these there will be $\frac{w}{2}$. A depth of about 1-12 span has been found economical for girders, and will be here adopted. In lattice girders of small span the



depth is, in general, the same throughout, and the diagonal bars all alike, and inclined at the same angle. When this is the case, we need only to calculate the section necessary to bear the *maximum* stress for each kind of member. The strains may be worked out graphically, as shown in Figs. 1 (*a*), 1 (*b*). The method is explained with reference to trusses of other forms in "Graphic Statics," Chaps. V., VI., VII., Nos. 2185, 2189, 2193. Fig. 1 (*a*) shows the centre-lines of the various members of the girder. In our calculations each boom is treated as if it were made up of parts jointed together at the ends of the bays, so that the resistance of the boom to bending is not taken into account, only the *direct*, and not the *bending* stresses being dealt with. In Fig. 1 (*b*), *a h* is drawn to represent a total load of 13 tons; *a b*, *b c*, *c d*, *d e*, *e f*, *f g*, *g h* represent the loads on the joints of top boom. The supporting resistances (HK, KA in Fig. 1, *a*) will be vertical, and are represented by *h k*, *k a*, each equal to $6\frac{1}{2}$ tons. To understand Fig. 1 (*b*), all that is necessary is to observe that the figure is made up of the polygons of the forces which act at the various points of Fig. 1 (*a*), and that, therefore, the strain on any member in Fig. (*a*) is given in Fig. (*b*) by the line which has at its extremities the letters which correspond to those which occupy the *spaces* which the bar separates in Fig. (*a*). The *direction* of the force in any bar will enable us to distinguish members in compression from those in tension. In a truss such as that under consideration, and loaded symmetrically, each diagonal bar which points *upwards* towards the centre will be in *compression*, and the others in *tension*. If it be desired to calculate arithmetically the various stresses, observe that each diagonal bar has to bear all the weight between its point of support and the centre of the girder; the stress in the bar, then, will be found by multiplying this weight by the fraction $\frac{\text{length of bar}}{\text{depth of girder}}$; that is, by the *cosecant* of the inclination of the bar to the horizon. The stress along any bay in one boom may be easily found by taking moments round the opposite joint in the other boom. Want of space forbids a detailed description of all these methods. Maximum stress on lower boom (tension) = $19\frac{1}{2}$ tons. Taking 5 tons to the square inch as a safe stress in tension gives 3·9sq.in. as the required *effective sectional area* (that is, after deducting loss by rivet-holes) of the tension boom. For the compression boom, we have—

$$\text{Max. stress} = 18\tfrac{5}{12} \text{ tons} = 18{\cdot}42 \text{ tons.}$$

$$\text{Sectional area} = \frac{18{\cdot}42}{4}\text{sq.in.} = 4{\cdot}6\text{sq.in.}$$

For braces, max. stress = about 7·6 tons. This requires $\frac{7{\cdot}6}{5}$, or 1·5sq.in. effective sectional area for the tension braces, and $\frac{7{\cdot}6}{4}$, or 1·9sq.in. sectional area for braces in compression. It is evident that a single bolt would have to be inconveniently large to join the braces and booms; it will be better to use rivets. Let us assume that the braces are to be of angle-iron $^5/_{16}$in. thick, and that the rivets are to be $\frac{3}{4}$in. diameter, and so arranged that there is a loss of only one rivet-hole in the section of the brace. Then $3\frac{1}{8}$in. by $3\frac{1}{8}$in. by $^5/_{16}$in. angle-iron will do for the tension braces, giving a slight excess of strength. Supposing the riveting to be properly done, there is no need to deduct for rivet-holes in a section which is in compression, since, the hole being filled up, the strength for resisting compression is not reduced. Hence, $3\frac{1}{8}$in. by $3\frac{1}{8}$in. by 5/16in. gives sufficient area for the compression braces. These ought to be tested for *stiffness* as well as for mere strength to resist compression (see Gordon's formula). As for the number of rivets necessary at junction of brace and boom, it is common to take the rivet area as equal to the effective sectional area of the bar; the number of rivets then will be—

$$\frac{\text{sectional area of bar}}{\text{sectional area of rivet}} = \frac{1{\cdot}9\text{sq in.}}{{\cdot}44\text{sq.in.}} = 4{\cdot}3.$$

We see, then, that 5 rivets will do, and that they may be arranged as shown in the rough sketch, Fig. 2. This arrangement reduces the sectional area of the booms by two holes at some places. 5in. by 5in. by $\frac{1}{2}$in. T-iron will serve for both booms. The above working can be modified to meet altered conditions. It is hoped that the explanations will be found sufficient. NOTE.—If there is more than one system of triangulation, the stresses above found for the braces may be divided by the number of such triangulations.—J. C. PALMER.

[11726.]—**Strain of Girder.**—Obtain the treatises published by Professor Adams, which will give all particulars. The subject has been treated over and over again in the "B.N."—A. L.

[11727.]—**Roofs.**—"A. D. W." may find graphic methods for working out the strains on each particular member of roof trusses of various forms in the chapter of "Graphic Statics" referred to in the answer to "J. C." The same method is applicable to lattice girders, as will appear in later chapters of "Graphic Statics."—J. C. PALMER.

[11728.]—**Legal.**—To question 1, yes; 2, a right of support of a building by land may be implied by a long and uninterrupted enjoyment. There is a legal phrase which states that one plot of land is entitled to have his land supported by the adjoining land as a right of property, and if this is interfered with the adjoining owner is liable. Any act which deprives the next owner of support is wrongful, and the person injured may claim damage. An important limit, however, has been made by which the owner of a building is not entitled to the lateral support of his neighbour's land if his house has been erected within 20 years. One case—"Smith v. Thackeragh"—lays this down. Here it was ruled that the right of an owner to lateral support of his neighbour's land is not an absolute right, and the infringement of it is not a cause of action without appreciable damage. A. dug a well near B.'s land, which sunk in consequence, and a building on it within 20 years fell, and it was proved that if the building had not been there, it still would have sunk. Held that B. had no cause of action. In "Dalton v. Angus" it has been decided that a right to lateral support may be acquired by 20 years' uninterrupted enjoyment for a building proved to have been newly built or altered.—A. J.

[11731.]—**Specifications.**—The specifications published by Mr. Leaning, and given in a series of articles in this journal, and those recently published in the "B.N.," "Adaptable Specifications," will no doubt suit "Young Architect's" requirements.—G. H. G.

[11732.]—**Strains on Structures.**—Several very useful handbooks have appeared. Those by Tarn and Campin, and the series of articles in the BUILDING NEWS, "Graphic Statics" (last volume), also "Strains on Structures," by Middleton, are recommended.—OLD STUDENT.

[11733.]—**Glazed Roofing.**—"Conservatory" cannot do better than adopt Rendle's "Invincible" glass roofing. Apply, 5, Victoria-street, Westminster, for details and information. This system allows for expansion, and gives ample security against the entrance of rain.—G. H. G.

[11735.]—**Sawing Stone.**—There is one obvious reply to this query of "Perplexed." If his "man cannot go down square," why does he not get someone who can? He must know whether he can. He can easily put guides at each end of the stone, and let the saw run through them. The guides might be fixed to a framing on which the stone rests whilst being sawed square.—D.

[11735.]—**Sawing Stone.**—This is a very simple matter, and the ordinary labourer in a stonemason's yard can easily accomplish it. No iron or steel plates are necessary to keep the saw-frame in line, which, I presume, is framed up in the usual manner, and must be suspended from a pole, with weights to balance it. A vertical V chase is cut in at each end of the stone to be sawn, for guidance, and the saw worked backward and forward, care being taken to saw direct down the line. Purchase's "Practical Masonry" gives a good description of the saw-frame, with illustrations and methods of working.—F. C. C.

Lady Shelley has offered the Bournemouth Town Council six acres of cliff and foreshore at Boscombe The gift is under consideration.

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Our Illustrations.

Architectural Association Excursion Sketches.

For description and further illustrations see pp. 212-13.

Girls' School at Roedean, near Brighton.

This new school, which we illustrate by a bird's-eye perspective and sketch-plan, is being built at Roedean, half-way between Brighton and Rottingdean, for the Misses Lawrence, of the former town, as a preparatory institution to Newnham College. The site, of some 18 or 20 acres, is an exceptionally difficult one, being a portion of the steep chalky slope of one of the Downs; but it overlooks the sea and faces due south. Opportunity, therefore, was taken to utilise the aspect to the full in the disposition of the buildings. A winding carriage-way has been carried up from the Brighton and Newhaven main road, ending in a terrace 40ft. wide in front of the open quadrangle, around which the buildings are grouped. The premises extend some 480ft. from east to west, with an extreme depth in the centre of 225ft. To the east and west of the quadrangle are four blocks of boarding-houses, each under the control of a mistress; the front portions are devoted to administrative purposes, and behind are bedroom wings, running hospital fashion north and south, so that every window has the direct sunlight at some period of the day. There are neither dormitories nor cubicles, but each girl has a separate bedroom, independently lighted, warmed, and ventilated. In the centre, looking down the quadrangle upon the sea, is the school-house, with central clock-tower and broad oriel over a main entrance, and having on either side a lofty tower containing the water-tanks. Behind this building, and running north and south, is the great hall, with detached music wing, containing professors' apartments and sound-proof rooms for practising. The buildings are carried out in local stock bricks covered with roughcast, the plinths and chimneys being of red bricks, and the copings, sills, &c., of Monk's Park Bath stone; the roofs are covered with Broseley tiles. The style adopted is a simple treatment of Early Seventeenth-Century Renaissance. The architect is Mr. John William Simpson, A.R.I.B.A., of 10, New Inn, Strand, W.C.; the builders are Messrs. Peters and Son, of Horsham; and the clerk of works is Mr. T. Bush Sage. Mr. J. Jeffreys, of Old Queen-street, Westminster, is the engineer for ventilation, heating, and water-supply, and Mr. J. Rogers-Field, B.A., is carrying out the sanitary arrangements. The total outlay will be between £60,000 and £70,000. The buildings are now nearly half-way up, and the memorial stone was formally laid by Mrs. Sidgwick, of Newnham College, on the 26th ult.

Chelsea Infirmary: Nurses' Home and Doctor's House.

The building is situated at the corner of Sydney-street and Cale-street, Chelsea, and has a frontage of 69ft. to the former street and 77ft. to the latter; the approach to same is from the principal open space of the adjoining infirmary building. The medical officer's house occupies the south-east corner of the site, and is self-contained upon four floors, two floors of the nurses' home being above same. The nurses' home consists of six stories; the lower ground-floor is devoted to large recreation-room, linen and box rooms, small kitchen, bath, lavatories, &c. The nurses' bedrooms, of which there are 55, are placed upon the five upper floors. The average size of the rooms is 13ft. by 9ft. by 10ft. high; those on the top floor are set apart for night nurses. A sitting and tea-room, for the use of night nurses, is provided on the third floor, in connection with which is a small kitchen. Each nurse's room is fitted with open register fire-place, fresh-air inlet, and extract ventilator. The floors of all rooms and corridors are wax-polished. A central corridor is arranged the whole length of the building; the stone staircase is placed centrally on one side of the corridor, and fire-escape bridges and staircases are provided between this and the adjoining block of buildings, with exit at each floor level, also serving as means of escape for patients in the infirmary. At the north-east corner of the building on each floor above the lower ground floor, a bathroom, water-closet, and a slop sink is provided. The whole of the floors throughout the building are of fireproof construction; the corridors are laid with wood block flooring, the bathrooms and w.c.'s are finished with granolithic paving. The joinery throughout the interior is stained and varnished. Each room and corridor has a small plaster-moulded cornice and a dado; the walls are distempered in party tints. The corridors and bath-rooms are heated by steam radiators. A small lift is provided from the lower ground-floor to the fourth floor level. Fire hydrants, with hose and appliances, are placed at the respective floor levels, immediately opposite the staircase. The building throughout is artificially lighted by electric light; provision for lighting by gas is also made. The baths are of fireclay, enamelled inside and outside, without casings, and stand clear of the walls. The drainage is on the outside of the building, with a very complete set of inspection and turning chambers, and the ventilating pipes are carried up to the ridges. The building is faced externally with picked bright yellow bricks, relieved with red brick bands and dressings. The sanitary conveniences were supplied by Messrs. Dent and Hellyer; the slop sinks by Messrs. Bolding and Sons. The electric lighting was carried out by Messrs. Graham and Biddle. The general contractors for the works, which have cost upwards of £10,000, were Messrs. W. H. Corden and Son, of Upper Tooting; Mr. F. Walker, of Shepherd's Bush, acted as clerk of works. The work was carried out from the designs, and under the supervision of, Messrs. Lansdell and Harrison, of Highbury. The design was selected in competition.

"Building News" Designing Club: A Tea and Coffee Restaurant.

For description and awards see page 210.

Students' Designs: Manchester School of Art.

The students' designs on this sheet were produced under the direction of Mr. Walter Crane during the period in which he occupied the position of art superintendent at the Municipal School of Art, Manchester. Just now, while the annual exhibition of National Competition Prize Works is open at South Kensington, this sheet of designs obtains a special interest, though, at any time, so suggestive a series of examples of decorative composition cannot fail to be welcomed by our readers. The designs explain themselves, and therefore call for no further comment beyond an approving note which we cordially record. We published some other examples from the same school on April 16 last.

Screen: Ockwells Manor.

Ockwells, or Ockholt, is situated on the right of the road between Maidenhead and Bray, and is distant from the former about two miles. It is a most interesting specimen of the half-timbered mansion of the time of Henry VI. and Edward IV., and has a beautifully gabled front. The great dining-hall, which goes up the whole height of the house and has an open-timber roof, is perfect, having a screen (herewith illustrated) with minstrels' gallery over, and divides the hall from the cloister which runs around the two sides of an inner courtyard—open stone fireplace, large central table and wooden benches, dais, and wainscoted walls. There is a very quaint Jacobean staircase in another part of the house. Some seven years ago the place was in a ruinous state and uninhabited save by numerous birds which built their nests. It has, however, since been restored, and the beautiful stained glass, which had been in safe keeping at Taplow Court, was again returned to its former position in the windows of the great hall. H. C. Pullin.

CHIPS.

A new company has been formed in Pitlochry under the name of the Athole Building Company, which, with a capital of £20,000, has for its object the purchase and building of houses in Pitlochry, Aberfeldy, Birnam, Kinloch, Rannoch, and Blair Athole.

Kopparbergs Hofors Sawmill Company have made a contract with the Stockholm Diving Society to blow up the large and dangerous rocks under the water-level in the harbour of Norrsundet, north of Gefle. The harbour will be deepened 6½ mètres under the lowest height of water. This extensive work will take two years to complete.

Plans for a new common lodging-house, to be built at the cost of the ratepayers of Southampton, have been adopted by the committee of the corporation of that borough, and the corporation are about to apply to the Local Government Board for permission to borrow £14,500 for a period of thirty years.

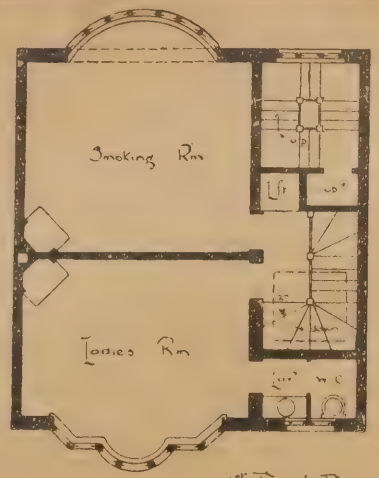
At the annual meeting of the Wakefield Hospital, Dr. Wright, who is 90 years of age, unveiled a portrait of the late Mr. Samuel Fozzard Harrison, who recently bequeathed nearly £25,000 to the hospital. The portrait has been painted by Mr. Fred Balshaw, of Manchester, and it is to be hung in the board-room of the hospital.

Business last week at the Tokenhouse-yard Mart was confined to three days only. Although the supply of properties was not large, the amount realised, £32,145, represents a fair average, exceeding that for the same week in last year by £670. Among landed estates, a property near Rolvenden, Kent, secured nearly £20 per acre, and a building estate of a little over three acres at Battersea brought about £3,250 per acre.

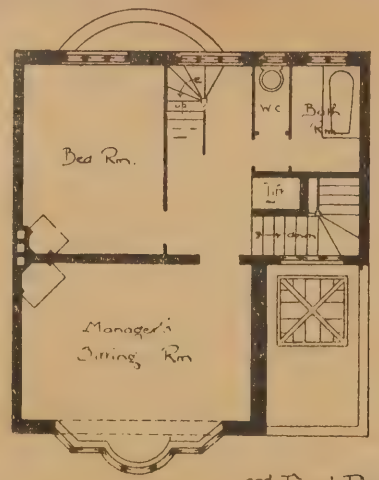
Mr. Edward B. Ellicott has been appointed City Electrician of Chicago. He devised the wiring of the Ferris wheel at the Columbian Exposition in that city, and also wired the miniature World's Fair, which was exhibited at the Atlanta Exposition.

A block of auctioneers' premises has just been built in Baldwin-street, Bristol. The premises have a frontage of 32ft., are in the Flemish style, and built of moulded brickwork with freestone dressings, the arches being of rubber brick. A pair of massive doors gives entrance to a corridor, leading direct to an auction mart, about 32ft. by 24ft., lighted from the top by a skylight. The ceiling is designed in panels of matchboard, the walls being coloured, while both the mart and the corridor are furnished with dadoes of painted cement. Off the corridor are arranged the offices for principals and clerks, with strong room and storage. At the front is the property sale-room. The sale-rooms and offices will be illuminated by electricity. The upper floors are divided into suites of offices, approached by a wide staircase from the entrance doors. The plans were prepared by Messrs. Gingell and Bond, of Alliance Chambers, Corn-street, and the buildings are being erected by Messrs. Ford and Canning, of King-street Hall, the owners of the property.

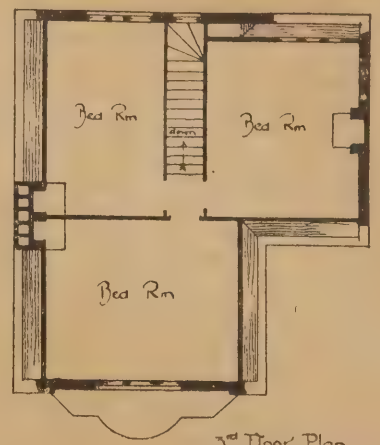
Madderty parish church, N.B., is at present undergoing renovation. A new entrance upon the north side, with porch facing the west, takes the place of the two openings now built up. A fresh heating apparatus is being introduced. Three window spaces have been made, and these, with the former spaces (all renewed), are in the Gothic style, and an old gallery has been removed. Among the special gifts are a tracery window of three compartments, bearing in the centre panel the crest of the Murray family, and another stained-glass three-light window, representing the Crucifixion, St. Mary, and St. John the Evangelist, and having, at the right and left lower corners respectively, the obverse and reverse of the ancient Inchaffray seal; also a rose-shaped window, showing a series of the emblems of the Christian faith, an organ, and a baptismal font of Caen stone. The glasswork is being executed by Messrs. Ballantine and Gardiner, Edinburgh.



1st Floor Plan

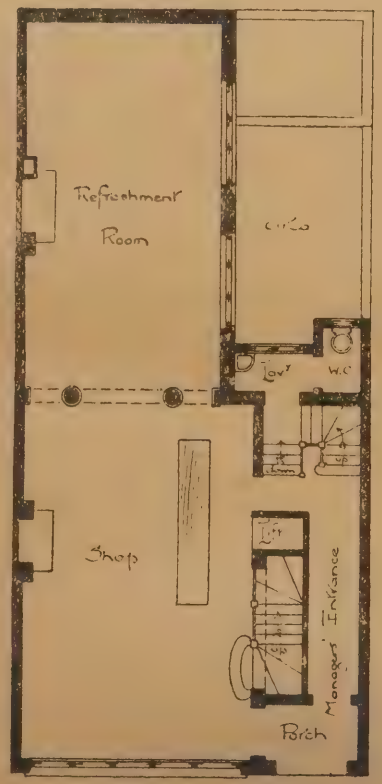


2nd Floor Plan.

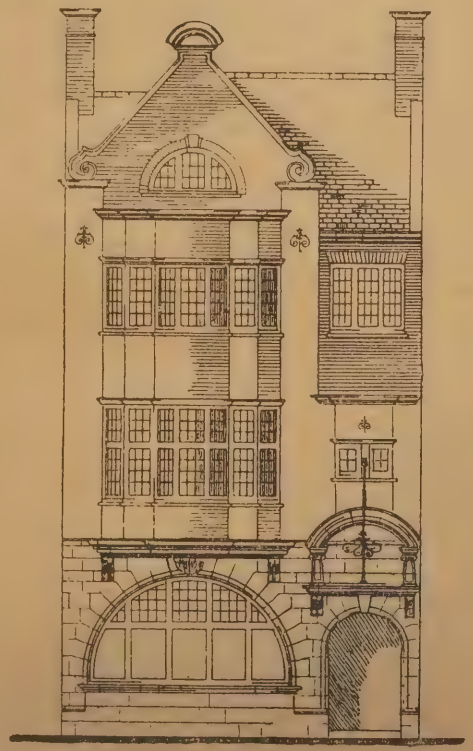


3rd Floor Plan

BUILDING-
-NEWS
DESIGNING-
-CLUB

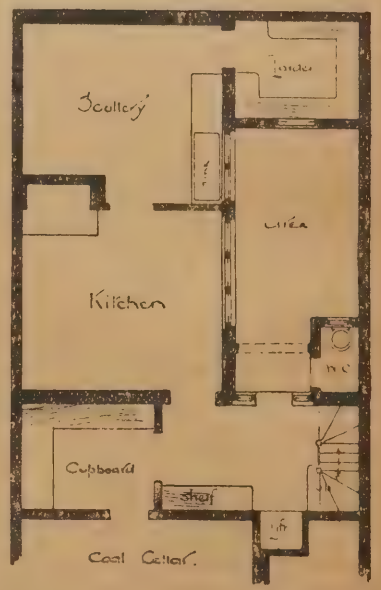


Ground Floor Plan



Elevation

A Tea & Coffee Restaurant
Designed by Pantile. June '97



Basement Plan

PLACED SECOND

B.N.D.C. A Tea and Coffee Restaurant

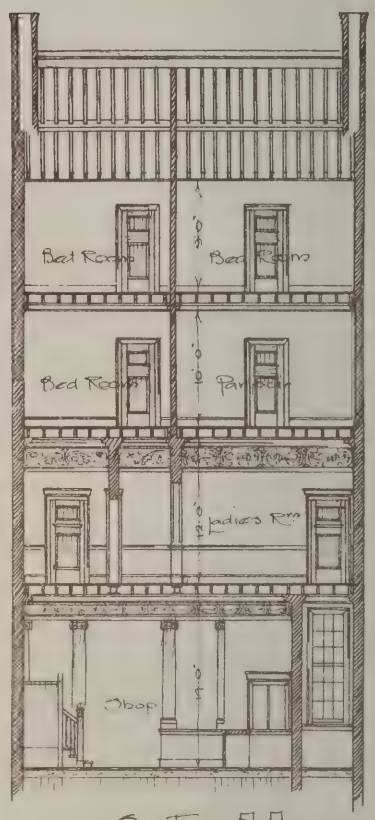
for a Suburban Street

by "Map"

10 5 0 10 20 30 40 feet.

Front Elevation

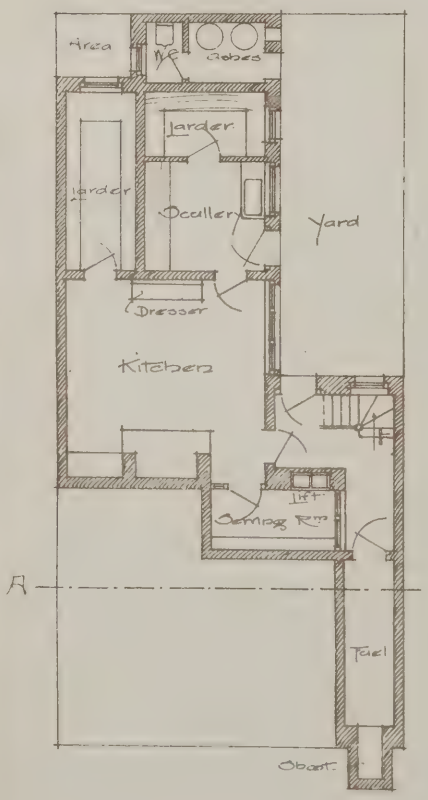
Sketch.



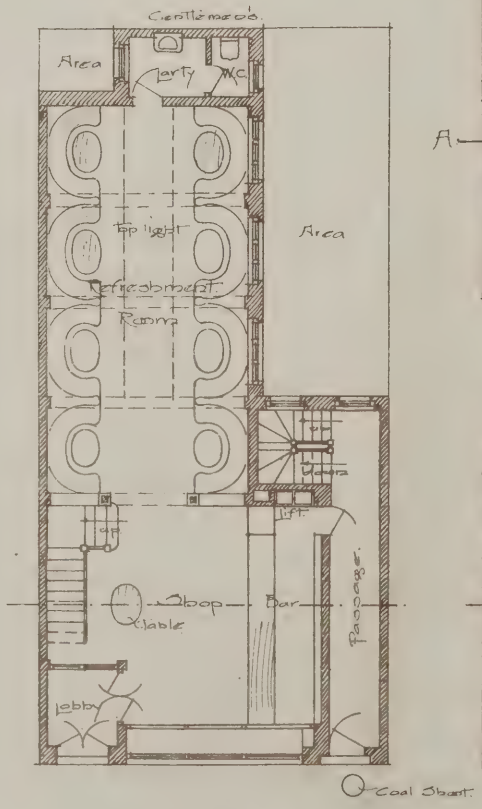
Section A.A.

Note the Third Floor Plan is similar to Second Floor Plan only 3 Bed Rooms and no Bath Room

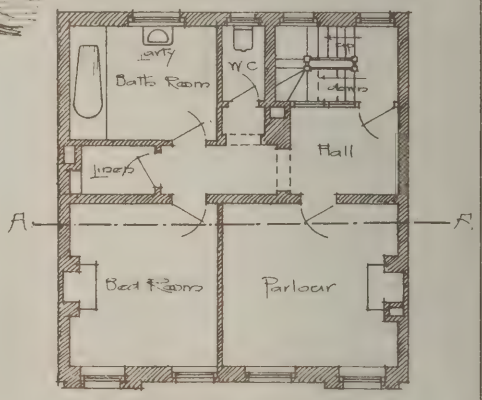
PLACED FIRST



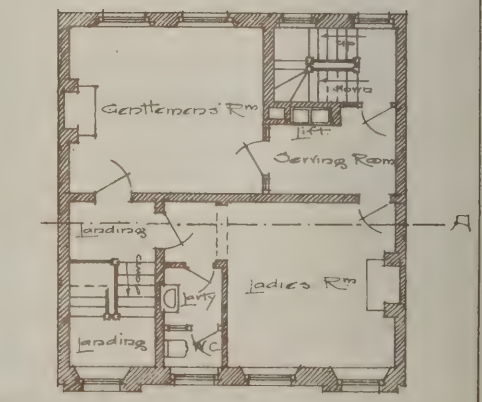
Basement Plan



Ground Plan



Second Floor Plan



First Floor Plan

Photo Lithographed & Printed by James Akerman, 6 Queen Square, W.C.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square W.C.

NURSES' HOME & DOCTOR'S HOUSE, CHELSEA INFIRMARY

THE ROEDEAN SCHOOL

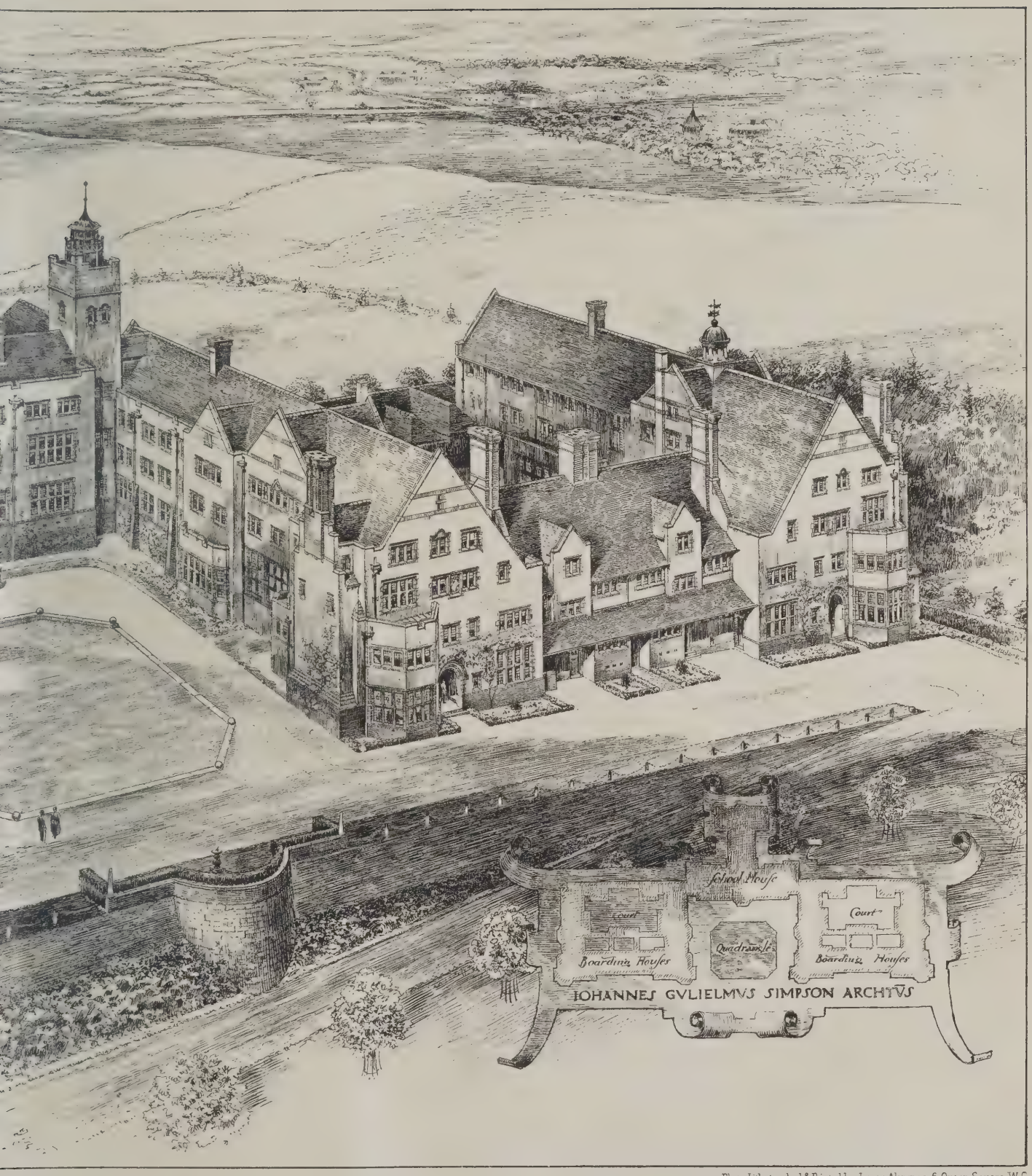


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

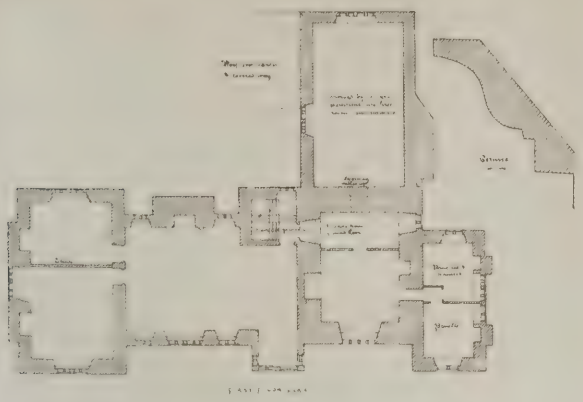
NORTH-WEST ELEVATION

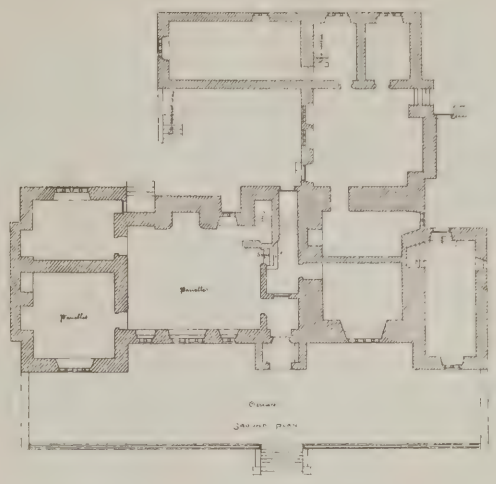
S.W. & E.T.

BORWICK HALL NR LANCASTER

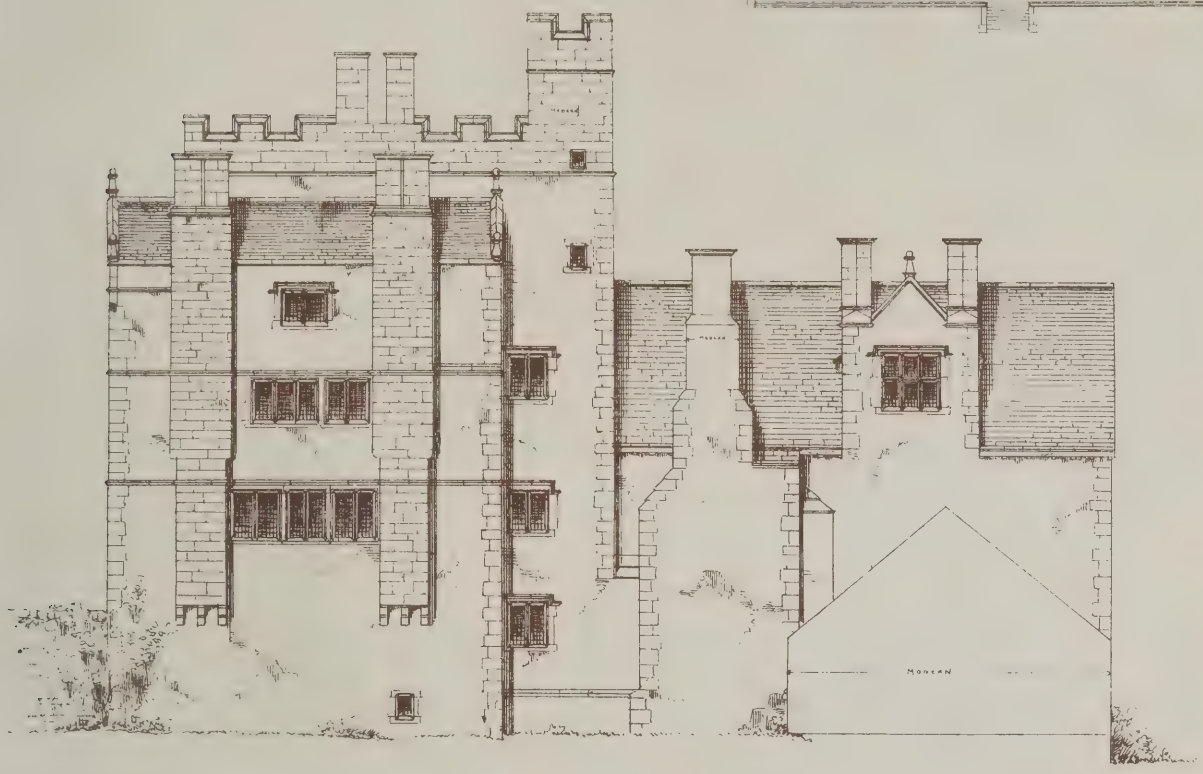
ARCHITECTURAL ASSOCIATION EXCURSION, 1897.

ELEVATIONS MEASURED & DRAWN BY S. WRIGHT & R.W. JOHNSON.





S.W. ET



SOUTH EAST ELEVATION.

ENTRANCE FRONT

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

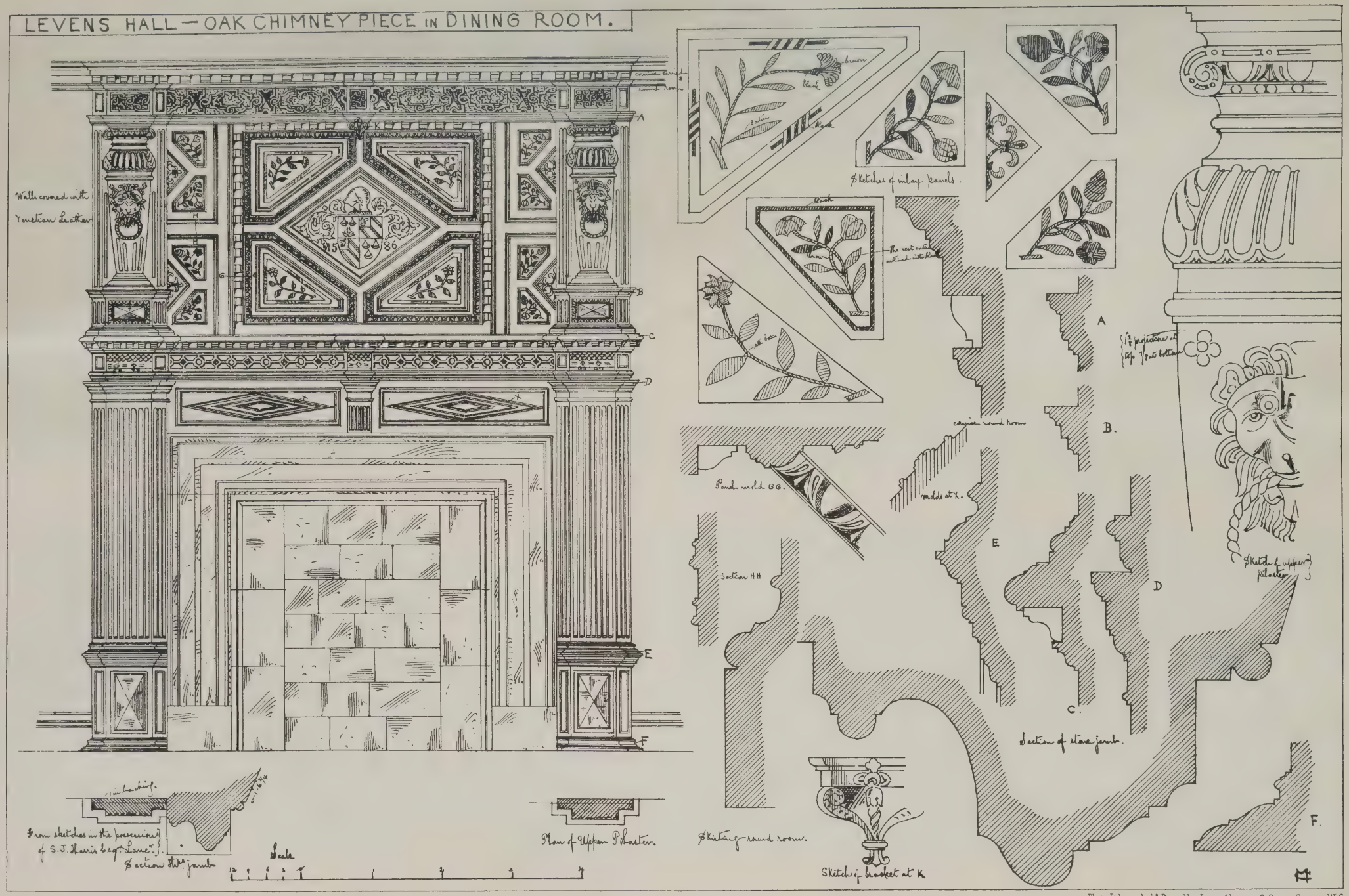


Photo-Lithographed & Printed by James Akerman, 6, Queen Square W.C.

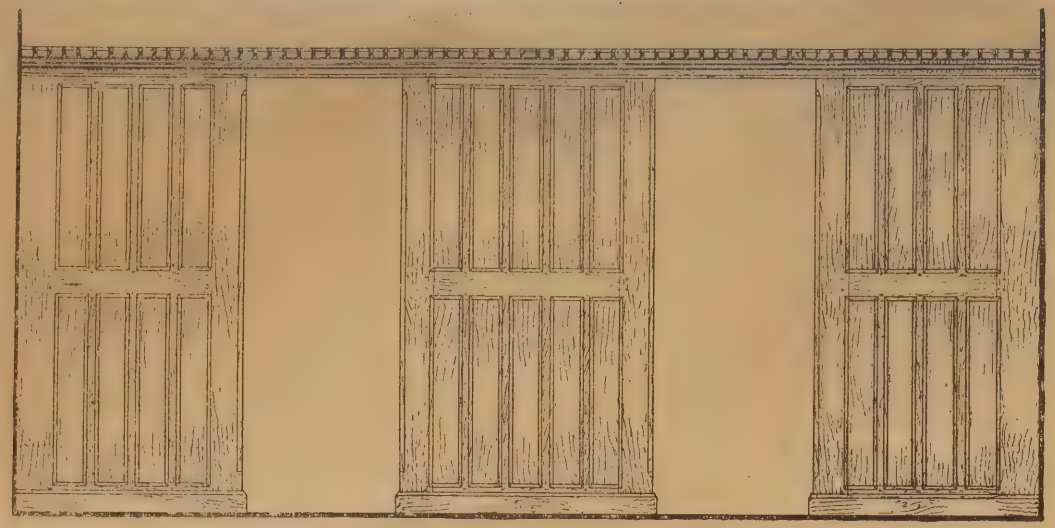
ARCHITECTURAL ASSOCIATION EXCURSION, 1897.

MANCHESTER MUNICIPAL SCHOOL OF ART.

STUDENTS' DESIGNS

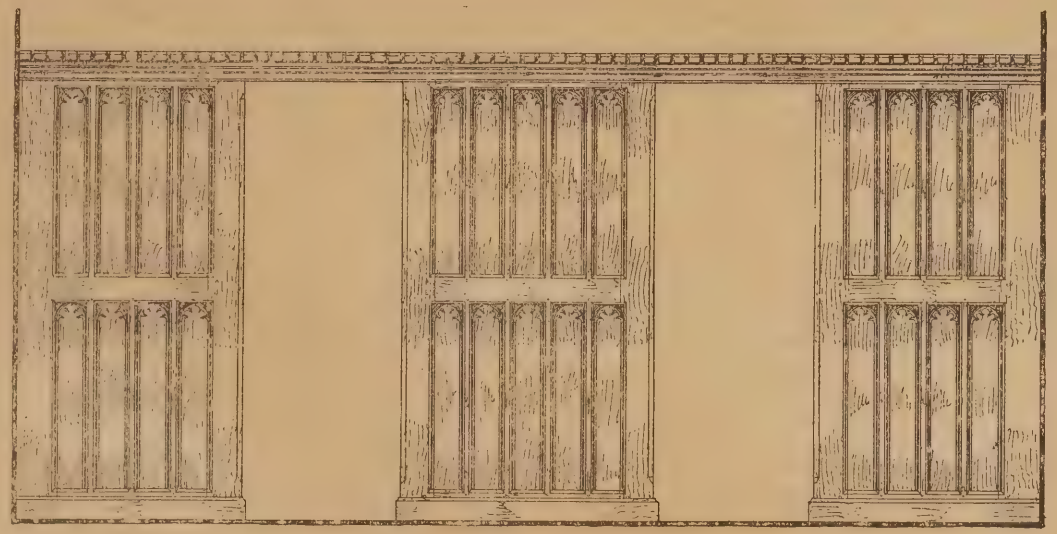
PRODUCED UNDER THE DIRECTION OF MR WALTER CRANE.

"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.

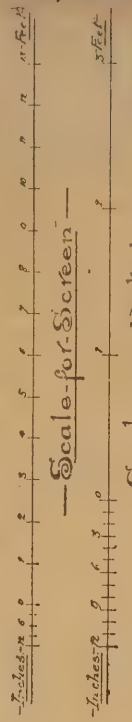


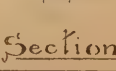
—Side towards Hall—

—Plan—

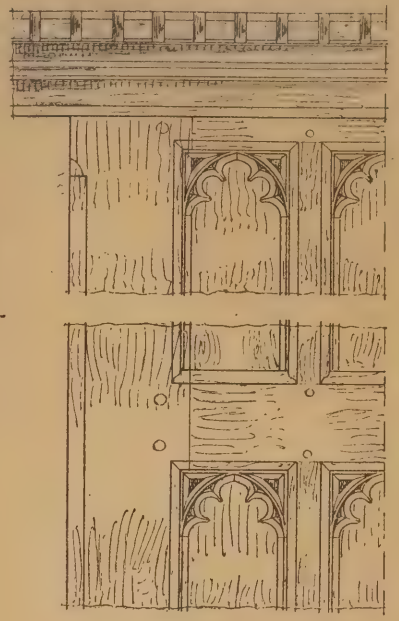


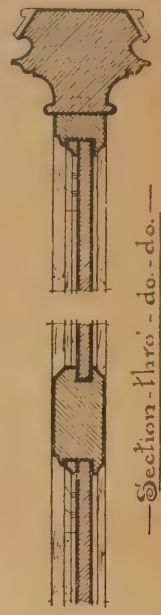
—Side towards Cloister—



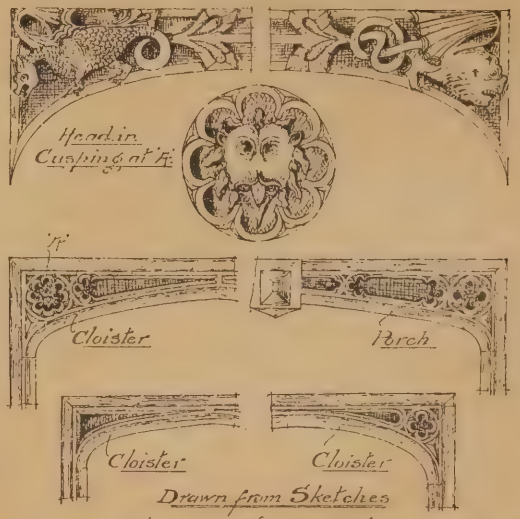


—Section—





Carving in Spandrels of Porch



—Various Spandrels—

SCREEN, OCKWELLS MANOR.

WATER SUPPLY AND SANITARY MATTERS.

Huddersfield.—Good process has been made this season with the construction of the Butterley and Blakeley reservoirs, which will for some years to come, at any rate, complete the system of water storage for the Huddersfield Corporation in the Wessenden Valley. At Blakeley a by-wash is nearly completed to carry down the storm and and current waters during the making of the retaining bank and the carrying out of other works. A line of railway has been continued up the valley, and the clay necessary for the puddle trench will be brought from Micklehurst, away over the Standedge Hills. The embankment of this reservoir will be 132 yards in length and 80ft. high. The capacity of the reservoir will be 80,000,000 gallons. Two-and-a-half or three years must elapse before these works can be completed. At the Butterley reservoir satisfactory progress has been made. Enormous difficulties have been encountered in securing an absolutely watertight embankment for this reservoir, which is the largest of the series in the valley, and which will hold 400,000,000 gallons of water when completed. Owing to the friable nature of the strata, it was found necessary to sink a trench 125ft. below the bed of the Wessenden stream and 209ft. below the natural banks of the stream. This great trench, which is 27ft. in breadth, is flanked by two walls of concrete so far as it penetrates the side of the valley. The construction of the embankment is now going on. At the base it will be 800 yards in length, and sloping up in terraces it will rise to a height of 98ft. The water area, when the reservoir is full, will be 42 acres. The cost of the Butterley reservoir up to date has been £151,029, and of the Blakeley reservoir £4,836. Altogether there are 450 men engaged on the works, of which Mr. J. Hughes is the resident engineer. When the two reservoirs named are completed, there will, after allowing for the large amount of compensation service of water which is sent down the valley for the use of millowners, be a supply for the inhabitants of Huddersfield for 200 days, or, if the reservoirs should be full, for 328 days. Altogether the storage capacity of the corporation's waterworks is 1,640,368,120 gallons.

Manchester.—The difficulty experienced by the corporation in the treatment of the sewage or the city, was a subject of discussion at Monday's meeting of the Mersey and Irwell Joint Committee. A further extension of time was asked for on behalf of the Manchester Corporation. The position of the corporation was described by Mr. Alderman M'Dougall, who said that a scheme of artificial filtration dealing with the entire sewage of the city would cost, according to an estimate of the city surveyor, no less a sum than £275,000, and the filters would need renewal every three years, at a further cost of £120,000. These figures were so alarming that some members of the committee were disposed to revert to the culvert scheme. For the same capital expenditure they could take the effluent altogether away from the neighbourhood. The committee decided to give the corporation a further period of three months in which to prepare a scheme.

The commission for the presentation portrait and replica for the Lord Mayor of Birmingham, will be given to Mr. J. J. Shannon, A.R.A.

It was reported to the Handsworth Technical Instruction Committee that the work in connection with the building of a new technical school, which is being erected at a cost of £10,000, was progressing, and the school would be ready for opening on the 29th September.

A petition has been presented to the Glasgow Dean of Guild Court to have the spire of St. Enoch's Church in that city, which was struck by lightning on Wednesday evening in last week, examined by an expert builder, and an inspection of the church has been made by Mr. Whyte, the master of works, and Mr. George Barlas. Mr. Whyte is of opinion that 20ft. or 30ft. of the spire will have to be taken down. There is at present, however, no danger to the public.

The free public library at Burton-on-Trent was opened on Wednesday. The old institute was closed in October last, and since then a number of structural alterations had been made in order to provide room for a subscription library as well as the free one. The electric light has also been introduced throughout the building, the contractors being Messrs. Strode and Co., of London. The alterations have been carried out from plans prepared by the late borough surveyor (Mr. J. E. Swindlehurst), who personally supervised the work, assisted by Mr. Longley, while Mr. Holcrow has acted as clerk of works. The contracts had been obtained by Messrs. J. and T. W. Selby (brickwork and portion of woodwork), Mr. Stevenson (woodwork), Mr. Pickering (glazing, &c.), and Messrs. Ordish and Hall, Mr. F. W. Wilson, and Mr. B. Abrahams (furnishing).

STAINED GLASS.

Winchester Cathedral.—The south window of the Lady-chapel of this cathedral has been filled with stained glass as a memorial to Bishop Thorold, and portions of the old painted glass have been worked in by the artist, Mr. C. E. Kempe, who prepared the designs and executed the work. The memorial window contains representations of scenes in the life of Our Lord in which the Virgin Mary appeared, and in the upper part are Saints Jerome, Ambrose, Gregory, and Augustine; in the centre, St. Elizabeth and St. Margaret; while to the right are St. Birinus, the Apostle of Wessex, Honorius the Pope, who sent him; St. Swithin, who was buried outside the cathedral and afterwards removed within, and St. Alphege. Above these are St. Anthony (the Bishop's Christian name), the Venerable Bede, St. Christopher, Kynegils, the first Christian King of Wessex, Bishop Fox, and in the extreme head of the window Henry VII. and Prince Arthur. The eastern portion of the Lady-chapel was rebuilt in the reign of Henry VII. as the thank-offering of his Queen, Elizabeth of York, for the birth of her eldest son Arthur, which took place at the Royal castle at Winchester in 1486. At the bottom of the window are an inscription, the arms of the See, and Bishop Thorold's family arms. It is intended to fill the north window of the Lady-chapel with other stained glass representations of scenes in the life of Our Lord in which the Blessed Virgin appears. The east window has been chosen for the purpose of commemorating the Queen's Diamond Jubilee, and Mr. Kempe has designed for this purpose a Jesse window with kneeling figures of English Sovereigns at the foot, one of the figures being that of Queen Victoria.

CHIPS.

A Congregational church is being built on the Avenue at Southampton. It is of brick, with stone facings to the Avenue and Alma-road, and will cost £7,000.

At the Coventry County-court on Saturday the town clerk applied for a further suspension of the injunction made against the Coventry Corporation in respect of polluting the river Sherbourne with sewage. His Honour consented to suspend the injunction over the January Court.

The memorial stone of a Church Sunday-school was laid at Hemyock on Saturday. Mr. E. T. Moward, of Wellington, Somerset, is the architect.

The new Sanatorium, Hastings, is being warmed and ventilated by means of Shorland's patent Manchester stoves, grates, and patent exhaust roof ventilators, the same being supplied by Messrs. E. H. Shorland and Brothers, of Manchester.

A new wing, the gift of Col. R. S. Donkin, M.P., which has just been built as an extension of the Tynemouth Victoria Jubilee Infirmary, North Shields, was formally opened on Friday by Earl Percy. Mr. F. R. N. Haswell is the architect.

The ceremony of laying the foundation stone of St. Mary's new Roman Catholic church, Eccles, Salford, has been fixed for Saturday, 28th inst.

Sir Hedworth Williamson, Bart., of Whitburn Hall, has just submitted to the Sunderland Corporation the plans of a block of model dwellings, two stories high, which he proposed to erect at Monkwearmouth, where they will replace a good deal of old property owned there by the baronet.

The surveying committee of the Bath Corporation approved, on Friday, of plans prepared by the surveyor of works for a new roadway to lead from the churchyard to York-street. By means of it there will be provided ample and improved access from the churchyard to the Abbey-green, while a broad flight of steps will afford access to the baths. The cost is estimated at £900. Another long discussion took place about the furniture for the new pump-room annexe, it being agreed eventually that Mr. J. M. Bryden, F.R.I.B.A., of London, the architect for the new buildings, should be asked to furnish designs.

The Hampshire County Council, at their meeting on Monday, elected Mr. Herbert W. Butler as assistant county surveyor.

The contractors for the new North Bridge, Edinburgh, have received instructions to have the work completed at the end of August.

A report is being drawn up by the Liverpool Corporation surveyor bearing upon a question which has been put to him as to the possibility of making land in the possession of the municipality available for the purpose of allotment gardens.

Mr. Silvanus Trevail, F.R I.B.A., of Truro, was, says the *West Briton*, "absent from a meeting of the Cornwall County Council on Tuesday last for the first time since that body was established. His absence on this occasion was, of course, due to the fact of his having resigned his seat. Is there any other member, we wonder, who has attended every meeting of the council?"

Lady Riddell has bequeathed a number of family portraits by Raeburn, Martin, and Partridge to Sir Rodney Stuart Riddell; but in the event of his being unmarried at the time of Lady Riddell's death, or, if married, without issue at that time, she directs her executors to hand over these portraits, along with certain specified busts, to the Scottish National Portrait Gallery under the name of "The Riddell Bequest."

In Friday's list of adjudications in bankruptcy the names appear of Arthur Victor Rutty and Harold Frederick Rutty, trading as A. and H. Rutty, St. Leonard's-street, Bromley-by-Bow, E., and Mansfield-road, Ilford.

The Great Northern Railway Company announce that the Station Hotel at Leeds, which has undergone considerable structural and other alterations and improvements, will be reopened for the reception of visitors on Tuesday in next week. The works of improvement, &c., have been undertaken by Messrs. Maple and Co.

The Dean of Guild Court at Stranraer have approved of the plans for the erection of a new post-office in Charlotte-street.

Extensive additions are about to be made to the county lunatic asylum at Bodmin, from designs by Mr. Silvanus Trevail, M.S.A., of Truro. The outlay will be about £35,000, and accommodation will be provided for about 350 more patients. This, with the necessary attendants, will make the population of the asylum not far short of 1,500.

The Leeds School Board, at their last meeting, accepted tenders, amounting to £3,804 14s., for the erection of a new infants' school at Hunslet Carr. This will provide 530 school places at a cost of £7 3s. 6d. per head. The board also approved of tenders, amounting to £675, for the enlargement of South Accommodation-road School, an extension which will provide 100 additional places at a cost of £6 15s. per child; and also a tender for the heating of Whingate Board School, at a cost of £185 10s.

The Tate Gallery of British Art at Millbank will be opened to the public on and after Monday next. Like the Trafalgar-square gallery, it will be opened on Sundays from 2 till 6 p.m., the first occasion being Sunday the 22nd inst.

The inhabitants of Dalton, near Richmond, North Riding, having decided upon the erection of a new church as a Diamond Jubilee memorial, the sum of £600 has so far been raised.

Lord and Lady Tweedmouth paid a visit on Saturday to Hutton Castle, and inspected the work now being executed at that residential mansion. During their stay they fixed the site of the new entrance gateway for the western approach to the Castle. Instructions were given to Mr. Dunn, architect, of Newcastle-on-Tyne, to prepare the necessary plans.

A special meeting of the Chester city council was held on Saturday to consider the acceptance of a contract for the restoration of the council chamber of the town hall, recently destroyed by fire. Six tenders had been received, ranging from £7,970 to £9,491. The mayor, in moving the adoption of a tender for £7,970 by Mr. W. W. Freeman, builder, Chester, intimated that the work would be completed by the 31st May next. A further recommendation of the committee to appoint a Mr. Helm (who had occupied a similar post at the electric light station) as clerk of the works at £3 10s. a week, including expenses, gave rise to an animated discussion. It was moved as an amendment that Mr. Arthur Jones, a young local architect (and son of a member of the council), be appointed at a salary of two guineas per week. The amendment was carried by 12 to 4.

At the half-yearly meeting of the Metropolitan District Railway Company, held on Monday, the chairman reminded the shareholders that Parliamentary sanction had been obtained for extending the system from Ealing to Harrow, and from Harrow to Uxbridge. He added that the directors intended to go on with this undertaking as a single piece of business, instead of in two portions, and, all being well, they hoped to have the line open from Ealing to Uxbridge within two years from now. Their Ealing extension cost them £90,000 a mile, whereas the Harrow and Uxbridge line would cost about £32,000 a mile. Contracts had been made in respect of the Harrow line with a responsible contractor of considerable experience at a very moderate price—a price sanctioned by Sir John Wolfe Barry; and the same contractor, backed by the same financial people, would, he presumed, accept the contract on the same terms to Uxbridge. They had also obtained Parliamentary sanction for a deep level line beneath this system between Earl's Court and the City; for a junction in Whitechapel and Bow with the Tilbury system; and an independent company had also obtained powers to construct an underground electric railway between Piccadilly-circus, and South Kensington, where it would be possible to effect a junction with the proposed deep-level District Railway.

LEGAL INTELLIGENCE.

Private or Public Road.—At the Bradford County Court, on Friday, his Honour, Judge Bompas, Q.C., delivered judgment in the case of the Pudsey Urban District Council v. Mr. William Henry Stott and Others. The claim was for £28 14s. 9d., expenses incurred by the plaintiffs in sewering, levelling, paving, metalling, flagging, channelling, and making good premises fronting and adjoining a certain street called Green-top, in Pudsey. The plaintiffs also claimed 10s. 8d. interest from the date when they made demand for payment of the sum they claimed. A similar claim has been made on various other property-owners in Pudsey, and this was a test case to decide the liability of all the parties. The action was tried at the Bradford County Court on July 8 last, when a number of witnesses were called on both sides. The plaintiffs contended that the street was a private one, and that the defendants were liable for its repair. The defendants, on the other hand, contended that it was public, and that they were therefore not liable. The Judge decided that evidence had been called which justified him in coming to the conclusion that the road was a public one before 1836 (the date of the Highways Act), and that the footpath had been repaired by the local authority some thirty years ago. He therefore found that the road was a highway repairable by the inhabitants at large, and gave judgment for the defendant with costs. Costs on the higher scale were allowed to defendant. Stay of execution was granted in the event of an appeal.

Thickness of Walls below Bressummer.—At the Lambeth Police-court, on Friday, Mr. Hopkins heard an appeal by Mr. John Tyerman, builder, Walworth, against a notice of objection served upon him by Mr. Ellis Marsland, M.S.A., district surveyor, in connection with the rebuilding of the "General Havelock," Parkstone-street, Peckham. Mr. Pasmore appeared in support of the appeal. The matter was brought before the Court under the provisions of section 150 of the London Building Act, which gives a builder power to appeal to a petty sessional court should he be dissatisfied with the decision of the surveyor. Mr. Pasmore stated that the notice of objection served upon the appellant by the district surveyor had reference to the thickness of the external walls of the basement of the building. The first schedule to the Act (Part 1, sec. 3) dealt with the thicknesses to be observed in the building of a wall exceeding 40ft., but not exceeding 50ft. in height, the thickness varying according to the length of the wall. In this case the wall was 43ft. high. Section 7 of the first schedule (preliminary) to the Act, provided "for the purpose of determining the thickness of a wall, the height of such wall shall be measured from the base of the wall to the top of the topmost story, whether such wall is carried to the full height or not, or, in the case of a gable, when there are no stories in the roof, to half the height of the gable." The definition clause of the Act provided that "The expression 'base' applied to a wall means the underside of the course immediately above the footings, if any, or in the case of a wall carried by a bressummer, above such bressummer. The definition of the word 'bressummer' was a wooden beam and a metallic girder, which carries a wall." In this case the district surveyor claimed that the wall over which the dispute had arisen should be 17½ inches thick for the basement story, it being in his view a wall 43ft. in height. Section 56 of the Act, which dealt with bressummers, showed that an entirely different state of things had to be considered where bressummers were employed. His (Mr. Pasmore's) point was that the wall began with the bressummer, and not with the basement. He might say that Mr. William Brutton, the architect, was building houses in every district in London, and Mr. Marsland was absolutely the only district surveyor who had called upon Mr. Brutton to build his basement wall according to the height of the building if there was a bressummer. He submitted that Mr. Marsland had misconceived the intention of the Act. Mr. W. M. Brutton, the architect, was called and examined as to the details of the work. There would be, he said, an open shop front with a bressummer above carrying the superstructure. Mr. Marsland: The external wall of the basement, I see on your drawing, is 14 inches. The Witness: What I call the retaining wall between the piers; yes, that is so. Mr. Marsland: I am asking that it should be 17½ inches thick? The Witness: That is so. Mr. Hopkins: What I am wondering is why a wall is less a wall within the statute because half way up, it may be, there is a bressummer. Mr. Pasmore: Because the height of the wall has to be measured from the base. The base of a wall carried on a bressummer must be from the bressummer. Mr. Hopkins: Yes, when you are dealing with the thickness of the wall above the bressummer, I agree it may be so, but I am not dealing with that. I am dealing with the wall below the bressummer. Mr. Pasmore: There can't be two bases to the same wall. The wall beginning in the basement does not go higher than the surface of the ground. Mr. Hopkins: Why is it less a wall throughout the whole height because it has a bressummer? Mr. Pasmore: Where the shop-front is, there is no wall at all. I will ask you to look at the definition of the word "base." Mr. Hopkins: My difficulty is that I am not dealing with anything above the bressummer. I am dealing with the wall below the bressummer and which carries the bressummer. Mr. Pasmore: The wall below the bressummer extends to the ground level only, and is not a wall 43ft. high. Mr. Hopkins: If you were dealing with an ordinary shop with brickwork all the way up, the question would not arise. You say that because you have an archway upon a bressummer your statutory position below the bressummer is altered. Mr. Pasmore: That is so, because under section 56 we have to support the bressummer in accordance with the provisions of the Act of Parliament. Mr. Hopkins came to the conclusion that the district surveyor was right, and dismissed the appeal.

"Walking Time" Allowed.—Mr. Thomas Ravey, builder, of 229, High-street, Shoreditch, was summoned at Worship-street Police-court, on Friday, by Edwin Alger, John James, Alfred Halzman, and Robert Richers, for money earned as French polishers. Mr. Thompson, barrister, appeared for the men on the part of the Amalgamated Society of French Polishers. The amount claimed by each plaintiff was 10s. 9d., but as to the 10s. there was no dispute. The 9d., it was explained by Mr. Thompson, was charged under the custom of the trade for "walking time" in going to and from the employer's head office and the place of the job. Mr. Ravey denied that it was the custom of the trade of French polishers, although it existed in connection with parts of the building trade. Mr. Thompson put in the rules of the men's Society, and said that Mr. Ravey had sent to the men's place of call for them to attend at his office. He submitted that that was to be taken as an acquiescence in the rules which the men put forward. Mr. Corser asked the defendant, as he denied knowing the rule, whether he had made any inquiry as to it, and Mr. Ravey replied that he had not. Mr. Corser decided that he was bound by the men's rule, in the absence of first objection, and made an order for amounts claimed, with 2s. cost of summons. He refused other costs, but observed that it was quite a reasonable case for the Society to have fought for the men.

Action to set aside an Award.—On Saturday, in the Queen's Bench Division of the High Court of Justice, before Mr. Justice Lawrance and Mr. Justice Collins, sitting as a divisional court, a motion was made in the referred action of Mr. Abraham Williams, contractor, against the Barmouth Urban District Council, Merionethshire, to set aside the award of the arbitrator in favour of the plaintiff. Mr. Abraham Williams entered into a contract to execute certain sewer works in Barmouth for £2,450. The engineer subsequently varied the contract, and plaintiff sent in a bill for £3,400. The board disputed payment of £959 5s. 10d. of that amount, the action was brought, and the question in dispute referred to arbitration. The umpire gave his award for the whole amount, £3,400. The Board resisted payment on the ground that the plaintiff had not executed all the works specified in the agreement, alleging that he had only done about two-thirds of them. The agreement was entered into in 1889, and the action was brought in 1895. It was referred in January, 1897, and the umpire made his award on May 29 of that year. The circumstances of the case were these:—The plaintiff by his contract undertook to construct a sewer to a sea outfall 375 yards from the shore. As originally planned the sewer was to be constructed on piles; but a rocky bottom being met with, the engineer altered the contract by arranging that the pipes should be anchored to heavy stones. This involved the extra cost which brought up the amount of the contractor's bill to £3,400. The ground on which the urban district council disputed £959 of that amount was that the engineer had gone beyond his authority, and that the contractor had concealed the fact that he had carried the pipe to a point 138 yards short of the 375 yards which the Local Government Board had imposed as the condition of their sanction to the sewer. The application of the urban district council was that the award should be sent back to be stated in the form of a special case, and Mr. Danckwerts pointed out that a similar course had been pursued in the case of the Kirkleatham Board and the Stockton and Middlesbrough Local Water Board. It was the contention of applicants that points of law were involved, and that therefore a special case should be stated. What was referred to the arbitrators was the question of facts and the question of amount; but the case raised points of law which the council had the right to raise. Mr. Channell, Q.C., for Mr. Williams, referred to a compromise which it was alleged had taken place between the parties, and urged that that was a bar to referring the case back. Mr. Danckwerts pointed out that the root of the matter lay in the fact that when it was discovered that the contractor had to deal with a rocky bottom, the engineer recommended that the pipes should be anchored to heavy stones. He submitted that the old contract lapsed when that was done. A compromise was effected as between the two contracts; then the arbitrator had made it binding without affording the council an opportunity of raising the point of law by having a case stated. The sewer was to be carried out 375 yards; but the fact had been concealed that it was 138 yards short of that. It was years since this work commenced, and he asked the Court to take a broad view of the matter. At the adjournment, on Monday, Mr. Danckwerts submitted that neither under the common law nor under the Public Health Act of 1875 could the Barmouth Council be called upon to pay the amount. Moreover, if the facts were found as it was admitted they would be found, it would then be seen that the plaintiff had not finished the work which he had undertaken to do: indeed, he had not done more than two-thirds of it. The plaintiff was seeking to impose charges upon the ratepayers in respect of work which had not been done in accordance with the requirements of the Public Health Act in regard to contracts being under seal, &c. The contract in this case was not under seal, yet the arbitrator had exceeded his function by finding in point of law that the contract was a valid contract. Mr. Justice Lawrance, in giving judgment, said he was of opinion that the case ought not to be sent back to the arbitrator to be stated. The local board had entered into a contract under seal, but the engineer, according to powers contained in that contract, altered and varied its terms. It was now argued that every one of these alterations and variations should have been made under the seal of the Barmouth District Council. If that contention were to hold good, then not the slightest alteration or alteration of any contract with a local authority could be effected save under the seal of that authority. But in this case it was clear that the board had entered into a compromise with the plaintiff for £1,020, and only afterwards came to the conclusion that they were wronging the ratepayers in not having the second or varied contract under seal. In these circumstances the matter had been submitted to an arbitrator, who, it seemed to the Court, was right in his finding, and there was no reason whatever for sending the case back to him. Mr. Justice Collins concurred, and said in his view the plaintiff was entitled to judgment for the amount claimed. The motion was dismissed with costs, and judgment entered for the plaintiff, whose counter motion was allowed with costs. Stay was granted on the payment of the money into court.

Transferred Ownership and the London Building Act.—At the South-Western Police-court on Tuesday, Mr. Francis gave an important decision in a summons against Mr. J. Schiefer, a builder, of Grove-mansions, Clapham-common, issued at the instance of the London County Council. The defendant was fined 10s. last March for erecting wooden structures at the rear of the mansions without the leave of the Council. As they were still allowed to stand, he was further summoned for the recovery of the cumulative penalties. That summons, however, was dismissed, the magistrate being of opinion that the Council had proceeded under the wrong section of the Act. The Council accordingly issued a summons under Section 170, the effect of which is a magisterial order empowering the Council to enter the premises and demolish the illegal structure, and charge the defaulter with the expenses. Mr. Thomas A. D. Chilvers supported the summons for the Council, and Mr. Warren, the defendant's counsel, raised the plea that his client, having parted with the property since his conviction in March, had no longer control over the structures. The magistrate said the section of the Act clearly intended to reach the premises without reference to the owner or the occupier. Certain buildings were condemned, and the important thing was to demolish them. If the defendant would not do it, no question of ownership could stop the Council from carrying out the order of condemnation. He gave his decision in favour of the council, with two guineas costs. On the application of defendant's counsel, his Worship agreed to grant a case for the consideration of a higher court.

Blackburn Chapel and its "Ancient Lights."—Shorrock and Others v. Birtwell.—A motion was made in the Chancery of Lancashire on Tuesday in the case of Shorrock and others v. Birtwell. Plaintiffs, the trustees of the Clayton-street Wesleyan Methodist Chapel, Blackburn, sought an injunction restraining defendant from proceeding with any building on his premises so as to darken, injure, or obstruct any of the ancient lights of the plaintiffs' chapel, and a mandatory order for defendant to pull down any building or such portion of a building as darkened, interfered with, or obstructed any of plaintiffs' ancient lights. It was contended by Mr. Bather, on behalf of plaintiffs, that defendant had committed a breach of faith in continuing to build a wall against an undertaking he had given. In April they found that he had commenced to build the wall so as to obscure the lights of the chapel. Negotiations took place between the parties, and towards the end of June defendant said

he would have to take counsel's opinion; but in the mean time, contrary to what he said, he went on building, and continued until the wall ran up to its present height. From affidavits read it was stated that defendant's wall was a serious detriment to the ancient lights, and so diminished the light that the gas had to be put on at the evening service earlier than before. The defence was that the defendant, for whom Mr. Radford appeared, had built up the portion co-extensive with the old wall to the present height before receiving any notice, and what plaintiffs complained of now was the continuation of the wall. It was as high on April 26 as it was now. The Vice-Chancellor said that in the chapel there were three windows, the bottom sill of which was 24ft. from the ground. In 1881 the chapel was demolished, and a new building erected, set back at a distance of 13ft. from the site of the old wall, and three windows were put in corresponding to the three old windows on what they might call the second floor; and they also put in a window on the ground floor. The three windows on the higher floor corresponding to the windows in the old building were undoubtedly entitled to the access of light, to so much of the light as passed through the old windows; but the evidence was not precise as to the exact position of the old windows and corresponding position of the new ones. It was incumbent on the plaintiffs to show which part of the new windows corresponded with the old ones. He could not see that the claim for access of light through the new window on the ground floor was justified, and he did not see any signs of a breach of agreement. It seemed to him that it would be wrong to grant an injunction. He had an open mind, but his impression was that the action would fail.

In re Simeon Wardle.—A meeting of the creditors of Simeon Wardle, now residing in Warley-road, Blackpool, formerly of Southport, and carrying on business as a contractor, decorator, and cabinetmaker under the style of T. and S. Wardle, of South Parade, Manchester, and Carnarvon-street, Manchester, was held on Tuesday afternoon at the offices of the Official Receiver in Bankruptcy, Manchester, Mr. C. J. Dibb, the official receiver, presiding. From the debtor's statement of affairs it appeared that the liabilities amounted to £1,765, and the assets to £889, after preferential claim had been met, the deficiency being £875. Bad debts, legal expenses, loss on goods sold by sheriff, and loss on contracts were put down as the cause of failure. A Manchester chartered accountant was appointed trustee, and a committee of inspection was elected.

Francis Morton and Co., Limited.—At a meeting of creditors held last week, after hearing a report as to what transpired since the date of the last meeting, the action of the committee and Receiver was approved, and the following resolution was passed:—"That the following committee be reappointed, namely:—Mr. James Dodds (Pearson and Knowles Coal and Iron Co.); Mr. Joseph G. Wright (Messrs. Isaac Jenks and Sons); Mr. Wm. Henderson (Messrs. Henderson and Glass); Mr. W. H. Hewlett (the Wigan Coal and Iron Co.); and Mr. John Hall (the Sheepbridge Coal and Iron Co.); to confer with the Receiver and Liquidator, with a view to the realisation of the assets to the greatest advantage of all concerned, and that, unless previously summoned, the creditors be called together again in three months' time."

Professor Reinhold Begas, the sculptor of the National Monument to the late Emperor William at Berlin, has been induced by numerous hostile criticisms to publish an essay stating his original conception of the monument, and the alterations he was compelled to make against his will.

At Sandbach, Cheshire, on Wednesday, Elisha Lees was summoned upon a charge of unlawfully appropriating to his own use £1,750 whilst acting as trustee of the money. He did not appear, and a warrant for his arrest was granted. Lees has held many responsible positions, having been surveyor to the local authority, secretary to the gas company, collector of Government taxes, holding also other offices of trust.

At the half-yearly meeting of the Great Northern Railway Company, held on Wednesday, the chairman, the Right Hon. W. L. Jackson, M.P., referred to the improvements now being made by the company. At Manchester, he said, they were building a separate station and providing accommodation for their traffic at a cost of one million. The contract had been let to a firm who had entered into an obligation to put the company in possession of a portion of the station on the the 30th June next year, and with the whole of it before the 30th of June in the following year. At Liverpool, also, they had bought a site and had opened agencies; while at Nottingham they had become joint owners of the central passenger station. With the exception of a very short link that would be dealt with subsequently, the company had now practically four lines all the way from London to Huntingdon, and would ultimately have four lines to Peterborough.

Our Office Table.

The South Kensington Museum's Committee have not concluded their inquiries this session, and ask to be reappointed next year. Meanwhile, in a second report just issued, the committee "feel bound to confirm and emphasise the recommendation of their first report as to the necessity of immediate action to secure the buildings against fire." They also "express their sense of the importance of completing the building on the east side of Exhibition-road, with a view to the safe deposit and satisfactory exhibition of the art collections (including the Indian section, now on the west side of the road in a hired building)."

The Bill for the creation of a Greater Bristol having been passed with some clippings and reductions, and received Royal assent, the *Western Press* is advocating the concentration and rebuilding of the municipal buildings on a scale at once comprehensive, adequate, and worthy of the extended city. As our Bristol contemporary remarks, "Bristol has, in the matter of its public offices, reduced decentralisation to a fine art. The sanitary offices are in one place, the medical officer's department in another, the central rate office, police-court, gas examiner's office, and weights and measure department have been just put down here and there where there happened to be room for them, and without any kind of suggestion that they form parts of a whole, or that they have any connection with the centre of municipal activity—the Council House. If an important public body comes to Bristol, the most commodious apartment the civic hospitality can offer is that in which Bristol holds its own town's meetings—the Criminal Court at the Guildhall. The fact that the Docks Committee are housed in a distinct building in Queen-square has some justification in the proximity of the ships; the erection of offices for the Electrical Department near the central generating station may also be defended, although, when the concentration does come about in a building worthier of Bristol than the present Council House, there will be something to be said in favour of the electrical accounts office being somewhere near the spot where other debts to the corporation have to be paid. No mention has been made of the venerable public library in King-street, with its wealth of literary treasures, which has earned the title of being the oldest institution of the kind and structurally the worst in the country. The late city surveyor, Mr. Josiah Thomas, prepared no fewer than 200 plans with a view to bring the matter to an issue; hundreds—probably thousands—of pounds (for no one knows exactly what the outlay has been) have been spent on mere patchwork on a building which might have sufficed for the early part of the century when it was erected, but which is, in 1897, quite out of date."

Mr. Chamberlain, replying to correspondents' inquiries regarding the provisions of the Workmen's Compensation for Accidents Bill, says:—"The Provisions of the Bill will apply to all buildings in the process of demolition, to all buildings which are being constructed with the help of steam, or any mechanical power, and also to buildings which are over 30ft. high. The definition is taken from the Factory Acts, and will include the great majority of all the accidents which occur in the trade, while at the same time it is intended to relieve from liability the very small builder, who is often no better off than his own workmen."

Among the measures to which the Royal Assent was given at the prorogation of Parliament on Friday were the following:—Patent Office Extension, Public Offices (Whitehall) Site, District Councils (Water Supply Facilities), Workmen (Compensation for Accidents), Metropolitan Water Companies, Post Office (Sites), North Pembrokeshire and Fishguard Railway, Great Western Railway (Bristol Lines), Brompton and Piccadilly Circus Railway, Great Northern and City Railway, Weston-super-Mare Grand Pier, Dublin, Wicklow, and Wexford Railway (New Ross and Waterford Extension), Hastings Harbour District Railway; Birmingham, North Warwickshire, and Stratford-upon-Avon Railway, Birmingham Churches, Invergarry and Fort Augustus Railway, Thames Subway (Greenwich to Millwall), Dearne Valley Railway, Southwark and Vauxhall Water, Metropolitan District Railway, Highgate Woods Preservation, Watford, Edgware, and London Railway, London County Council (General Powers), Harrow and Uxbridge Railway, and the Whitechapel and Bow Railway.

We learn by the *Church Times* that three of Mr. Pearson's famous churches are now in course of completion. These are (1) St. Augustine's, Kilburn, the spire of which will shortly be finished; (2) St. Stephen's, Bournemouth, known as the Bennett memorial church, the chancel of which will be complete and consecrated in October next; and (3) Truro Cathedral, where the workmen are now busy in putting in the foundations for the remaining seven bays of the nave.

The annual report of the director-general of the Geological Survey, issued on Tuesday, states that the area dealt with last year amounts to 740 square miles, with 3,866 miles of boundary line. A portion of the staff is engaged in the centre and south of England upon a survey of the drift deposits, and making also such revisions in the solid geology as are found necessary. The resurvey of the South Wales coalfield has made satisfactory progress, and that of the North Staffordshire coalfield has been continued. The mapping of the Isle of Man has been completed during the year. "A Memoir on the Geology of Appleby, Ullswater, and Haweswater," by Mr. J. R. Dakyns, Mr. Tiddeman, and Mr. Goodchild, has been printed, and will shortly be issued. Three sheets of the one-inch map (new series) have been published, comprising parts of Hampshire, Dorsetshire, and the South Wales coalfield. New editions of two six-inch maps (Lancashire) have been published. Six new sheets of the general map of England and Wales (scale, four miles to one inch) have been published—namely, Northumberland, Isle of Man, Lake District, North Wales, Central England and South Wales, and North Devon. Sheet 1 (title) and sheet 3 (index of colours) have also been prepared, so that the entire map is now published. Sheet 6 (East Yorkshire), 9 (Eastern Counties), and 15 (Sussex coast) have been reissued, printed in colours. One sheet of vertical sections has been published: this illustrates the geology of the South Wales coalfield, and has been prepared by Mr. A. Strahan and Mr. W. Gibson. MS. copies of 121 six-inch maps have been deposited in the office for public reference.

The western branch of the Sanitary Inspectors' Association, of which the Right Hon. C. Seale Hayne, M.P., is president, will hold its annual meeting at Glastonbury to-day (Friday) and to-morrow (Saturday). The visitors will be received by the Mayor and Town Councillors this afternoon, after which the general meeting of members will be held for the reception of the report, election of executive, &c., and this will be followed by a dinner at the famous George Hotel. To-morrow morning, after inspecting the Glastonbury waterworks and sewage-works, the members will visit Street, where they will be received by the chairman and members of the Urban District Council. They will inspect the Street sewage-works and the blue lias stone quarries under the guidance of Mr. T. Collingwood, surveyor to the Urban District Council, after which they will be entertained to luncheon by Mr. W. S. Clark, J.P., the chairman of the council. On returning to Glastonbury a public meeting will be held at the Town Hall, under the presidency of the Mayor (Alderman Porch). Alderman J. L. Bulleid has promised an address on "The Past and Present Sanitation of Glastonbury," and Mr. C. MacMahon, of Torquay, will contribute a paper on "The Training of Sanitary Inspectors."

One hundred and fifteen projects for an attraction of an extraordinary nature at the Paris Exhibition to be held in the year 1900 were brought up for consideration at the meeting of the committee on Saturday. They included a proposal to build a glass under-water restaurant, and another for two immense mirrors to be attached to the Eiffel Tower, one at the top and the other at the bottom, so that people promenading round the lower one should see a reflection of nearly the whole of Paris. Another suggestion was to erect a memorial temple of present-century progress, with representations of the eight great nations of Europe. A fantastic inventor submitted an idea for the erection of a model town of the future, in the year 2000 or some such advanced period. A doctor urged the construction of a miniature hygienic city, to be built on the most advanced and perfect hygienic principles, and inhabited by people living in strict accord-

ance with the laws of hygiene. A startling proposal was that a house 600ft. high should be erected, in order to show how tall a habitable building could be made without danger. Another scheme was for the construction of a street to be guarded from end to end by detachments of soldiers clad in the different uniforms worn in France since the time of the Gauls. Yet another suggestion was for the erection of an enormous vertical screw, with a massive revolving nut fitted up as a café and restaurant travelling up and down it continually. A lady recommended a wooden reproduction of the Horse of Troy, fitted up internally with various apartments capable of accommodating 1,000 people at a time; while a daring gentleman considered a huge beauty show with deputations of ladies from every country in the world would prove an irresistible attraction. A great many schemes were presented for making use of the Eiffel Tower in all sorts of strange and fantastic ways, several being that the tower should be encircled with a spiral railway, while one proposal was that it should be used as a toboggan chute. Another inventor desired to cover it so as to make it a gigantic copy of Bartholdi's famous statue of "Liberty" at New York. In the end the committee decided that none of the suggestions were sufficiently practical or worthy of adoption.

The excavations that have been going on for months past on a plot of ground belonging to Herr Schabb, a manufacturer at Trèves, have resulted in the discovery of a Roman private house. The façade lies parallel with the principal street of the old Roman city. A number of blocks which served as pedestals for the wooden or stone pillars of a portico still remain. The entrance is distinctly recognisable between two buttresses and an immense heap of stones. A long entrance-hall running right through the house, from front to back, is intersected by another corridor, so that the building is divided into four parts. Side corridors lead into the rooms. Of these the marble tesselated bath rooms for hot and cold water and warm air lie, as usual, side by side. The two latter were supplied with warm air through subterranean passages. The escape of the smoke was effected by means of hollow tiles laid on one another. The south-western rooms have cellars under them. In a light court in the same part of the house there is a well-preserved window, the first ever found in a Roman building. The most interesting thing, however, is the richly-coloured mosaic floor. Experts assign the building to the first half of the fourth century.

Governor Hastings, of Pennsylvania, has vetoed the Bill to regulate the construction in that State of buildings in cities of the first class, which, of course, was of particular interest to Philadelphia. The measure provided that every building hereafter erected which shall extend to a greater height than 70ft. above the sidewalk level, and every building hereafter erected or altered, to be used as a hotel, apartment, tenement or lodging-house, containing more than 50 rooms above the first floor, and every public hospital, asylum, or institution for the care or treatment of insane, weak-minded, or indigent persons, if more than two stories in height, shall be approved by the Bureau of Buildings Inspection. Governor Hastings states that he is convinced that the Bill was not in the interest of the protection of human life, as it sought to relieve owners of extremely high buildings and buildings densely occupied, as well as buildings occupied by the sick, insane, and helpless, from the erection of fire-escapes as now required by law. The existing safeguards under the fire-escape laws upon the statute books will, in his judgment, prove more efficient in saving human lives than the provisions of the Bill under consideration.

The largest hotel structure in the world is to be erected in Boston, Mass., the coming year, and its total cost will be something over 3,000,000dol., says the *Southern Manufacturer and Builder*. The building will be eleven stories high, and will be faced with fancy buff brick and terracotta. The design is after that of the palace of the Duke of Mecklenburg-Schwerin, in the north of Germany. The hotel will be in three sections, each one containing more than 700 rooms, and making a total of 2,250 separate apartments. The plans provide for an open court between each section of the house 70ft. wide, and giving ample light to the rooms facing it. Then in each section there will be an interior court 35ft. square. The dining-room is to be on the north side, next to the river, a one-story structure, divided into a number of cosy, half shut-in apartments. The suites will be of various sizes, and each will have the advantage of a double elevator service, one set of elevators being for passengers and the other for freight. There will be 21 elevator wells in the building. Features of the hotel will be the banqueting hall, the ballroom, and the ice skating rink, the latter to be used in the summer as a bicycle pavilion. The hotel will be specially fitted for the purpose There will be an elaborate refrigerating apparatus in the hotel, and this will be used to make ice for the skating rink, the floor of the rink being flooded and the water congealed. Many other unusual features are in the plans.

The Administration Report on the Railways in India for 1896-7 has just been published as a bulky bluebook of 280 pages, illustrated with a large map. From this it appears that the total length of railways open and sanctioned on the 31st March, 1897, was 24,528½ miles, being a net increase of 1,062½ miles during the year. The total length of railways open for traffic on the same date was 20,390¼ miles, being a net increase of 713¼ miles, leaving 4,138¼ miles still under construction or sanctioned. The mean mileage worked during the calendar year was 19,783 miles, being an increase of 623 miles over the figures of the previous year. The total capital outlay on railways open to traffic amounted on the 31st December, 1896, to Rs. 253·16 crores, being an increase of Rs. 8·78 crores as compared with the expenditure incurred to the end of the previous year. The gross earnings in 1896 amounted to Rs. 25,36,60,425, or Rs. 87,08,635 less than in the previous year; the working expenses amounted to Rs. 12,19,76,875, and absorbed 48·09 per cent. of the gross earnings against 46·19 per cent. in 1895. The net earnings amounted to Rs. 13,16,83,550, being a decrease of Rs. 94,86,650. The statistical return on the capital expenditure was 5·20 per cent. against 5·78 per cent. in the previous year. The new proposals during the year under review were confined to commercial lines, the most important additions being the Hyderabad-Gódâvari Valley (Hyderabad to Manmád), 389¾ miles; Tapti Valley line (Surat to Amalner), 162½ miles; the Sultanpur, Bogra and Kaliganj, 60 miles; and the Mymensingh, Jamalpur and Subhankhali, 63 miles.

J. Ludwig Hebrahn, a German archæologist, has arrived at Oaxaca, Mex., from an extensive exploration trip, covering six months, in the State of Chiapas, which abounds in evidences of a prehistoric race. He reports having discovered another ancient city, situated in the depths of a tropical forest, about sixty miles west of the Guatemalan border. He has with him a number of curious relics of the place, and states that he will go to Germany, where he will endeavour to enlist the services of the Government in sending out an expedition to make a further exploration of the city and that section. The city is partly buried, and is covered with trees of large size and great age.

Uneasiness has been caused among the manufacturing concerns which flocked a few years ago to the natural-gas belt of Indiana by a recent report of the geologist of that State. The statement in this report that during last year the gas pressure declined 20lb. on an average all over the 2,500 square miles of the field would indicate that the supply is failing very fast, and that manufacturing plants, which are large consumers, cannot be multiplied without hastening the day of complete exhaustion. In this respect the history of the Indiana oil-field will be a repetition of the history of fields previously exploited. The supply is failing everywhere, and few rich finds are rewarding the explorers. As to whether the supply will ever be renewed, geologists differ. It is held by some that the production of gas is a continuous process, as the petroleum constantly oozes from the oil-bearing strata to come in contact with the heated strata which converts it into gas. The Indiana geologist believes, however, that gas-production is an action already completed, and that when the gas fails it is gone for ever.

A competitive examination is to be held by the United States Civil Service Commission, to fill the vacancy in the position of supervising architect to the U.S. Treasury. The salary of this official is 4,500dol. per annum, and the Government hopes that an architect of high attainments and administrative ability may be secured to undertake the duties of this important and responsible post.

Trade News.

WAGES MOVEMENTS.

Edinburgh and Leith Masons' Strike.—Thirty-two masters have now granted the eight hours' day, and of 106 operatives—103 in Edinburgh and three in Leith—who had been working under the o'd conditions, the majority have ceased work and joined the men on strike. There are about 900 men out of work. A number have left town in search of employment elsewhere. The Masters' Association held a meeting on Tuesday afternoon at 10, Shandwick-place, Edinburgh. Mr. Peter White was in the chair. The meeting was private; but the secretary reported that the masters were still united, as they considered the demand of the men unwarranted, and that, so far as the Association was concerned, there had only been one defection.

Huddersfield.—End of the Masons' Strike.—A meeting of representatives of the masters' and operative masons' associations at Huddersfield was held on Friday, when terms were arrived at. The men agreed to accept an advance of ½d. now and another ½d. in May, 1898, making 8½d. now and 9d. in May, together with a rearrangement of rules. The strike has lasted fourteen weeks. The men will go in on Monday morning, and some important building operations at the new police offices will be resumed. The settlement will afford much relief in other directions.

Liverpool.—The difficulty at present existing between employing and employed plasterers is but little nearer settlement than last week. The employers state that they have, notwithstanding all the efforts put forward to prevent the engagement of non-union plasterers, enough men at work to complete outstanding contracts. They expect the next overture in the direction of arbitration to come from the men, and look to a possible settlement during the coming fortnight.

Musselburgh.—The operative joiners of Musselburgh have received a further advance in their wages of ½d. per hour, as from the beginning of August. The rate is now 9d., the same as in Edinburgh. Hitherto the Musselburgh rate has ruled ½d. under that of Edinburgh.

Paisley.—An agreement has been entered into between the masters and operative plumbers in Paisley whereby an increase of wages of ½d. per hour came into force on Monday. The minimum wage is now 9d. per hour, and the working week consists of 51 hours. This is the highest figure ever reached in plumbers' wages in the district.

South Shields.—The plasterers came out on strike on Saturday last as a protest against the bricklayers doing work which is claimed by the plasterers as their right. For many years past the work of putting down cement flooring such as is used in backyards, stables, sculleries, &c., has been performed by both plasterers and bricklayers, but the plasterers in Shields claim that this work is being done in other districts by plasterers alone, and they further assert that the plasterers' trowel and rule must be used for the job.

CHIPS.

The church of St. James's, Piccadilly, will be closed until the end of September for cleaning and redecoration, under the direction of Sir Arthur Blomfield, and for repair and improvement of the organ.

A Conservative Club is being built at Oxton from plans by Mr. Frank Holmes. It is two stories in height, and has a bowling-green attached.

In Orchard-street, Neath, new offices are being built for the Neath Rural District Council. Mr. D. M. Davies is the architect, and Messrs. Thomas Watkins and Co. are the builders.

The city engineer of Oxford has submitted to the corporation alternative schemes of £342, £890, and £1,477 to deal with storm waters, which were referred to a committee; £2,000 will be spent on Carfax Tower, excluding the clock, which is to cost £320.

At the monthly meeting of the town council of Newport, Mon., on Tuesday, it was decided that it would be desirable to acquire some property adjacent to the town-hall with the view to carrying out extensions. The price asked for the property is £21,000.

Mr. R. B. Haldane, M.P., opened on Monday Prestonpans Town-hall, recently erected at a cost of £1,500. The building, the plans for which were prepared by Mr. Peter Whitecross, architect, Prestonpans, has a plain exterior, the stone dressings being from Locharbriggs quarry, Dumfriesshire, and the stone of the face-work from Hailes quarry. The main room is entered from a vestibule with glazed screen, is 60ft. by 35ft. in width, and seated for about 450 persons.

CHIPS.

Miss Talbot, of Margam Park, the great church builder in the diocese of Llandaff, has just built a very handsome one dedicated to St. Theodore, at Port Talbot, in memory of Mr. C. R. M. Talbot, M.P., so long the Father of the House of Commons. The Bishop of Llandaff, in consecrating it, on Monday, said that it was one of the handsomest churches in the diocese.

The private view of the Autumn Exhibition at Liverpool will take place on Saturday, August 28, and the inaugural soirée on the following Monday. For the first time the galleries will be illuminated throughout by the electric light.

The town council of Walsall have decided to hold an exhibition of artists' pictures in the art gallery, under the management of Mr. Creswell, of Birmingham, and to set aside £100 a year for the purchase of pictures for the gallery.

The Department of Science and Art has received, through the Foreign Office, a copy of a despatch inclosing a translation of a royal decree for the holding of an exhibition of Spanish industries in the Palace of Arts and Industry, Madrid, this year. The exhibition will be opened on October 20.

At the Airdrie Dean of Guild Court, on Monday, the plans were passed and lining granted of a new Episcopal church to be erected at Springwells, Airdrie. The building will accommodate 200 persons, and will be Gothic in design.

The Home Secretary, Sir M. White Ridley, M.P., opened, on Monday, two new hospital wards that have been added to the Blackpool Hospital, at a cost of £4,000.

A water-supply for Springfield and Gretna Green, which has just been constructed for the Annan District Committee of the Dumfriesshire County Council, was formally opened on Monday. Mr. J. S. Millar has been the contractor.

The Archbishop of York opened, on Tuesday, a new Seamen's Institute on Sandside, Scarborough. The large room on the ground floor is capable of seating 250 people. It is to be used as a recreation room, and also for concerts and temperance meetings. Another room upstairs is used as a reading-room, and an apartment on the ground floor as a coffee bar.

At Tuesday's meeting of the Aston Board of Guardians, a long discussion took place upon the question of the cost of the proposed cottage homes. The Building Committee reported that they had received the detailed estimate for the homes, and had had under consideration a letter from the Local Government Board upon the subject. The total cost would be £50,000, and they recommended that the estimates should be accepted, and that the Local Government Board should be asked to sanction a loan of £39,540, repayable in sixty years, to defray the cost of the building of the structure and the architect's charges; and a further loan of £10,460, repayable in twenty years, to meet the other charges. The report was eventually adopted by a large majority.

In his native town of Shrewsbury, and in front of the school which for nine years he attended, a statue was unveiled on Tuesday in memory of Charles Darwin. It is the work of Mr. Horace Montford, R.A., and represents the naturalist seated in a massive chair, holding some MS. upon which he is engaged, but from which his face is turned as if in deep thought, while at the foot are a number of volumes representing his finished works. The statue, which is of bronze, is the gift of the Shropshire Horticultural Society, and cost 1,000 guineas.

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LATEST PRICES.

IRON, &c.

	Per ton.		Per ton.
Rolled-Iron Joists, Belgian	£5 15 0	to	£6 0 0
Rolled-Steel Joists, English	6 0 0	,,	6 10 0
Wrought-Iron Girder Plates	5 15 0	,,	6 10 0
Bar Iron, good Staffs	7 0 0	,,	8 0 0
Do., Lowmoor, Flat, Round, or Square	17 0 0	,,	17 0 0
Do., Welsh	5 15 0	,,	5 17 6
Boiler Plates, Iron—			
South Staffs	7 17 6	,	8 5 0
Best Snedshill	10 0 0	,,	10 10 0

Angles 10s., Tees 20s. per ton extra.

Builders' Hoop Iron, for bonding, &c., £6 15s. 0d. per ton.

Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.

Galvanised Corrugated Sheet Iron—

	No. 18 to 20. Per ton.		No. 22 to 24. Per ton.
6ft. to 8ft. long, inclusive gauge	£10 15 0	...	£11 0 0
Best ditto	11 5 0	...	11 10 0

	Per ton.		Per ton.
Cast-Iron Columns	£6 0 0	to	£8 10 0
Cast-Iron Stanchions	6 0 0	,,	8 10 0
Cast-Iron Sash Weights	—	,,	4 2 6
Cast-Iron Socket Pipes—			
3in. diameter	5 10 0	,,	5 15 0
4in. to 6in.	5 5 0	,,	5 10 0
7in. to 24in. (all sizes)	4 15 0	,,	5 0 0

[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]

Pig Iron—	Per ton.		
Cold Blast, Lilleshall	105s. to 110s.		
Hot Blast, ditto	57s. 6d. to 62s. 6d.		

Wrought-Iron Tubes—Discount off Standard Lists f.o.b.

Gas-Tubes	75p.c.	Fittings	77½p.c.
Water-Tubes	70	,,	72½
Steam-Tubes	62½	,,	65
Galvanised Gas-Tubes	60	,,	62½
Galvanised Water-Tubes	55	,,	57½
Galvanised Steam-Tubes	45	,,	47½

	10cwt. casks. Per ton.		5cwt. casks. Per ton.
Sheet Zinc, for roofing and working up	£22 0 0	to	£23 0 0
Sheet Lead, 3lb. per sq. ft. super.	14 0 0	,,	15 0 0
Pig Lead, in 1cwt. pigs	13 10 0	,,	14 10 0
Lead Shot, in 28lb. bags	16 10 0	,,	17 10 0
Copper Sheets, sheathing and rods	60 0 0	,,	61 0 0
Copper, British Cake and Ingot	50 5 0	,,	51 5 0
Tin, Straits	62 6 3	,,	63 6 3
Do., English Ingots	66 15 0	,,	67 15 0
Spelter, Silesian	17 10 0	,,	17 15 0
	Per ton.		Per ton.
Cut Clasp Nails, 3in. to 6in.	£8 15 0	,,	£9 15 0
Cut Floor Brads	8 10 0	,,	9 10 0

Wire Nails (Points de Paris)—

0 to 7	8	9	10	11	12	13	14	15	B.W.G.
8/6	9/0	9/6	10/3	11/0	12/0	13/0	14/9	16/9	per cwt.

TIMBER.

Teak, Burmah	per load	£14 5 0	to	£15 10 0
,, Bangkok	,, ...	10 10 0	,,	15 0 0
Quebec pine, pitch	,, ...	—	,,	—
,, yellow	,, ...	2 0 0	,,	4 0 0
,, Oak	,, ...	5 10 0	,,	6 10 0
,, Birch	,, ...	4 5 0	,,	6 0 0
,, Elm	,, ...	4 0 0	,,	5 5 0
,, Ash	,, ...	3 5 0	,,	4 10 0
Dantsic and Memel Oak	,, ...	2 10 0	,,	3 10 0
Fir	,, ...	2 5 0	,,	4 5 0
Wainscot, Riga p. log	,, ...	2 0 0	,,	3 15 0
Lath, Dantsic, p.f.	,, ...	4 10 0	,,	5 10 0
St. Petersburg	,, ...	5 0 0	,,	6 10 0
Greenheart	,, ...	8 0 0	,,	8 10 0
Box	,, ...	4 0 0	,,	15 0 0
Sequoia, U.S.A.	per cube foot	0 1 8	,,	0 1 10
Mahogany, Cuba, per super foot 1in. thick		0 0 5	,,	0 0 6½
,, Honduras	,, ...	0 0 5	,,	0 0 6½
,, Mexican	,, ...	0 0 4	,,	0 0 5
Cedar, Cuba	,, ...	0 0 4½	,,	0 0 5
,, Honduras	,, ...	0 0 4	,,	0 0 5
Satinwood	,, ...	0 0 7	,,	0 1 0
Walnut, Italian	,, ...	0 0 3½	,,	0 0 7

Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 11in.:—

Quebec, Pine, 1st		£20 10 0	to	£26 10 0
,, 2nd		15 0 0	,,	17 10 0
,, 3rd		7 10 0	,,	11 10 0
Canada Spruce, 1st		10 10 0	,,	12 0 0
,, 2nd and 3rd		8 0 0	,,	9 0 0
New Brunswick		7 10 0	,,	8 0 0
Riga		6 10 0	,,	7 10 0
St. Petersburg		8 10 0	,,	12 10 0
Swedish		9 0 0	,,	15 10 0
Finland		8 0 0	,,	8 10 0
White Sea		9 10 0	,,	16 0 0
Battens, all sorts		5 0 0	,,	20 0 0
Flooring Boards, per square of 1in.:—				
1st prepared		0 8 6	,,	0 15 6
2nd ditto		0 7 0	,,	0 12 0
Other qualities		0 5 0	,,	0 6 6
Staves, per standard M:—				
Quebec pipe		—		—
U.S. ditto		35 0 0	,,	42 10 0
Memel, cr. pipe		230 0 0	,,	240 0 0
Memel, brack		200 0 0	,,	210 0 0

OILS.

Linseed	per ton	£16 7 6	to	£17 0 0
Rapeseed, English pale	,, ...	28 0 0	,,	28 5 0
Do., brown	,, ...	26 10 0	,,	26 15 0
Cottonseed, refined	,, ...	15 15 0	,,	16 15 0
Olive, Spanish	,, ...	28 0 0	,,	30 0 0
Seal, pale	,, ...	23 10 0	,,	24 0 0
Cocoanut, Cochin	,, ...	26 15 0	,,	27 15 0
Do., Ceylon	,, ...	23 5 0	,,	23 10 0
Palm, Lagos	,, ...	21 10 0	,,	22 10 0
Oleine	,, ...	18 15 0	,,	19 15 0
Lubricating U.S.	per gal.	0 6 3	,,	0 7 6
Petroleum, refined	,, ...	0 0 4¾	,,	0 0 4⅞
Tar, Stockholm	per barrel	1 2 0	,,	1 5 0
Archangel	,, ...	0 12 6	,,	0 15 0
Turpentine, American	per ton	21 0 0	,,	21 10 0

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TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

Abersock, near Pwllheli.—For alterations to Bwlch C.M. Chapel, Abersock, Pwllheli. Mr. Rowland Lloyd Jones, 14, Market-street, Carnarvon, architect:—

Jones, Roberts, & Jones, Pwllheli £575 0 0

Bermondsey.—For inclosing additional land and executing works on site of Page's-walk School, for the London School Board:—

		A.
Rice and Son	£1,003 0 0	£24 0 0
Akers, W., and Co.	871 0 0	25 0 0
Minter, F. G.	850 0 0	30 0 0
Garrett, J., and Son	843 0 0	30 0 0
Charteris, D.	816 0 0	27 0 0
Nicholson, T.	792 0 0	72 0 0
Thomas and Cooper	776 10 0	36 0 0
Ford, J. F.	755 0 0	26 0 0
Jones and Groves	750 0 0	48 0 0
Goad, W. V.	675 0 0	20 0 0
Leney, H. (accepted)	675 0 0	19 10 0

A.—Extra amount required for building brickwork in cement.

Blyth, Northumberland.—For carrying out improvements in Union-road, for the joint committee of the Blyth and Cowpen Urban District Councils:—

Simpson, G. E. (accepted) £701 17 0

Bolton Perry.—For erecting a mansion near the Oak-avenue, on the New Appleton estate, for Mr. Ernest Holden:—

Keswick, J., York (accepted).

Brixton.—For erecting iron buildings on Santley-street site, for the London School Board:—

Charteris, D.	£1,125 0 0
Humphreys, Ltd.	1,114 0 0
Harbrow, W.	1,075 0 0
Cruwys, T.	1,050 0 0
Hawkins, T. J.	1,020 0 0
Mitson, J.	998 17 0
Croggon and Co., Ltd. (accepted)	937 10 0

Bromley, E.—For new boundary wall in Leven-road, adjoining Bromley Hall-road site, for the London School Board:—

Derby, A. W.	£273 0 0
Munday, G., and Sons	232 0 0
Holliday, J. F.	225 0 0
Gibb, D., and Co.	215 0 0
Robey, J. T.	193 0 0
Wales, G. (accepted)	183 0 0

(*Continued on page XV.*)

THE BUILDING NEWS
AND ENGINEERING JOURNAL.
VOL. LXXIII.—No. 2224.
FRIDAY, AUGUST 20, 1897.

THE NEW CULT.

In his work on "Social Aims," Emerson says, "Next to the originator of a good sentence is the first quoter of it," a truism which finds an exemplification amongst architects and artists generally. We have plenty of "quoters" in architecture and to spare; but they do not always select the best points, and, as the essayist goes on to show, it is as difficult to appropriate the thoughts of others as it is to invent. The new cult of architects and art craftsmen have come to the same conclusion, and they will not "quote" anything; therefore they find little sympathy among the rank and file of the profession, who are content to follow the easiest and safest path, which is the most popular and lucrative. The methods adopted by the "new art cult," if we may so call the advanced school, may not be the most conducive to their success; but at least they have the courage of their convictions, and manage to give offence in many quarters.

Unless they have something fresh to say, theorists and lecturers on art meet with no response. Real art is the same now as it was in the time of the Greeks, and nothing very new can be said about it that is worth remembering. But the fact is that what we call "art" has somewhat changed; what was once real has become only a kind of fashion or convention, and there is therefore an opportunity now and then for some inspired prophet to arise and say plainly how much "art" is fallen. Ruskin many years ago promulgated what appeared to be a new gospel of art, though it was simply a denunciation, almost prophetic in its tone, of what is called modern art, its abuses and conventions. It came like a new revelation to many; in vigorous word-painting he tore off the veil of shams and hypocrisy which obscured the reality of art, and if he said many things which looked extravagant and paradoxical, the object of his writings has been attained in more honest workmanship and sincerity of intention. The same may be said of William Morris, whose writings and work gave an impulse to the workman who had a vocation, till then dormant under a load of shackles. These and a few more stirred the dead bones till a new life began to breathe in them. What these men did simply was to discern the real meaning of art, which till then was a mere fiction and fashion—to strip it of all false ideas and concretions. And we have a few more of the same kind who are following their example, trying to keep fresh and alive the real faith in art, and prevent it from again being tampered with by those who make profit out of it. Plain speaking is, of course, unpalatable to architects and decorative artists amongst others, who are content to remain in a groove, and it is just for this reason that anything that seems to be a little strange is laughed at. People of this sort are always prating and canting on the intricacies and perplexities of art, inventing fine phrases and terms, and wrapping up their particular art and craft in technical terms, and making it appear more and more difficult to the outsider. They do not like to be told, as Mr. Cobden-Sanderson says in his introductory sketch prefixed to a volume on "Art and Life and the Building and Decoration of Cities," that the "immediate function of art is to do each right thing well, in the spirit of the artist, in the spirit of the whole." The professional architect, or decorator, or carver thinks his own vocation a more important function than thus described so simply, requiring a knowledge of technical matters, of styles, of art methods; but the above definition of doing each right thing well comprises a good deal more than the ordinary craftsman thinks. He has to discover the *right thing* first of all, which means how to think and adapt, and then to do it well—that is, with the best skill he can command. What has to be guarded against is the thought that any piece of work—a building, a cabinet, a chair, or a scheme of decoration—is necessarily right because it is like something else of the same kind; or because a good model or example has been followed, or because the artist has adopted a traditional method, the work is a "right thing." What is right can only be found out by thinking with an honest intention to do what is true, which may often lead us to a very different result from that which we obtain by the other method. So that this short and simple definition means a great deal more than may be imagined. How does this dictum explain the architect's work? Does he always take a right model or conception of a building? Is it not too often something complex when its use dictates extreme simplicity in plan and elevation? Instead of making a plan that will just suit the requirements, it is more than is wanted. Or he selects a model of a building that is by no means appropriate. Complexity and expense too often force themselves upon him;—its ornamentation and details are borrowed, not genuine expressions of the materials chosen, nor suitable to the purpose or the locality. The engineer has not this temptation. The necessity of absolute utility makes him less liable to go wrong, and neglect the "right thing"; but the architect is for ever being haunted with feelings that his first honest impulses are crude, and in endeavouring to improve his design he loses sight of utility. How many examples of building illustrate this neglect of the dictum "to do each right thing well." If we look at all the labourers' cottages, to take an easy example, how many of them fall short of the absolute simplicity and use demanded! How many of those erected on noblemen's and gentlemen's estates imitate little cottages *orné* or fanciful villas, with such details as carved or pierced bargeboards, bay-window, timber ornamentation. So inside one finds a cramped passage or entrance with stairs in front, no one decently sized family or living room, but a number of closet-like apartments, following the arrangement of a small suburban house suitable for a class above the labourer, but which is ridiculous for a country labourer's family. The whole idea has been to ape the type of better-class villas on a small scale. Even for the city clerk or professional class of small means the suburban house is seldom better. A man with a family of three or five does not want a complete set of small rooms, one with a bay window in front, called almost satirically a "drawing-room," with perhaps a third called a "morning room"; but he wants one good sized sitting-room, and another as a room for receiving visitors, and a few good-sized and ventilated bedrooms. The "right thing" here is certainly not chosen even if the "doing it well" passes muster. In such buildings as almshouses, convalescent homes, village churches, schools, stables, and the like, the same error is common. The village church is pretentious, though small; the architect could not conceive one without a nave and two aisles, a chancel and a tower and spire, and all the adjuncts of a town church; but how ridiculous—it recalls to mind a Bond-street exquisite, top hat and all, climbing an Alpine peak or shooting on the moors. "Quite out of place!" we instinctively exclaim, as we see a dandy in black coat and silk hat on the sands. So it is equally absurd to find a church built of minster or cathedral-like completeness in a poor and crowded town district or a diminutive Osborne or Balmoral Castle in a London suburb. The "right thing in the right place" has scarcely been learned by the architect of Philistine tendencies; he has to obey orders or the commands of my Lord Snob or my Lady Fashionable. The desire not to be simple or self-evident is one of the weaknesses of modern architecture, and that is why a too-obvious expression is so rarely admired except by the certain "cult" or school of artists we have mentioned. Perhaps the idea that if we made our designs too simple and apparent, the public would think less of the architect's services, has something to do with this opinion. Elaborateness and complexity savour of learning and cleverness; but a very direct way of doing a thing has an air of childish simplicity about it not very congenial to the great Five Per Cent. On the whole, it must be confessed, one of the weak points of mere professionalism in art is the temptation to become fussy and unreal—to appear to be clever or learned; and the same feeling pervades all professions, more or less. Such societies as the Arts and Crafts are direct protests to this exclusive view of art, which makes it appear that only those who have acquired certain professional training or have been apprenticed can turn out artistic work. Mr. Cobden-Sanderson says all men are potentially artists, each in his own degree, and one and all to be capable of co-operating and bringing themselves into unison with "the rhythm of the universe." Latent talent there is undoubtedly in many men, requiring only to be brought out to enable them to take their share. Many an architect can remember instances where he has found a client able to improve on a plan, and of workmen who have made useful suggestions and improved on details of design. They see a thing in a new light, unobscured by those hindrances and prejudices which the professional artist cannot avoid. In this way a bricklayer or a mason sees the obvious and direct way of forming a brick chimney or of setting a stone detail that would never occur to the designer or draughtsman.

The same principle applies to furniture and woodwork. The "right thing" or method of framing a table, a sideboard, or chair is never likely to occur to the ordinary manufacturer or designer of these articles. His head is full of the technical methods in use, the "properties" of his craft, beads and reels, mouldings, and other survivals of past styles. He looks through volumes of designs by various schools and makers, modern pattern books in Curtain-road; but he neglects the main question of right and wrong. To tell him that real art is not in these things, but in thinking how he ought to frame to give the utmost convenience with effective strength, how to dress his wood to set off its figure, where he ought to mould or carve, is to undeceive him. It may be only a limited kind of art, the exercise of common sense in handicraft; but it is art all the same, in doing work well. As a matter of fact, the question which weighs with the ordinary craftsman is not How a certain thing should be done, but How it *is* done, and what people look for. They expect a certain class of goods turned out a certain way. If they see a chair that is really comfortable to sit in, and looks plain and straightforward, they pooh-pooh it; but if it follows a pattern of Chippendale or Sheraton, it must be right—so powerful is the influence of conventional tradition. "Peculiar," "stiff," "horribly plain," "a fad," are terms which people of this kind apply to all independent effort to do things in a reasonable and artistic manner, and the only way is to point the maxim as often as possible. In decoration it is just the same: it is not the right thing that is wanted so much, but what looks *chic* to Mr. Brown or Mr. Smith,

who have an immense dislike to anything eccentric or that looks peculiar; and this is the prejudice which the architect has to fight against and try to overcome. It claims attention in politics, theology, opinions about all matters; until the thin crust of prejudice and ignorance is broken through, people will stick to their old ideas, and they will hail the new only when it becomes popular.

Our art schools have been trying to inculcate the same principle of reliance or independent thought, but what they have tried to do with one hand they have rendered abortive with another. How can a student design anything original in ironwork hangings or wall decoration when he has to surfeit his eyes on patterns and conventions of the most stereotyped kind? Nor, if we take the designs awarded medals at the National Competition, do we see that he is encouraged much for any effort in this direction: the youth who can draw and repeat mechanically has the best chance of winning. The general complaint made by examiners shows how little material and appropriateness are considered. Thus, in one subject, designs are made without reference to the material; in another instance, a design for a tablecloth with a border does not indicate that the latter hangs down, indeed the pattern would equally serve the purpose of ridge-cresting; and in other instances folial patterns are upside down, and animals on their heads. Fundamental principles of decoration, whether for wall surfaces, for hangings, for iron and metal, for faïence, never occur to students who have been instructed according to examples, not to have notions.

The only hope for a better state of things will depend on the success which awaits those who are trying to revert to the primary principles of art. A few of the more educated among those who patronise art are beginning to see that good art lies far below the surface; that it extends to good construction, to technical qualities, to materials and workmanship—all of which have to be fashioned by the exercise of common-sense and taste. We have had too much theorising and lecturing to little purpose by men who have only touched the fringe of their subjects—who have entirely missed the main question. The public monuments of our streets, our sculpture, the design of our fountains, our seats, the laying out of open spaces, even our railings, lamps, and lamp-pillars, all show how much we are still under the control of the manufacturer and the commercial designer.

WALLS BELOW BRESSUMMERS.

THE question whether a wall of a building erected in the Metropolis is to be of the statutory thickness below a bressummer which carries the upper part is one of importance to all builders and architects. The facts of a case were reported in our last issue. A builder of Walworth appealed against a notice of objection made by Mr. Ellis Marsland, M.S.A., the district surveyor, having reference to the thickness of the external walls of the basement of a public-house which was being rebuilt at Peckham. The district surveyor claimed that the wall in question should be 17½in. thick for the basement story in accordance with the schedule, it being in his view a wall 43ft. in height. On the contrary, it was contended for the appellant that it was not a basement wall in this sense—that section 56 of the Act which dealt with bressummers showed an entirely different state of things had to be considered where a bressummer was used. It was argued that the wall began with the bressummer, and not with the basement. While the district surveyor said the thickness of the wall had to be regulated by its height taken from the basement; the appellant, on the other hand, contended that the height should be taken from the bressummer. It will be seen the plea set up was a rather plausible one, and sought by reducing the height of wall to reduce its thickness. Indeed, it is such a plea that might occur to any builder. Between the ground-floor level and the bressummer there is practically no wall, it being occupied by the shop-front. Then why make the lower portion of the basement wall so thick? It has no weight on it. But did the Act contemplate this case? The only provision referring to it is section 7 of the First Schedule (preliminary), which runs as follows:—"For the purpose of determining the thickness of a wall, the height of such wall shall be measured from the *base* of the wall to the top of the topmost story, whether such wall is carried to the full height or not; or in case of a gable, when there are no stories on the roof, to half the height of the gable." Now the question occurs, What is the meaning to be attached to the "base of the wall"? Certainly the framers of the Act could have had no other idea than that of the "base" defined in the Act. Turning to which, we read the following definition:—"The expression 'base' applied to a wall means the underside of the course immediately above the footings [if any, or in the case of a wall carried by a bressummer, above such bressummer]." The part within brackets is the new matter in the repealed Act. The framers of the new Act, therefore, had in contemplation a wall carried by a bressummer as well. They, therefore, thought of two bases, but not belonging to the same wall. In the case before the magistrate there was a basement wall 14in. thick, called by the architect "a retaining wall" only, which might be regarded as included in the height of the wall above the bressummer. This is the view the magistrate took. Mr. Hopkins asked "Why a wall is less a wall within the statute because half-way up, it may be, there is a bressummer?" The reply to this was that "Because the height of the wall has to be measured from the base—and the base of the wall in this case was from the bressummer." Here was the point at issue. While the appellant said the basement wall was only a retaining wall, the magistrate held it to be the wall of the building which came under the statute. It was argued, on the other hand, that there cannot be two bases to the same wall—that the basement wall did not go higher than the surface of ground. The magistrate said he was not dealing with anything above the bressummer, but with the wall below, and which carries the bressummer, and upon this ground he dismissed the appeal.

If our readers have followed the argument they will at once see on what ground the magistrate decided for the district surveyor's view. It was, in fact, one wall from the basement to the topmost story; and if there was a large vacant space or shop-front bridged over by a bressummer, it was an accident. The wall had to be measured through the bressummer, and the second base was not considered. And no doubt this is a reasonable view when we consider one possibility, though it did not occur to the parties. Suppose, for instance, the owner of the building one day turns the shop into an office, or a dwelling-house, and builds up with brick the shop-front opening, and removes the bressummer. It would then be one wall from top to bottom. The 14in. basement wall would not be sufficient, or, at least, it would then be clearly contrary to the statutory thickness. Therefore, it is safe to look at the wall of basement as a part of the wall above the bressummer. Section 56 of the Act, relied on by the appellant, which deals with "rules as to bressummers," does not materially alter matters. It merely refers to the bearing of beams of this kind upon piers of brick or stone, or upon story-posts fixed on a solid foundation. If such piers had been brought up independently from such a foundation to carry the bressummer, no doubt the finding would have been different.

One important thing about the case is that it points to a rather debatable subject. The provisions of the Act are certainly wanting in precision. The section we have quoted might have been worded in such a manner as to leave no doubt whatever as to where the height of a wall was to be taken from when a basement wall below a bressummer or shop-front was shown. The question may occur again, Can there be two bases to the same wall? It would be easy for a builder to argue that the base of a wall carried on a girder some feet from the ground is from the girder. Ingenious devices to support walls may be invented which, interpreted by the definition clause of "base," would lead to some trouble. The statutory definition of "base" is ambiguous: it may mean one of two things—either a base above a footing, or a base above a bressummer. It cannot mean both. The schedule of thicknesses applies to the height of wall above a foundation, and therefore it is necessary to take the former meaning. Those who make designs for new buildings or for alterations will do well to bear in mind the decision that has been given. It would be interesting to know positively if any walls had been built, as it was hinted, contrary to this rule, on the understanding that the height in such cases was taken from the bressummer instead of from the basement. There can be little doubt that when the clause (sect. 7 of the first schedule) was framed, the words "measured from the base of the wall, &c.," were intended in every case to mean the base above the foundation, and that any doubt must have arisen from the definition which speaks of another base. The facts as related in the court afford another instance of the very great importance to be attached to definitions in building Acts;—how often they have rendered a section intended to mean a certain thing nugatory.

BRITISH ASSOCIATION OF SCIENCE AT TORONTO.

PRESIDENT'S ADDRESS—ARCHÆOLOGY AS A SCIENCE.

SIR JOHN EVANS, the president, in his address at Toronto, on Wednesday, said: It appears to me that my election to this important post may, in the main, be regarded as a recognition by this association of the value of archæology as a science. Leaving all personal considerations out of question, I gladly hail this recognition, which is, indeed, in full accordance with the attitude already for many years adopted by the association towards anthropology, one of the most important branches of true archæology. It is no doubt hard to define the exact limits which are to be assigned to

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and archæology as a branch of history and belles lettres. It must, however, be acknowledged that a distinction does exist between archæology proper, and what, for want of a better word, may be termed antiquarianism. It may be interesting to know the internal arrangements of a Dominician convent in the middle ages; to distinguish between the different mouldings characteristic of the principal styles of Gothic architecture; to determine whether an English coin bearing the name of Henry was struck under Henry II., Richard, John, or Henry III., or to decide whether some given edifice was erected in Roman, Saxon, or Norman times. But the power to do this, though involving no small degree of detailed knowledge and some acquaintance with scientific methods, can hardly entitle its possessors to be enrolled among the votaries of science. A familiarity with all the details of Greek and Roman mythology and culture must be regarded as a literary rather than a scientific qualification; and yet, when among the records of classical times we come upon traces of manners and customs which have survived for generations, and

which seem to throw some rays of light upon the dim past, when history and writing were unknown, we are, I think, approaching the boundaries of scientific archæology. Every reader of Virgil knows that the Greeks were not merely orators, but that with a pair of compasses they could describe the movements of the heavens and fix the rising of the stars; but when by modern astronomy we can determine the heliacal rising of some well-known star, with which the worship in some given ancient temple is known to have been connected, and can fix its position on the horizon at some particular spot, say, 3,000 years ago, and then find that the axis of the temple is directed exactly towards that spot, we have some trustworthy scientific evidence that the temple in question must have been erected at a date approximately 1,100 years B.C. If on or close to the same site we find that more than one temple was erected, each having a different orientation, these variations, following as they may fairly be presumed to do the changing position of the rising of the dominant star, will also afford a guide as to the chronological order of the different foundations. The researches of Mr. Penrose seem to show that in certain Greek temples, of which the date of foundation is known from history, the actual orientation corresponds with that theoretically deduced from astronomical data. Sir J. Norman Lockyer has shown that what holds good for Greek temples applies to many of far earlier date in Egypt, though up to the present time hardly a sufficient number of accurate observations have been made to justify us in foreseeing all the instructive results that may be expected to arise from astronomy coming to the aid of archæology. The intimate connection of archæology with other sciences is in no case so evident as with respect to geology, for, when considering subjects such as those I shall presently discuss, it is almost impossible to say where the one science ends and the other begins. When we come to discuss that remote age in which we find the earliest traces that are at present known of man's appearance upon earth, the aid of geology and palæontology becomes absolutely imperative. The changes in the surface configuration and in the extent of the land, especially in a country like Britain, as well as the modifications of the fauna and flora since those days, have been such that the archæologist pure and simple is incompetent to deal with them, and he must either himself undertake the study of these other sciences or call experts in them to his assistance. The evidence that man had already appeared upon the earth is afforded by stone implements wrought by his hands, and it falls strictly within the province of the archæologist to judge whether given specimens were so wrought or not; it rests with the geologist to determine their stratigraphical or chronological position, while the palæontologist can pronounce upon the age and character of the associated fauna and flora. If left to himself the archæologist seems too prone to build up theories founded upon form alone, irrespective of geological conditions. The geologist, unaccustomed to archæological details, may readily fail to see the difference between the results of the operations of nature and those of art, and may be liable to trace the effects of man's handiwork in the chipping, bruising, and wearing which in all ages result from natural forces; but the united labours of the two, checked by those of the palæontologist, cannot do otherwise than lead towards sound conclusions. It will, perhaps, be expected of me that I should on the present occasion bring under review the state of our present knowledge with regard to

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and probably no fitter place could be found for the discussion of such a topic than the adopted home of my venerated friend, the late Sir Daniel Wilson, who first introduced the word "prehistoric" into the English language. Some among us may be able to call to mind the excitement, not only among men of science, but among the general public, when, in 1859, the discoveries of M. Boucher de Perthes and Dr. Rigollot in the gravels of the valley of the Somme, at Abbeville and Amiens, were confirmed by the investigations of the late Sir Joseph Prestwich, myself, and others, and the co-existence of man with the extinct animals of the Quaternary fauna, such as the mammoth and woolly-haired rhinoceros, was first virtually established. It was at the same time pointed out that these relics belonged to a far earlier date than the ordinary stone weapons found upon the surface, which usually showed signs of grinding or polishing, and that, in fact, there were two Stone Ages in Britain. To these the terms Neolithic and Palæolithic were subsequently applied by Sir John Lubbock. The excitement was not less, when, at the meeting of this association at Aberdeen in the autumn of that year, Sir Charles Lyell, in the presence of the Prince Consort, called attention to the discoveries in the valley of the Somme, the site of which he had himself visited, and to the vast lapse of time indicated by the position of the implements in drift-deposits 100ft. above the existing river. The conclusions forced upon those who examined the facts on the spot did not receive immediate acceptance by all who were interested in geology and archæology, and fierce were the controversies on the subject that were carried on both in the newspapers and before various learned societies. It is at the same time instructive and amusing to look back on the discussions of those days. While one class of objectors accounted for the configuration of the flint implements from the gravels by some unknown chemical agency, by the violent and continued gyratory action of water, by fracture resulting from pressure, by rapid cooling when hot or by rapid heating when cold, or even regarded them as aberrant forms of fossil fishes, there were others who, when compelled to acknowledge that the implements were the work of men's hands, attempted to impugn and set aside the evidence as to the circumstances under which they had been discovered. In doing this they adopted the view that the worked flints had either been introduced into the containing beds at a comparatively recent date, or, if they actually formed constituent parts of the gravel, then that this was a mere modern alluvium resulting from floods at no very remote period. In the course of a few years the main stream of scientific thought left this controversy behind, though a tendency to cut down the lapse of time necessary for all the changes that have taken place in the configuration of the surface of the earth and in the character of its occupants since the time of the palæolithic gravels, still survives in the inmost recesses of the hearts of not a few observers. In his address to this association at the Bath meeting of 1864, Sir Charles Lyell struck so true a note that I am tempted to reproduce the paragraph to which I refer:—"When speculations on the long series of events which occurred in the Glacial and post-Glacial periods are indulged in, the imagination is apt to take alarm at the immensity of the time required to interpret the monuments of these ages, all referable to the era of existing species. In order to abridge the number of centuries which would otherwise be indispensable, a disposition is shown by many to magnify the rate of change in prehistoric times by investing the causes which have modified the animate and inanimate world with extraordinary and excessive energy. It is related of a great Irish orator of our day that when he was about to contribute somewhat parsimoniously towards a public charity he was persuaded by a friend to make a more liberal donation. In doing so he apologised for his apparent want of generosity by saying that his early life had been a constant struggle with scanty means, and that 'they who are born to affluence cannot easily imagine how long a time it takes to get the chill of poverty out of one's bones.' In like manner, we of the living generation, when called upon to make grants of thousands of centuries in order to explain the events of what is called the modern period, shrink naturally at first from making what seems so lavish an expenditure of past time. Throughout our early education we have been accustomed to such strict economy in all that relates to the chronology of the earth and its inhabitants in remote ages, so fettered have we been by old traditional beliefs that, even when our reason is convinced, and we are persuaded that we ought to make more liberal grants of time to the geologist, we feel how hard it is to get the chill of poverty out of our bones." Many, however, have at the present day got over this feeling, and of late years the general tendency of those engaged upon the question of the antiquity of the human race has been in the direction of seeking for evidence by which the existence of man upon the earth could be carried back to a date earlier than that of the Quaternary gravels. There is little doubt that such evidence will eventually be forthcoming; but, judging from all probability, it is not in Northern Europe that the cradle of the human race will eventually be discovered; but, in some part of the world more favoured by a Tropical climate, where abundant means of subsistence could be procured, and where the necessity for warm clothing did not exist. Before entering into speculations on this subject, or attempting to lay down the limits within which we may safely accept recent discoveries as firmly established, it will be well to glance at some of the cases in which implements are stated to have been found under circumstances which raise a presumption of the existence of man in pre-Glacial, Pliocene, or even Miocene times. Flint implements of ordinary Palæolithic type have, for instance, been recorded as found in the Eastern Counties of England, in beds beneath the chalky boulder clay; but, on careful examination the geological evidence has not to my mind proved satisfactory, nor has it, I believe, been generally accepted. Moreover, the archæological difficulty that man, at two such remote epochs as the pre-Glacial and the post-Glacial, even if the term glacial be limited to the chalky boulder clay, should have manufactured implements so identical in character that they cannot be distinguished apart, seems to have been entirely ignored. Within the last few months we had the report of worked flints having been discovered in the Late Pliocene forest bed of Norfolk; but in that instance the signs of human workmanship upon the flints are by no means apparent to all observers. But such an antiquity as that of the forest bed is as nothing when compared with that which would be implied by the discoveries of the work of men's hands in the Pliocene and Miocene beds of England, France, Italy, and Portugal, which have been accepted by some geologists. There is one feature in these cases which has hardly received due attention, and that is the isolated character of the reputed discoveries. Had man, for instance, been present in Britain during the Crag period, it would be strange indeed if the sole traces of his existence that he left were a perforated tooth of a large shark, the sawn rib of a manatee, and a beaming full face, carved on the shell of a pectunculus. In an address to the Anthropological section at the Leeds meeting of the Association in 1890 I dealt somewhat fully with these supposed discoveries of the remains of human art in beds of Tertiary date; and I need not here go further into the the question. Suffice it to say that I see no reason why the verdict of "Not proven" at which I then arrived should be reversed. In the case of a more recent discovery in Upper Burma in beds at first pronounced to be Upper Miocene, but subsequently "definitely ascertained to be Pliocene," some of the flints are of purely natural and not artificial origin, so that two questions arise:—1st, Were the fossil remains associated with the worked flints or with those of natural forms? And second, Were they actually found in the bed to which they have been assigned, or did they merely lie together on the surface? Even the *Pithecanthropus erectus* of Dr. Eugène Dubois from Java meets with some incredulous objectors from both the physiological and the geological sides. From the point of view of the latter the difficulty lies in determining the exact age of what are apparently alluvial beds in the bottom of a river valley. When we return to Palæolithic man, it is satisfactory to feel that we are treading on comparatively secure ground, and that the discoveries of the last forty years in Britain alone enable us to a great extent to reconstitute his history. We may not know the exact geological period when first he settled in the British area, but we have good evidence that he occupied it at a time when the configuration of the surface was entirely different from what it is at present; when the river valleys had not been cut down to anything like their existing depth, when the fauna of the country was of a totally different character from that of the present day, when the extension of the southern part of the island seaward was in places such that the land was continuous with that of the continent, and when in all probability a far more rainy climate prevailed. We have proofs of the occupation of the country by man during the long lapse of time that was necessary for the excavation of the river valleys. We have found the old floors on which his habitations were fixed, we have been able to trace him at work on the manufacture of flint instruments, and by building up the one upon the other the flakes struck off by the primæval workman in those remote times we have been able to reconstruct the blocks of flint which served as his material. That the duration of

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must have extended over an almost incredible length of time is sufficiently proved by the fact

that valleys, some miles in width and of a depth of from 100 to 150ft., have been eroded since the deposit of the earliest implement-bearing beds. Nor is the apparent duration of this period diminished by the consideration that the floods which hollowed out the valleys were not in all probability of such frequent occurrence as to teach Palæolithic man by experience the danger of settling too near to the streams, for had he kept to the higher slopes of the valley there would have been but little chance of his implements having so constantly formed constituent parts of the gravels deposited by the floods. The examination of British cave-deposits affords corroborative evidence of this extended duration of the Palæolithic Period. In Kent's cavern at Torquay, for instance, we find in the lowest deposit, the breccia below the red cave-earth, implements of flint and chert corresponding in all respects with those of the high level and most ancient river gravels. In the cave-earth these are scarcer, though implements occur which also have their analogues in the river deposits; but, what is more remarkable, harpoons of reindeer's horn and needles of bone are present, identical in form and character with those of the caverns of the Reindeer Period in the South of France, and suggestive of some bond of union or identity of descent between the early troglodytes, whose habitations were geographically so widely separated the one from the other. In a cavern at Cresswell Crags on the confines of Derbyshire and Nottinghamshire, a bone has moreover been found engraved with a representation of parts of a horse in precisely the same style as the engraved bones of the French caves. It is uncertain whether any of the River-drift specimens belong to so late a date as these artistic cavern-remains; but the greatly superior antiquity of even these to any Neolithic relic is testified by the thick layer of stalagmite, which had been deposited in Kent's Cavern before its occupation by men of the Neolithic and Bronze Periods. Towards the close of the period covered by the human occupation of the French caves, there seems to have been a dwindling in the number of the larger animals constituting the Quaternary fauna, whereas their remains are present in abundance in the lower, and therefore more recent, of the valley gravels. This circumstance may afford an argument in favour of regarding the period represented by the later French caves as a continuation of that during which the old river gravels were deposited, and yet the great change in the fauna that has taken place since the latest of the cave-deposits included in the Palæolithic Period is indicative of an immense lapse of time. How much greater must have been the time required for the more conspicuous change between the old Quaternary fauna of the river gravels and that characteristic of the Neolithic Period! As has been pointed out by Professor Boyd Dawkins, only thirty-one out of the forty-eight well-ascertained species living in the post-Glacial or River-drift Period survived into prehistoric or Neolithic times. We have not, indeed, any means at command for estimating the number of centuries which such an important change indicates; but when we remember that the date of the commencement of the Neolithic or Surface Stone Period is still shrouded in the mist of a dim antiquity, and that prior to that commencement the River-drift Period had long come to an end; and when we further take into account the almost inconceivable ages that, even under the most favourable conditions, the excavation of wide and deep valleys by river action implies, the remoteness of the date at which the Palæolithic Period had its beginning almost transcends our powers of imagination. We find distinct traces of river action from 100ft. to 200ft. above the level of existing streams and rivers, and sometimes at a great distance from them; we observe old fresh-water deposits on the slopes of valleys several miles in width; we find that long and lofty escarpments of rock have receded unknown distances since their summits were first occupied by Palæolithic man; we see that the whole side of a wide river-valley has been carried away by an invasion of the sea, which attacked and removed a barrier of chalk cliffs from 400ft. to 600ft. in height; we find that what was formerly an inland river has been widened out into an arm of the sea, now the highway of our fleets; and that gravels which were originally deposited in the bed of some ancient river now cap isolated and lofty hills. And yet, remote as the date of the first known occupation of Britain by man may be, it belongs to what, geologically speaking, must be regarded as a quite recent period, for we are now in a position to fix, with some degree of accuracy, its place on the geological scale. Thanks to investigations ably carried out at Hoxne in Suffolk, and at Hitchin in Hertfordshire, by Mr. Clement Reid, under the auspices of this Association and of the Royal Society, we know that the implement-bearing beds at those places undoubtedly belong to a time subsequent to the deposit of the great chalky boulder clay of the Eastern Counties of England. It is, of course, self-evident that this vast deposit, in whatever manner it may have been formed, could not, for centuries after its deposition was complete, have presented a surface inhabitable by man. Moreover, at a distance but little farther north, beds exist which also, though at a somewhat later date, were apparently formed under Glacial conditions. At Hoxne, the interval between the deposit of the boulder clay and of the implement-bearing beds is distinctly proved to have witnessed at least two noteworthy changes in climate. The beds immediately reposing on the clay are characterised by the presence of alder in abundance, of hazel, and yew, as well as by that of numerous flowering plants indicative of a temperate climate very different from that under which the boulder clay itself was formed. Above these beds, characterised by temperate plants, comes a thick and more recent series of strata, in which leaves of the dwarf Arctic willow and birch abound, and which were in all probability deposited under conditions like those of the cold regions of Siberia and North America. At a higher level and of more recent date than these—from which they are entirely distinct—are the beds containing Palæolithic implements, formed in all probability under conditions not essentially different from those of the present day. However this may be, we have now conclusive evidence that the Palæolithic implements are, in the Eastern Counties of England, of a date long posterior to that of the great chalky boulder clay. It may be said, and said truly, that the implements at Hoxne cannot be shown to belong to the beginning rather than to some later stage of the Palæolithic Period. The changes, however, that have taken place at Hoxne in the surface configuration of the country prove that the beds containing the implements cannot belong to the close of that period. It must, moreover, be remembered that in what are probably the earliest of the Palæolithic deposits of the Eastern Counties, those at the highest level, near Brandon in Norfolk, where the gravels contain the largest proportion of pebbles derived from glacial beds, some of the implements themselves have been manufactured from materials not native to the spot, but brought from a distance, and derived in all probability either from the boulder clay or from some of the beds associated with it. We must, however, take a wider view of the whole question, for it must not for a moment be supposed that there are the slightest grounds for believing that the civilisation, such as it was, of the Palæolithic Period originated in the British Isles. We find in other countries implements so identical in form and character with British specimens, that they might have been manufactured by the same hands. These occur over large areas in France under similar conditions to those that prevail in England. The same forms have been discovered in the ancient river-gravels of Italy, Spain, and Portugal. Some few have been recorded from the north of Africa, and analogous types occur in considerable numbers in the south of that continent. On the banks of the Nile, many hundreds of feet above its present level, implements of the European types have been discovered; while in Somaliland, in an ancient river valley at a great elevation above the sea, Mr. Seton-Karr has collected a large number of implements formed of flint and quartzite, which, judging from their form and character, might have been dug out of the drift deposits of the Somme or the Seine, the Thames or the ancient Solent. In the valley of the Euphrates implements of the same kind have also been found, and again farther east in the lateritic deposits of Southern India they have been obtained in considerable numbers. It is not a little remarkable, and is at the same time highly suggestive, that a form of implement almost peculiar to Madras reappears among implements from the very ancient gravels of the Manzanares at Madrid. In the case of the African discoveries we have as yet no definite Palæontological evidence by which to fix their antiquity, but in the Narbadá Valley of Western India Palæolithic implements of quartzite seem to be associated with a local fauna of Pleistocene age, comprising, like that of Europe, the elephant, hippopotamus, ox, and other mammals of species now extinct. A correlation of the two faunas with a view of ascertaining their chronological relations is beset with many difficulties, but there seems reason for accepting this Indian Pleistocene fauna as in some degree more ancient than the European. Is this not a case in which the imagination may be fairly invoked in aid of science? May we not from these data attempt in some degree to build up and reconstruct the early history of the human family? There, in Eastern Asia, in a tropical climate, with the means of subsistence readily at hand, may we not picture to ourselves our earliest ancestors gradually developing from a lowly origin, acquiring a taste for hunting, if not, indeed, being driven to protect themselves from the beasts around them, and evolving the more complicated forms of tools or weapons from the simpler flakes which had previously served them as knives? May we not imagine that, when once the stage of civilisation denoted by these Palæolithic implements had been reached, the game for the hunter became scarcer, and that his life in consequence assumed a more nomad character? Then—and possibly not till then—may a series of migrations to "fresh woods and pastures new" not unnaturally have ensued, and these following the usual course of "westward towards the setting sun," might eventually lead to a Palæolithic population finding its way to the extreme borders of Western Europe, where we find such numerous traces of its presence. How long a term of years may be involved in such a migration it is impossible to say; but that such a migration took place the phenomena seem to justify us in believing. It can hardly be supposed that the process that I have shadowed forth was reversed, and that man, having originated in North-Western Europe, in a cold climate where clothing was necessary and food scarce, subsequently migrated eastward to India, and southward to the Cape of Good Hope! As yet, our records of discoveries in India and Eastern Asia are but scanty; but it is there that the traces of the cradle of the human race are, in my opinion, to be sought, and possibly future discoveries may place upon a more solid foundation the visionary structure that I have ventured to erect. It may be thought that my hypothesis does not do justice to what Sir Thomas Browne has so happily termed "that great antiquity, America." I am, however, not here immediately concerned with the important Neolithic remains of all kinds with which this great continent abounds. I am now confining myself to the question of Palæolithic man and his origin, and in considering it I am not unmindful of the Trenton implements, though I must content myself by saying that the "turtle-back" form is essentially different from the majority of those on the wide dissemination of which I have been speculating, and, moreover, as many here present are aware, the circumstances of the finding of these American implements are still under careful discussion. Leaving them out of the question for the present, it may be thought worth while to carry our speculations rather further, and to consider the relations in time between the Palæolithic and the Neolithic periods. We have seen that the stage in human civilisation denoted by the use of the ordinary forms of Palæolithic implements must have extended over a vast period of time if we have to allow for the migration of the primæval hunters from their original home, wherever it may have been in Asia or Africa, to the west of Europe, including Britain. We have seen that, during this migration, the forms of the weapons and tools made from silicious stones had become, as it were, stereotyped, and further, that, during the subsequent extended period implied by the erosion of the valleys, the modifications in the form of the implements and the changes in the fauna associated with the men who used them were but slight. At the close of the period during which the valleys were being eroded comes that represented by the latest occupation of the caves by Palæolithic man, when both in Britain and in the south of France the reindeer was abundant; but among the stone weapons and implements of that long troglodytic phase of man's history not a single example with the edge sharpened by grinding has as yet been found. All that can safely be said is that the larger implements as well as the larger mammals had become scarcer, that greater power in

chipping flint had been attained, that the arts of the engraver and the sculptor had considerably developed, and that the use of the bow had probably been discovered. Directly we encounter the relics of the Neolithic Period, often, in the case of the caves lately mentioned, separated from the earlier remains by a thick layer of underlying stalagmite, we find flint hatchets polished at the edge and on the surface, cutting at the broad and not at the narrow end, and other forms of implements associated with a fauna in all essential respects identical with that of the present day. Were the makers of these polished weapons the direct descendants of Palæolithic ancestors whose occupation of the country was continuous from the days of the old river gravels? or had these long since died out, so that after Western Europe had for ages remained uninhabited, it was repeopled in Neolithic times by the immigration of some new race of men? Was there, in fact, a "great gulf fixed" between the two occupations? or was there in Europe a gradual transition from the one stage of culture to the other? So far as I know we have as yet no trustworthy evidence of any transition from the one age to the other, and the gulf between them remains practically unbridged. We can, indeed, hardly name the part of the world in which to seek for the cradle of Neolithic civilisation, though we know that traces of what appear to have been a stone-using people have been discovered in Egypt, and that what must be among the latest of the relics of their industry have been assigned to a date some 3,500 to 4,000 years before our era. The men of that time had attained to the highest degree of skill in working flint that has ever been reached. Their beautifully-made knives and spear-heads seem indicative of a culminating point reached after long ages of experience; but whence these artists in flint came or who they were is at present absolutely unknown, and their handiworks afford no clue to help us in tracing theirorigin. Taking a wider survey, we may say that, generally speaking, not only the fauna but the surface configuration of the country were, in Western Europe at all events, much the same at the commencement of the Neolithic Period as they are at the present day. We have, too, no geological indications to aid us in forming any chronological scale. The occupation of some of the caves in the South of France seems to have been carried on after the erosion of the neighbouring river valleys had ceased, and so far as our knowledge goes, these caves offer evidence of being the latest in time of those occupied by man during the Palæolithic period. It seems barely possible that, though in the North of Europe there are no distinct signs of such late occupation, yet that, in the South, man may have lived on, though in diminished numbers; and that in some of the caves, such, for instance, as those in the neighbourhood of Mentone, there may be traces of his existence during the transitional period that connects the Palæolithic and Neolithic Ages. If this were really the case, we might expect to find some traces of a dissemination of Neolithic culture from a North Italian centre; but I much doubt whether any such traces actually exist. If it had been in that part of the world that the transition took place, how are we to account for the abundance of polished stone hatchets found in Central India? Did Neolithic man return eastward by the same route as that by which, in remote ages, his Palæolithic predecessor had migrated westward? Would it not be in defiance of all probability to answer such a question in the affirmative? We have, it must be confessed, nothing of a substantial character to guide us in these speculations; but, pending the advent of evidence to the contrary, we may, I think, provisionally adopt the view that owing to failure of food, climatal changes, or other causes, the occupation of Western Europe by Palæolithic man absolutely ceased, and that it was not until after an interval of long duration that Europe was re-peopled by a race of men immigrating from some other part of the globe where the human race had survived, and in course of ages had developed a higher stage of culture than that of Palæolithic man. I have been carried away by the liberty allowed for conjecture into the regions of pure imagination, and must now return to the realms of fact, and one fact on which I desire for a short time to insist is that of the existence at the present day, in close juxtaposition with our own civilisation, of races of men, who, at all events but a few generations ago, lived under much the same conditions as did our own Neolithic predecessors in Europe. The manners and customs of these primitive tribes and peoples are changing day by day: their languages are becoming obsolete, their myths and traditions are dying out, their ancient processes of manufacture are falling into oblivion, and their numbers are rapidly diminishing, so that it seems inevitable that ere long many of these interesting populations will become absolutely extinct.

LONDON BOARD SCHOOL BUILDINGS.

THE annual report of the Works Committee of the London School Board gives an abstract of the work done during the year ended March 25. The committee, after referring to the acquisition of 10 sites for new schools and additional land for 46 existing schools with regard to which compulsory powers were obtained in 1895-96, report that in the past year it had been decided to schedule 20 sites for new schools and additional land for enlarging 25 existing schools or playgrounds or for the purpose of carrying out general improvements. In some cases, however, the sites and the land had since been omitted from the schedule. During the year the Board agreed to purchase various interests in sites, at a cost of £116,561 13s., the surveyors' fees amounting to £659 19s. 6d. The value of all the sites purchased or agreed to be purchased previous to March last was £3,222,412, and the costs £430,621. According to a table prepared by the finance department, the cost of the sites for 325 schools, the accounts for which had been completed at September 29, 1896, was £6 11s. 10d. per child, and the average cost per head of the school buildings was £13 14s. 1d., and of the furniture and fittings 10s. 7d. Up to Lady Day, 1896, the total number of permanent schools which had been erected and opened was 409; and during the year under review nine additional schools and 15 enlargements were opened. The nine new schools were erected—one in Finsbury, one in Greenwich, one in Hackney, one in East Lambeth, two in West Lambeth, one in Southwark, and two in Tower Hamlets. The total accommodation provided was for 8,072 children, and the cost of sites, buildings, and furniture was set down at £237,875 12s. 6d., or an average cost per head of £29 9s. 4d. The enlargements were carried out in Chelsea, Greenwich, Hackney, East Lambeth, West Lambeth, Southwark, and Tower Hamlets. They provided additional accommodation for 4,761 children at a cost of £98,787, or an average cost per head of £20 14s. 11d. Loans were authorised by the Education Department in respect of the nine new schools and sites amounting to £239,527, and on account of the 15 enlargements and sites amounting to £131,202.

As to future provision of schools, tenders were accepted during the year for erecting nine new schools—one in Chelsea, two in Finsbury, two in Hackney, two in West Lambeth, one in Marylebone, and one in Westminster—giving accommodation for 9,968 children, at a cost of £170,936, or £17 2s. 11d. average cost per head. Tenders were also accepted for eight enlargements—one in Greenwich, one in East Lambeth, one in West Lambeth, two in Southwark, and three in Tower Hamlets—to accommodate 2,696 children at a cost of £69,832, or £25 18s. per head. With regard to the new schools, each will be provided with a hall for each department, which was not counted in the accommodation of the school, and the tenders included the provision of centres for cookery, laundry, manual training, or special instruction, and in eight cases a drawing classroom. As to the enlargements, the variation in cost arose mainly from the fact that in enlarging the buildings the opportunity was taken to improve the existing schools so as to make them thoroughly efficient, and in some cases centres were added. Tenders had also been accepted for providing 12 cookery centres, 14 laundry centres, 18 manual training centres, seven schools for special instruction, rooms for upper standards at three existing schools, extending a chemical laboratory, providing covered playgrounds at three schools, carrying out drainage and sanitary works to 29 schools, and for other works. The total amount of the tenders for sanitary work at 24 of these schools was £32,398.

In their last report it was stated that the committee were considering the whole question as to the cost of the schools and that they had appointed a sub-committee to consider the subject. This committee recommended, with the view of reducing the cost, that, among other things, the Board should revert to the old specification in force in 1885-86 for the next six schools, subject to certain modifications; and the Board had sanctioned the experiment. Among the other works referred to, the committee state that the proposed deaf institution at Anerley, for which a tender had been accepted for £38,920, had been abandoned because the Education Department had declined to approve of the plans. The industrial school for girls at Isleworth would soon be ready for occupation. Homerton Training College had been purchased and would be used for temporary school accommodation and for the provision of various centres. During the year, 132 schools had been painted or cleaned inside or out. The system of carrying out repairs to buildings by workmen employed direct by the Board was being continued in nine of the 18 districts of the clerks of works for repairs, the total number of men so employed being 49. On the subject of rates of wages paid by contractors, the report clause was now inserted providing that where the London scale of wages applied the contractor should pay to the workmen not less than the rate of wages from time to time mutually agreed upon by the Central Association of Master Builders of London and the representatives of the men's unions, the agreed rate of wages at present recognised being set out in the schedule. In other districts where the London scale of wages did not apply the clause provided that the contractor should pay not less than the minimum standard of wages which might for the time be usual.

At Lady Day last the following amount of school accommodation was in course of provision:—Eighteen schools were being erected, providing accommodation for 19,013 children, and nine enlargements, giving accommodation for 3,521 children. Thirty-two additional sites for new schools had been or were to be purchased. The schools to be erected on 20 of these sites would provide accommodation for 17,920 children, and in the case of the other 12 the accommodation had not been determined. Ten new sites for schools had been scheduled, and the schools to be erected on five of them would give accommodation for 4,185. Twenty-four enlargements had been sanctioned for 8,075 children; and the Education Department had also sanctioned the provision of sites, which would be scheduled next session, in five districts.

THE PARTHENON.

RESTORERS have been at work on the Parthenon, much to the dismay, we should think, of all who denounce restoration as destruction or substitution. A correspondent in the *Times* describes the condition of this unique edifice, from which it appears that the structure has been obscured of late by a huge scaffolding at the western end, and that "certain rotten and broken architrave blocks have been removed and replaced with fresh blocks." "What vandalism!" we imagine some will exclaim—"a rebuilding piece by piece of the great temple reared by Ictinus and Phidias!" It does indeed seem a little ironical that we should have to substitute new for old stones with the object of preservation. But something must be done if we want to prevent the destruction of so priceless a treasure of great historical value to all time. Earthquakes have threatened the ruin, and it is necessary to shore up or repair the mischief already done. The work undertaken is to replace decayed blocks, and to secure the whole entablature against future seismic disturbances. We are told that the "interior stones of the entablature are rotten throughout," and these stones were broken by the late earthquakes, though they still hang together. Only the exterior stones of the epistyle are sound, and the inference is that the builders used the softer marble on the inside, as we should have done. The epistylum or architrave consists of three blocks of marble side by side, which stand on their edges and span the space of each intercolumn. The new inside Pentelican marble blocks are oiled and waxed to tone down their whiteness. To preserve the unsurpassed frieze and its world-renowned sculpture should be the main effort of all restoration; we mean, to preserve the work of Phidias, not a copy of it. We are informed the process of decay, due to age and other causes, has seriously impaired the beauty of the reliefs, and it certainly appears preferable that the entire frieze should be taken down and carefully preserved in a museum, than that it should

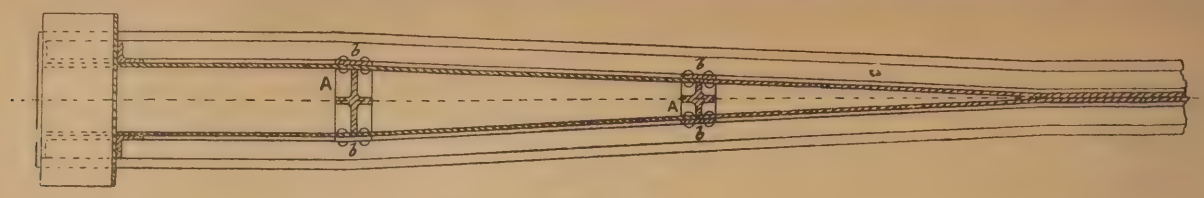


Fig. 165.

be allowed gradually to decay in position. The thought of severance and dissociation is certainly a cruel thing to contemplate; but the question is, Is it not better than the certain destruction that awaits it from natural decay and earthquakes? A modelled frieze or a copy of the original, it is suggested by the correspondent, could be substituted on the ruin. But we hope these reports are not so serious as they make out. Every lover of the Parthenon would be shocked to hear of any intention to remove so valuable a sculpture, which gives life and beauty to the whole structure, and makes it an historical record of priceless value. Other and more feasible plans are proposed, such as the roofing over of the ruin, which, however it may spoil the appearance, seems to be one of the most judicious modes of preserving the structure from the destructive agencies of moisture. In our issue of the 21st of May last, p. 729, we reported the lucid description given by Mr. F. C. Penrose, F.R.S., to the Royal Institute of British Architects of the measures which he, in conjunction with Professor Dürm, of Carlsruhe, and M. Lucien Magne, of Paris, had recommended the Greek Government to take for preserving the remains of the Parthenon. Associated with the members of the Athens Archæological Society was Dr. Dörpfeld, a great authority on the subject. Mr. Penrose, in his paper to which we have referred, points to the instability of the angles of the pediments, owing to the great weight of the overhanging stones; but he said that no further injury had occurred to the western pediment, or to the posticum behind since his previous examination half a century ago. The most damaged portion was the hexastyle portico of this posticum, and at least five of the architrave stones, which are 13ft. 9in. long, would have to be replaced. Only four of the columns of this part are free; the other two are imbedded in the masonry of a Turkish minaret. Those who wish to see what was actually recommended will do well to read Mr. Penrose's paper. That gentleman describes minutely the position of the stones above the architrave which back and range in level with the Panathenaic frieze, which are cracked, and he attributes this damage chiefly to fire and to the earthquake of 1894.

WROUGHT-IRON AND STEEL IN CONSTRUCTIONAL WORK.—XXVII.

In roof-work, lightness, both in weight and appearance, consistently with the strength demanded, has to be considered. When roofs are built of iron or steel girders, these are, generally, even though shallow, of the lattice type.

The roof of the Central Station, Liverpool, in

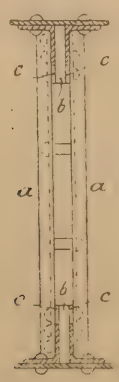


Fig. 164.

common with many others, has both principals, bracing-rafters, and purlins constructed thus. The main arched ribs or principals afford a good example of construction in wrought iron; they are so designed that they are capable of sustaining the load of the roof without the use of ties. Ties are employed, however, for harmony of appearance and as a stand-by. Though the roof is made of wrought iron mainly, and was built about 23 years ago, the lattice work of the purlins and bracing-rafters gives the whole an appearance of much lightness.

A sectional view of the principals is given in

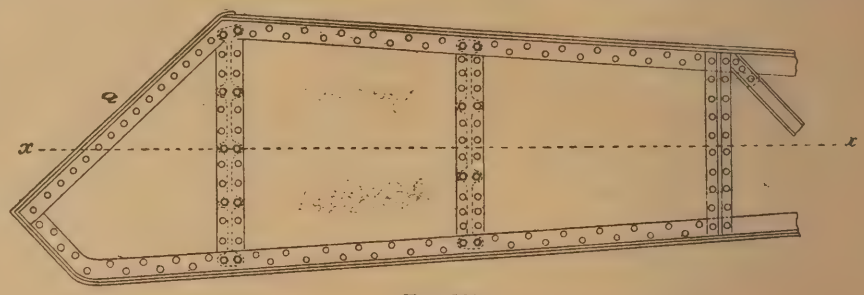


Fig. 166.

Fig. 164; they are formed of top and bottom plates and angles, and with bracings of channel iron singly triangulated. The flanges are made of plates 1ft. wide by $\frac{15}{16}$in. thick; to each flange, two angle-irons, 4in. by 5in., of varying thicknesses, are riveted. The diagonal channel-irons *a a* are in pairs, placed back to back, but are kept 1in. apart, with a view to afford increased lateral stiffness, ferrule packings 1in. thick maintaining the distance correctly; they connect the flanges

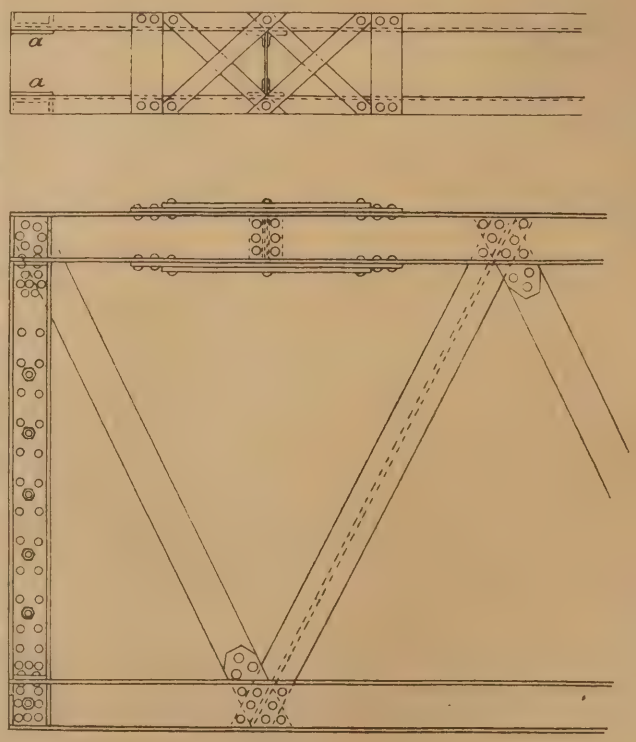


Fig. 167.

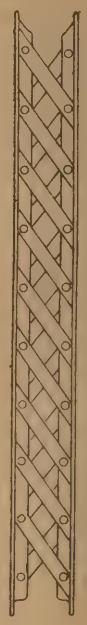


Fig. 168.

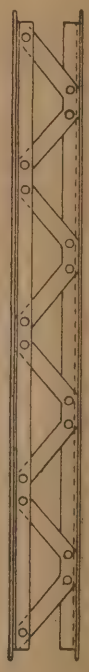


Fig. 175.

by a system of single triangulation, and are riveted through connecting-plates, *b*, between, and packings, *c*, beyond the angles, the latter being of the same thickness as the angles. The principals are 3ft. 9in. deep, excepting near the ends, where the depth increases. In order to afford increased lateral stability at the springings, the ribs, 1ft. wide elsewhere, are enlarged to 2ft. wide at the bases, where they abut upon the supports, Fig. 165, and these portions are plated and connected with distance-castings bolted between the plates. Fig. 166 shows an elevation of the plated ends to the commencement of the channel-bracings, the end *a* being perpendicular; and Fig. 165 is a section through Fig. 166 in the plane *x x*. A A, Fig. 165, are the cast-iron distance-pieces bolted between the plates, seen also dotted in elevation in Fig. 166. The web-plates are jointed here also, and *b b*, *b b* are cover strips riveted over the joints. This is illustrative of a usual method of increasing the stability of long, light, curved roof principals at their abutments without adding much to the total weight.

A cheap method of building a light Warren girder is illustrated in Fig. 167. These girders were built in 80ft. spans for the Antofagasta Railway viaduct in Bolivia, over the River Loa; both top and bottom booms, which measure 7ft. 11in. from centre to centre, are constructed of channel-irons, 10in. by 3in., placed back to back, at a distance of 1ft. 2in. between. The ties are flat bars, 7in. by $\frac{7}{16}$in. at the ends, diminishing towards the centre, and the struts are each formed of a pair of tee-irons of various dimensions, connected with diagonal bracing, Fig. 168; this is a cheap form for moderate spans, saving a large amount of riveting. Gussets are not used, but the ties are riveted to the channels

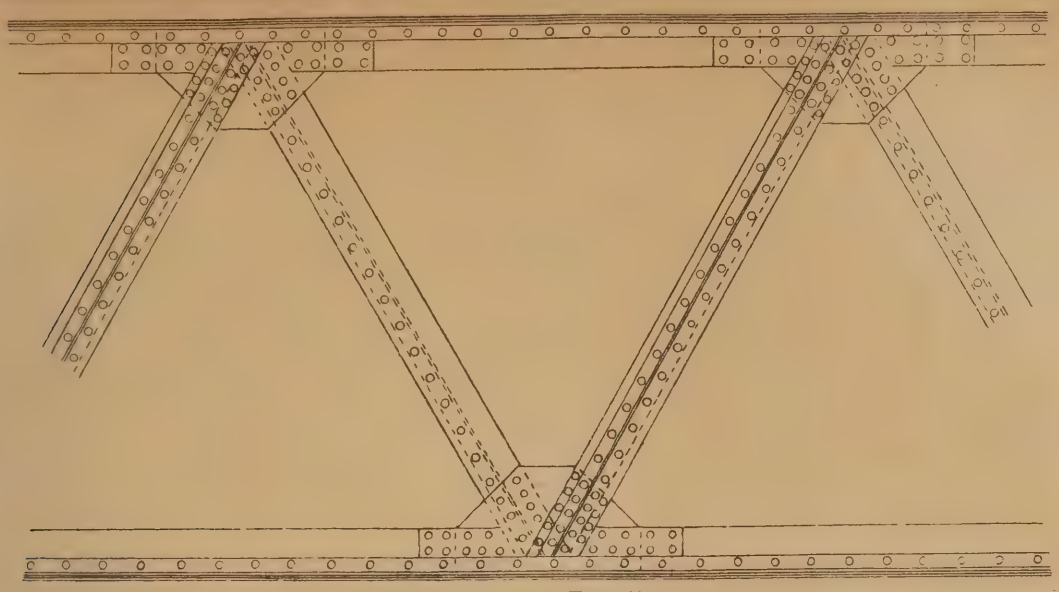


Fig. 169.

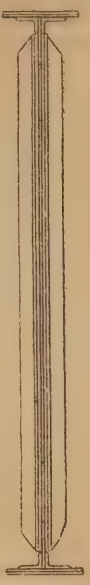
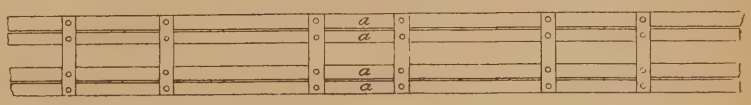


Fig. 170.

Fig. 174.



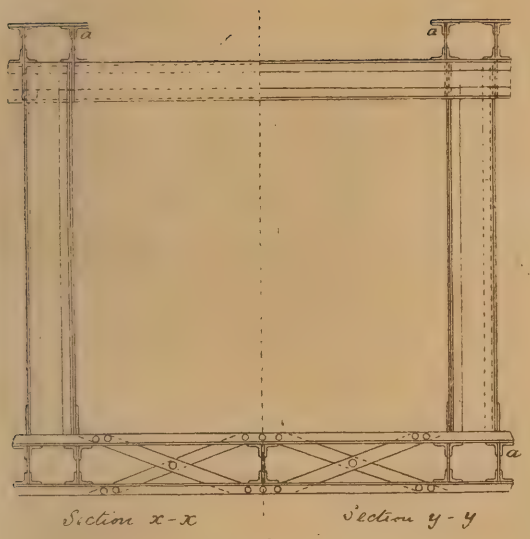


Fig. 173.

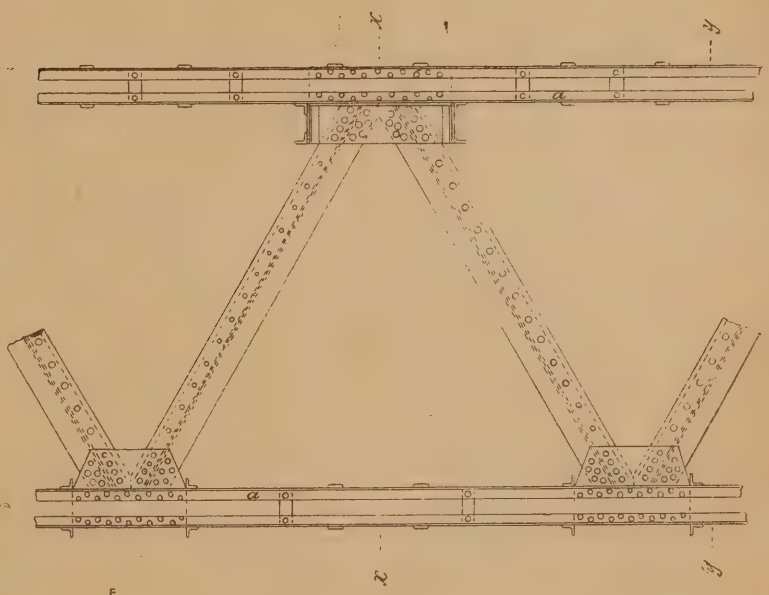


Fig. 172.

through thickening-plates, which put the rivets passing through the channel-irons into double shear. The plan-view above, Fig. 167, shows how the channels are connected with cross and diagonal bracing; the end-posts are also formed of channels, stiffened with plates *a a* at the backs, riveted and bolted through.

Figs. 169, 170 illustrate a portion of a Warren girder, in which struts and ties are each formed of bars and angle. The difference between the two is that the struts have angles on opposite sides of the bar, and the ties have one angle only on one side. The double angles pass along each face of the gussets (compare with the sectional view, Fig. 170), and this puts the rivets into double shear at those sections; the gussets pass between the angles, and the bracings lie directly upon the gussets. This involves the breaking-off of the vertical webs short of the gussets, and cover-plates make a joint between the two.

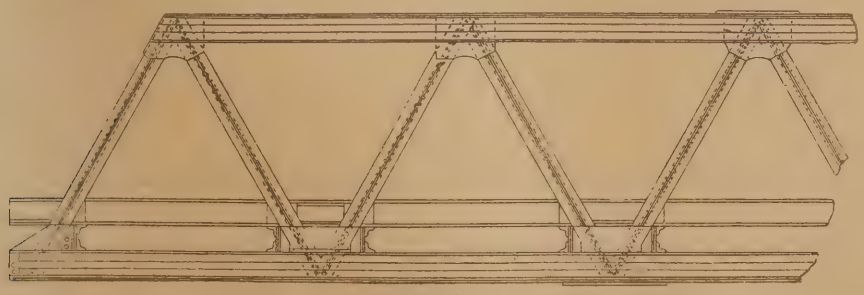


Fig. 171.

Another method of building up a Warren girder is shown in Fig. 171. Here trough girders, built of plate and angle, are used for top and bottom booms; this is a girder of 126ft. 6in. span, used for the Salado Bridge, the depth being about 10ft. The bracings fit within the side webs of the trough girders, being riveted to gussets riveted to the web; each bracing member is formed of four angles, two on each side, connected by diagonal bracings of the same type as that in the girder elevation. The figure also shows the attachment of the cross girders, and of the rail girders above the cross girders. Details of the methods by which connections between main elements are made, will, however, be illustrated in a subsequent stage.

Figs. 172-174 show the building up of Warren girders to form the spans of a light iron railway bridge over the Nerbudda River, for the Indian State Railways. The booms are formed of angles, eight in each boom, maintained at the required intervals apart by means of packing-pieces and covering bars, thus employing little material, and leaving every part open to inspection. The triangular bracing is built of plate and angle near the ends and lattice-braced, Fig. 175, towards the centre of the spans. Short single gussets, ⅜in. thick, riveted between

the vertical angles receive the riveting of the diagonals, 1in. rivets being used. The main girders are connected by transverse girders at top and bottom; those at top being plated, those at the bottom being lattice-braced, Fig. 173. The roadway is carried by rail girders on the top—not shown—which are riveted with gusset-plates to the transverse plated girders. The method of building up the booms in these figures would not be followed in a long-span heavy bridge. The continuous plating of the top boom, illustrated in most of the previous examples, would be necessary for safety; or broad plating, alternating with lattice-bracing, would occupy an intermediate type. Only in this way could the severe compressive forces be resisted. J. H.

CLEANING IRON BRIDGES BY THE SAND-BLAST.

THE external condition of some of the public road-bridges over the Thames, within the jurisdiction of the Metropolitan authorities, is not a credit to the custodians of our own *Ponts et Chaussées*, nor does it favourably impress foreigners and visitors. Old Southwark and equally old—to within a few years—Vauxhall Bridge, together with that more modern monstrosity at Lambeth, cannot be said to be ornaments to the noble stream upon whose waters they cast their shadow. The second of the three on our list is doomed, and is now, in fact, existing only on sufferance until a temporary bridge is sufficiently far advanced to relieve it of all further duty for ever. The plans, designs, and necessary working drawings for new Vauxhall Bridge are making good progress; but if the erection of the new permanent structure is to proceed at the same time-rate as that of the temporary one, there is not a man at present alive who will ever cross over it. It is also pretty well understood that the demolition and rebuilding of Lambeth Bridge is to follow later on; but unless the approaches of both the principal and subsidiary roads and streets on the Middlesex shore be all cleared, widened, and otherwise improved at the same time, little or nothing will be gained by putting the project into execution. It is but fair to state that these remarks do not equally apply to other bridges lower down the river, which are periodically thoroughly well cleaned and painted and decorated in both an effective and handsome manner, as their position unquestionably demands.

It is when we pass from the road to the railway bridges that the uncleaned, unpainted, unkempt, and generally neglected appearance in which these structures are allowed to remain becomes unpleasantly conspicuous. One would be inclined to suppose that, apart from all æsthetic or other considerations, some attention would be given to the fact that the safety, durability, and what might be termed the life of a bridge, or of any other metallic erection, is very closely connected with the proper protection and preservation of its external surface. Now the painting process, even as usually conducted, is not *per se* a laborious or particularly troublesome one, although it must be admitted that it is frequently a terribly tedious operation. It is just possible that the introduction of the "spray-painter" will remove these defects and inconveniences; but we are not just at present concerned with this somewhat novel method of laying on pigment. Previously to painting any metallic surface it is absolutely necessary that it should be perfectly clean and entirely free from all old paint, rust, scale, and incipient corrosion of every kind. There are two especial reasons for these stringent precautions. One is, that if any rust or other source of corrosion be left underneath the new coats of paint, the latter will afford no protection whatever, and the corrosive action will continue in all its pristine vigour. The other reason is that very frequently, nearly always in fact, the new paint will not adhere to a dirty or foul metallic surface, although it may appear to do so when first laid on. After a very short time cracks and blisters make their appearance, the paint peels off, and the naked metal is exposed to all the destructive effects of climatic influences.

Recently it has been proposed to dispense with the services of the wire brush and the chisel, and to employ a jet or blast of sand projected with an adequate amount of force, by compressed air or other suitable means, upon the metallic surfaces to be cleaned. The installation required is simple, inexpensive, and easily managed, as will be at once apparent from the following brief account of the cleaning of an iron bridge in America, of several spans, whose united length amounted to some 1,200ft. A reservoir for compressed air, a bellows, a sand-box, some flexible tubes connecting the reservoir with the hollow rod from which the sand-blast issued, completed the cleaning apparatus. The steam for driving the bellows can always be easily obtained, either from a small portable engine, or in large towns and cities from an ordinary steam-roller. It is evident that the diameter of the sand projector tube, that of the orifice or spout, and its length, are details which can be varied to suit the circumstances of each particular example. In the case alluded to, the projecting flexible tube was given a general diameter of 2½in., diminished at the nozzle to ¾in., and a maximum length of 30ft. A space of about 6in. separated the nozzle of the tube from the surface acted upon by the blast. So far as rapidity of execution is concerned, it must be recollected that a built-up iron or steel bridge—for example, one on the open-web or lattice principle—is not by any means a favourable specimen of construction to experiment upon. There are so many different members whose surfaces all lie in so many different planes, and abundance of holes and corners and rivets besides, that they prolong the work far beyond the time that would be needed to clean the same total amount of surface better disposed and arranged for receiving the action of the sand-blast.

In order to prove how the shape and contours of the structure governed the time in which the respective cleanings were conducted, the following figures may be quoted:—In the case of a bridge of the type we have selected, an area of about 2sq.ft. was effectually cleaned per minute. But when the bottom of an iron ship was submitted to the same process, the rate was exactly double—that is, 4sq.ft. to the minute. It is also claimed for the sand-blast that it does the work better, and more thoroughly, than the ordinary hand method; that it does not in any manner injure the material; and that it effects a considerable saving in the erection of temporary scaffolding and false work, which is probable enough. A word of caution may be put in here. Great care is required in applying the sand-blast to the cleaning of cast iron, and, indeed, it should not be so used by anyone not well skilled in the employment and manipulation of it. It may be scarcely necessary to mention that for the cleaning of stone or brickwork, and many other materials of construction, the sand process is utterly unsuited. T. C.

A NEW ROCK IN THE HIGHLANDS.

IN the 44th report of the Science and Art Department, just issued, an account is given in the Geological Survey Section of the composition of a remarkable rock belonging to a type hitherto unrecognised in Britain, which occurs at Kentellan quarry, about half a mile west of the Ballachulish granite. It is almost black, being known locally as "black granite," and shows lustre-mottling due to the presence of brown mica. The actual amount of mica is small, but uniform orientation may be seen to extend over surfaces measuring a ¼in. or even ½in. across. The rock is composed of olivine, augite, biotite, plagioclase, orthoclase, magnetite, and apatite. The olivine is fresh, colourless, and is traversed by the usual anastomising veins of magnetite. It is also, as a rule, crowded with extremely minute and often rod-like inclusions, which give it a cloudy aspect when viewed with low powers. The sections of the individuals are never bounded by straight lines meeting in sharp angles, but traces of idiomorphism are not uncommon; in other words, the mineral occurs as grains or as crystals with more or less rounded angles. It is present as inclusions both in augite and biotite, and the felspars are often moulded upon it. The augite occurs in grains, crystals, and patches, which vary in size—the largest often measuring several millimetres in diameter. The common crystalline forms may frequently be recognised, and the angles are often fairly sharp. The colour in thin slices is pale green, and sections which appear homogeneous in ordinary light often show a beautiful zonal structure under crossed nicols. Biotite occurs in small ragged patches, which, in spite of their apparent isolation, often show uniform orientation over large areas. The mineral is of a rich brown colour, approximately uniaxial and strongly pleochroic. It is not only moulded on the augite and olivine, but also occasionally on the felspars, and was therefore one of the last minerals to form. The felspars, together with the small quantity of biotite, make up the interstitial matter in which the olivines and augites are embedded. Both plagioclase and orthoclase are present in approximately equal quantities, and the former is markedly idiomorphic with respect to the latter. The plagioclase sometimes shows a zonal structure, and probably ranges in composition from labradorite to oligoclase, the acid type predominating. It may be readily distinguished from the orthoclase by its higher refractive index and by albite twinning. The orthoclase occurs as interstitial matter (mesostasis). Individual patches sometimes show twinning on the Carlsbad plan. The accessory minerals are apatite and magnetite, the latter occurring almost exclusively in the veins which traverse the olivine. All the minerals are remarkably fresh. The occurrence of a large amount of olivine in a rock containing a considerable quantity of orthoclase is of so unusual a character that an analysis was made. The results of microscopical and chemical research show that the rock is in many respects a peculiar one. It possesses affinities with picrites and monzonites. In the low percentages of silica and alumina and high percentage of magnesia it resembles the former; whereas in the total amount and relative proportions of the alkalies it resembes the latter. The mineralogical composition of the rock also illustrates these affinities. In the extraordinary abundance of olivine and augite the rock resembles the picrites, but in the character of the augite and in the presence of both orthoclase and plagioclase in approximately equal proportions, it resembles the monzonites. It seems more desirable to emphasise the relation of the rock to the monzonites than to the picrites, and it may, therefore, be termed an olivine-monzonite. The typical monzonites contain, however, only a small quantity of magnesia (2 to 4 per cent.), and that the rock from Smälingen, Norway, which contains olivine, and which Prof. Brögger classes as an olivine-monzonite, possesses only 7·45 per cent. The rock from Kentellan quarry, with 15·26 per cent. of magnesia, is far richer in olivine than any rock hitherto recognised as belonging to the monzonite group.

THE STAINED-GLASS AT THE VERDIN TECHNICAL SCHOOLS, NORTHWICH.

SOME very good stained-glass has been erected in the Verdin Technical Schools, Northwich, which building we illustrated on p. 177. The window at the main entrance, which we illustrate herewith, is described as "The Empire Window," the idea being to indicate the vast extent of the dominion over which her Majesty holds sway. The centre panel is appropriately occupied by a portrait of her Majesty Queen Victoria, encircled with a wreath, on which is inscribed in quaint characters the date of her Coronation and Jubilee. The outer space or field is filled in the upper portion with two figures of "Fame" and "Peace." Fame holds a torch, and Peace carries a palm in her hand, and each supports the Crown of Empire which is held above her Majesty. Below are two "amorini" sustaining a small shield, on which are inscribed Tennyson's well-known lines—

> She wrought her people lasting good,
>
> . . . . . .
>
> Her Court was pure, her life serene;
> God gave her peace, her land reposed;
> A thousand claims to reverence closed
> In her as mother, wife, and Queen.

Flanking this at each side are, to the right, shields of New Zealand and Tasmania, and, to the left, of Ceylon and Jamaica, with the usual mantlings. In the square above her Majesty are emblazoned the Royal arms, and below the arms of India. The two corner windows at the top are filled in with the arms of the West Indies and the Cape of Good Hope, whilst the bottom corners are charged with the arms of Australia and Canada.

The territories under British sway are so numerous that it would have been impossible to have included representations of them all, but the above representative possessions have been carefully selected, and tell their own tale.

Near to this window is the small window described as the "Prince's" window, containing the portraits and arms of their Royal Highnesses the Prince and Princess of Wales. His Royal Highness as Earl of Chester has a distinctive

West Indies.

Royal Arms.

Cape of Good Hope.

New Zealand. Tasmania.

Ceylon. Jamaica.

Canada.

India.

Australia.

THE EMPIRE WINDOW. (Main Entrance.)

Designed and Executed in the Studios of W. G. Sutherland, Ltd., Mosley Street, Manchester.

claim for recognition in this conjunction. The motto underneath is that borne by Richard I., popularly known as Richard the Lion-hearted. The arms below the Princess are the quarterings of the Danish Royal family encircled with the insignia of the Order of the Golden Elephant, the motto on the label being that of the Royal House of Denmark. Flanking the shields the field of the window has been enriched with the Prince of Wales' feathers, which the Princess is entitled to emblazon.

The window to the art entrance has been described as the "Victorian" window, and is suggestive of men of mark in her Majesty's reign. In the centre large square the arms of the donor, Sir Joseph Verdin, Bart., encircled in a wreath of fruit and foliage, resting on a large cartouche. Above this comes the portrait and arms of H.R.H. the late Prince Consort. The arms to the left are those of H.R.H. the Duke of Saxe-Coburg, and the arms to the right are the Royal arms with the label, the whole inclosed in a bold cartouche, with pendent foliage and fruit. Above this is the portrait of his Grace the Duke of Westminster, K.G., inclosed with wreath, and set on a cartouche of similar design to the one below in the "Prince Consort" window. At each side of the portrait are the arms of the Duke and Duchess respectively. The right and left top corner lights in this window are filled in by portraits of the Most Noble the Marquis of Salisbury and the Right Hon. W. E. Gladstone, representing statesmanship. Below these come two men eminent in the field of art and literature, Lord Leighton and Lord Tennyson. And below these again are portraits of Michael Faraday and George

Stephenson, representing chemistry and engineering skill. The two lower panes are filled in with the portraits of the late Mr. Robert Verdin, M.P. for the Northwich Division, and Sir Joseph Verdin, Bart., the donor of the institute. This latter portrait has been expressly included at the desire and cost of the Northwich Urban District Council.

The two central lights in the committee-room are enriched with the arms of Chester and Northwich respectively. The arms of each are similar, being the sheaf or garb, but different in their supporters. The supporters of the arms of Chester carry a feather in recognition of the office which the Prince of Wales holds as Earl of Chester.

The large window in the gymnasium is devoted to illustrating in flat and silhouette the various games which will be practised and encouraged within the building.

The whole of the stained glass has been designed and executed in the studios of Messrs. W. G. Sutherland, Limited, of Mosley-street, Manchester.

ART EXHIBITIONS AND SCHOLARSHIPS.

THE following is the list of candidates to whom Royal Exhibitions (Art) and Local Scholarships (Art) have been awarded, 1897, by the Department of Science and Art :—

ROYAL EXHIBITION.

Charles Arthur Palmer, aged 22, Art Student, Croydon.
Rex Osborne, 20, Art Student, R.C.A., South Kensington.
Thomas Currie Bell, 24, Art Student, Edinburgh.
Charles James Pibworth, 19, Art Student, Queen's-road, Bristol.
Joseph Tom Friedenson, 19, Art Student, Leeds.
Mary Caldwell, 23, Art Student, Canterbury.
Nathaniel Heard, 24, Art Student, Hull.
Alfred Samuel Ryland, 19, Art Student, Cheltenham.
Thomas Siminson, 22, Art Student, Queen's-road, Bristol.
Luke Thomson Taylor, 20, Art Student, St. Leonard's, York.

LOCAL SCHOLARSHIPS.

Marion E. Broadhead, aged 20, Art Student, Macclesfield.
Benjamin Clemens, 21, Art Student, Camden, Holloway.
Herbert Slinger, 21, Art Pupil Teacher, Technical College, Bradford.
Charles Grange Lowther, 17, Sign Writer and Decorator, Hull.
Gertrude Lydia Mary Syme, 21, Art Pupil Teacher, Watford.
William George Simmonds, 21, Art Student, R.C.A., South Kensington.
Henry John Lintott, 20, Art Student, Brighton.
Reginald Fairfax Wells, 19, Art Student, R.C.A., South Kensington.
John Frederick Pettinger, 19, Art Student, St. Leonard's, York.
Robert Herdman Smith, 17, Art Student, Leeds.
Hilda May Giraud, 19, Art Student, Brighton.
Sydney March, 21, Carver, Hull.
John Macdonald Aiken, 17, Monumental Draughtsman, Gray, Aberdeen.
Walter Taylor, 21, Tapestry Weaver, Putney.
John Earnshaw Sutcliffe, 21, Lithographic Artist, R.C.A., South Kensington.
Leta Rosina Roff, 18, Art Student, North London.
James Albert Hancox, 21, Art Student, Leeds.
Ernest William Cotton, 19, Art Student, Municipal, Birmingham.
Thomas Cantrell Dugdale, 16, Art Student, Cavendish-street, Manchester.
Ethel Beatrice May, 19, Art Student, Municipal, Birmingham.

A Royal Exhibition is tenable for three years, and entitles the holder to free admission to the Royal College of Art at South Kensington or the Metropolitan School of Art, Dublin, for the session of about 42 weeks each year, and during that time to a maintenance allowance of 25s. a week and third-class railway fare for one journey to and fro each session between the home of the scholar and London or Dublin. The Royal Exhibitions are held on the condition that the Exhibitioner regularly attends the course of instruction laid down for him, complies with the rules laid down for his guidance, and makes satisfactory progress. The allowance may be withheld or reduced in the case of a student who fails to attend the Royal College of Art or the Metropolitan School of Art at the prescribed time. A Local Scholarship is tenable for three years, with a maintenance allowance of £20 a year, at any School of Art under the Department which is open at least three days and five nights a week, and which will remit the fees for instruction of the holder. The scholar must attend a School of Art during at least 40 weeks in the year for 30 hours each week, of which 18 hours at least must be in the day. The scholarship commences on the date at which the school, where the Scholarship is tenable, reopens after the summer vacation in each year. The maintenance allowance is paid quarterly, on the receipt of a certificate from the master and secretary of the School of Art that the scholar has attended regularly and pursued his studies satisfactorily. No candidate can obtain both a Royal Exhibition and a National Scholarship; nor can he hold a Local Scholarship with either. But the past or present holder of a Local Scholarship may compete for a Royal Exhibition or a National Scholarship, and the Local Scholarship will determine as soon as the holder enters on the Royal Exhibition or National Scholarship.

RESERVOIR FAILURES IN AMERICA.

IN a recent number of the *Engineering News* a description is given of the failure last July of two earthen dams having masonry heart walls erected at Melzingak by the Fishkill and Matteawan Water Company. The dams are stated to have been well designed and built, whilst the area of discharge over the by-washes was in accord with rules proposed by an eminent American engineer. The two dams were comparatively small, and were located one above the other on a mountain stream. The upper had a capacity of 8,000,000 imperial gallons, whilst the lower could impound 64,000,000 gallons. The upper dam was 340ft. long and 38ft. high, whilst the lower was 400ft. long and 34ft. high. In each case there was a masonry heart wall 3ft. thick at the bottom, tapering to 1ft. or 1ft. 6in. at the top, and carried up to within 1ft. at the top of the bank. This wall was backed with earth on each side, the upper slope being covered with stone pitching. The earthwork in the case of the lower dam had been somewhat carelessly put in place, but with the upper one greater attention had been paid to securing good work. The by-wash in the case of the upper dam was 4ft. long, its crest lay 1½ft. below the top of the bank, whilst in the case of the lower dam the by-wash was 75ft. long and 18in. deep. This small difference between the levels of the top of the banks and the crests of the overflow weirs is the point most to be criticised, especially as a certain settlement of the main bank had occurred in each case, further reducing the margin of safety. Another objectionable feature was to be found in the laying of a pipe through the bottom of the banks, but this had, as it happened, no bearing on the failure. This arose by the upper bank being topped by a flood, although on the day of the accident the water-level in the reservoir had been 7½ft. below the crest of the upper overflow weir, and the rainfall recorded in the neighbouring meteorological stations was nothing extraordinary. Apparently, however, there must have been a local fall of very great intensity, which rapidly filled the reservoir, and which the by-wash proved inadequate to carry off. Once the bank was topped, the dam soon gave way, and the flood, passing down, of course, carried away the lower bank, which nothing could then have saved.

CHIPS.

Through the exertions of the vicar, and the munificence of Lord Llangattock, Mr. Walter Savage Landor, and others, the ancient Abbey Church of Llanthony, Monmouthshire, has been restored and reopened.

The vestry of Paddington have borrowed £13,000 from the London County Council for the purpose of extending wood pavements in the parish. Already about eight miles of the streets of Paddington are paved with wood, but mostly soft wood. For reasons of durability, cleanliness, and sanitation, the vestry have now abandoned the use of soft deal in favour of hardwood, and have accepted a tender for the supply of 850,000 West Australian hardwood blocks at £10 17s. 6d. per 1,000 blocks.

At Stockport on Tuesday some workmen were engaged demolishing old gas works, which are to be replaced by an electric lighting station, when the scaffolding suddenly collapsed, and three men named William Maull, Peter Higgins, and Joseph Woodall were precipitated into some disused tanks below, a distance of 40ft. The men lie in the infirmary in a critical condition.

The English Arboricultural Society assembled in Lynn on Tuesday for the 16th annual general meeting and 12th annual excursion. Mr. F. W. Beadon, president for the year, occupied the chair. The business included the election of new members, of whom there were about 30, the adoption of the statement of accounts, and the election of representatives on the council and other officials. On Wednesday the members visited Sandringham.

Mr. Onslow Ford, R.A., has now completed the memorial statue of Dr. R. W. Dale—a seated figure—and it will soon be sent to Birmingham, to be placed in the Art Gallery. It is probable that it wil be ready for inauguration about the middle of October.

OBITUARY.

Lieut.-Gen. Sir William Francis Drummond Jervois, G.C.M.G., C.B., R.E., who died on Tuesday from a carriage accident at Bittern Court, aged 70 years, had done good service to the nation in his earlier years of professional life in designing fortifications and other engineering works. From 1842 to 1845 he was professionally engaged at various frontier stations, making roads, building bridges, and establishing military posts. In 1845, having been appointed acting adjutant to the Royal Engineers, he accompanied the chief engineer over the whole frontier of the Cape Colony and the settlement of Natal. During the Kaffir war he made a military survey and map of Kaffraria—a work of great difficulty in the midst of the military operations. In 1852 he was ordered to the Island of Alderney for the purpose of designing plans for the fortifications, and the superintendence of their execution—a work strongly advocated by the great Duke of Wellington. In 1855, Major Jervois was nominated by Lord Panmure a member of a committee on barrack accommodation, whose labours contributed much to the improvements which have of late years been effected in the construction of barracks as well as in the sanitary condition of our troops. In 1856 he was appointed Assistant Inspector-General of Fortifications under Sir John Burgoyne, and on the appointment in 1859 of a Royal Commission to report upon the defences of the country, he was selected by the Government to be secretary. He was at the same time secretary to the Permanent Defence Committee, under the presidency of the Duke of Cambridge. He became the confidential adviser of Lord Palmerston and of several Secretaries of State on matters relating to defence, and designed the fortifications of Portsmouth, Plymouth, Pembroke, Portland, Cork, the Thames, the Medway, and other places. During his long service, nearly 20 years, in the War Office, he was also a member of the Special Committee on the application of iron to ships and fortifications. In 1862 he was appointed Deputy-Director of Fortifications, and in 1863 was sent on a special mission to report on the defences of Canada, Nova Scotia, and New Brunswick, on which occasions he visited the fortifications at the principal ports on the seaboard of the United States. In 1864 he was sent again on a special mission to Canada to confer with the Canadian Government on the question of the defence of the Dominion. On his return to England his report was laid before Parliament, and the Imperial Government undertook to carry out the defences of Quebec on the plan recommended by him. He was also sent on special missions to Bermuda, Halifax (N.S.), Malta, and Gibraltar, and planned improvements and additions to the fortifications of those places. In 1871-72 he was ordered to India to advise the Government of India respecting the defences of Bombay, Aden, the Hooghley, and other places. He was Governor of the Straits Settlements from 1875 till April, 1877, when he was appointed to advise the Governments of the Australian colonies on the defence of their chief ports. While in Australia he was selected to be Governor of South Australia. In December, 1882, he was appointed Governor of New Zealand, where, on his advice, the fortification of the principal ports was undertaken by the Colonial Government. Throughout his stay in Australasia till 1889 he continued to be chief adviser of the Governments there on matters relating to defence.

Mr. Francis Goold Morony Stoney, M.I.C.E., Managing Director of the firm of Ransomes and Rapier, Limited, Waterside Works, Ipswich, has died suddenly at the age of 60, at Neuenahr, Germany. Mr. Stoney was born in County Tipperary, and was the son of Mr. Thomas Stoney, of Arran Hill and Kyle Park, in that county. He received his engineering education at Queen's College, Belfast, and afterwards served his apprenticeship with Sir John MacNeill, then engaged on important work in connection with Irish railways. He subsequently acted as manager of Dundalk Foundry, from which position he passed to the service of the Clyde shipbuilding firm of Mr. John Elder, of Glasgow. During 1835 and 1866 he represented it in South America. Shortly after he returned home he again left England, in April, 1868, for India, and there continued two years. It was during this period that his attention was first turned to the problem of the control of large rivers, both in regard to their liability to floods and to their use for irrigation in hot countries. Ever since then

the best of his engineering powers have been devoted to the invention and maturing of various sluice mechanisms. Ten years ago Mr. Stoney became manager of the Waterside Works at Ipswich, and during his connection with that firm they have provided sluices for the Manchester Ship Canal and for the river Weaver; a movable weir on the Clyde at Glasgow, with sluices after Mr. Stoney's own designs; and similar work on the Thames at Richmond; while his designs for storing and controlling the Nile water at Philæ have been under the consideration of the Egyptian Government. During his residence in Ipswich the machinery laid down at the Waterside Works had more than trebled. He sat for a year on the town council of Ipswich.

CHIPS.

The Hospitals Committee of Glasgow Corporation have resolved to build a new Hospital Reception House at a cost of £6,500.

The City of Leeds has purchased for its permanent collection a large seascape entitled "A Wave," by Mr. R. E. Robertson—a picture exhibited in the Liverpool Autumn Exhibition of last year.

The Linslade Rural District Hospital, Leighton Buzzard, is being warmed and ventilated by means of Shorland's patent Manchester grates, patent exhaust roof ventilators, and special inlet panels, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

An application is about to be made to the Consistory Court of Ripon to grant a faculty authorising the removal of the north and south galleries, the erection of new clergy and choir vestries and north and south transepts, and other alterations required in the Bradford Parish Church, as a permanent memorial of the labours of the late Archbishop Bardsley, for sixteen years vicar of the parish. The estimated cost is £4,000, and the works are to be completed within twelve months from the time of the faculty being obtained.

Rothesay Town Council, over which the Marquis of Bute presided, resolved last week to invite the Sanitary Association of Scotland to hold its annual congress at Rothesay next year.

The new Headland Hotel, to be forthwith erected at Newquay on about six acres of land overlooking the Headland and Fistral Bay, will have a frontage of over 300ft. with five floors. Mr. Silvanus Trevail, of Truro, is the architect.

The Bishop of London (Dr. Creighton) will visit Leicester on Tuesday, Oct. 5, in order to open the new Technical and Art School, which is now being completed in the Newarkes at a cost of about £40,000.

The Tamworth Rural District Council considered, on Saturday, the appointment of a highway surveyor, at a salary of £150 per annum. A member moved the appointment of Mr. H. J. Clarson, the present surveyor to the council, &c., which was duly seconded. An amendment was proposed in favour of deferring the appointment for a month, and advertising the position. A discussion ensued, in which a Mr. Clark, in supporting the amendment, declared that the making of the appointment was planned, and was the biggest piece of rotten jobbery he had ever heard of. The chairman denied it, and said it was an insult to the council. On a division the voting was equal, being eleven on either side, and the chairman, who had not previously voted, gave his vote in favour of the proposition. Mr. Clarson was accordingly appointed.

The fifty-fourth annual congress of the British Archæological Association opened at Conway yesterday (Thursday), and will last until Thursday in next week.

The committee of the Congregational Union has arranged for a whole session to be devoted to the important question of church extension at the forthcoming meetings to be held in Birmingham. It is proposed to formulate a scheme to raise a national fund of £100,000 for the purchase of sites and the erection of church buildings in centres of large populations.

The foundation-stones of new schools erected in connection with the Wakefield-road Baptist Church, Stalybridge, were laid on Saturday. The estimated cost of the schools is £2,500.

At a special meeting of the South Bank and Normanby Urban District Council, held on Monday, Mr. A. Smithies, of Leeds, was, out of 16 applicants, appointed surveyor. The salary is £120 per annum.

Professor W. H. Corfield has been elected an honorary member of the Royal Society of Public Health of Belgium, of which he has been a corresponding member for some years. The honorary members consist of Ministers, ambassadors, and other high State officials, and a few foreign hygienists. Professor Corfield is the only Englishman who has received this honour.

COMPETITIONS.

Blackpool.—At a meeting of the directors of the Blackpool Jetty Company held last week the design submitted by Mr. R. Knill Freeman, F.R.I.B.A., in limited competition for the extension of the central pier and the erection upon it of a pavilion and other buildings, was adopted. The engineering works in connection with the substructure will be carried out from the designs of Mr. Thos. Dryden, engineer, Preston, who has just completed extensive works of a similar character on the North Pier. The leading feature of the design submitted by Mr. Freeman is an absence of square ends and elevations which would offer great resistance to the winter gales. Four toll-houses are proposed, with turnstiles at each face, and sliding gates allow of the pier being quickly cleared. The other buildings are for a board-room, secretary's office, retiring-rooms, ladies' lounge, reading-room, and shops. The widening of the structure is proposed, with a new dancing pavilion or concert hall. The pavilion is Indian in style. There will be accommodation on the ground floor for 2,000, and for 500 in the gallery. There is provision for two corner shops at the westerly end, two refreshment buffets at the easterly corners (approached from without and within), and a dozen other shops, each 10ft. deep, at stated positions round the pavilion. The intervening spaces will be taken up by lavatories, side exits, toll offices, shelters, &c. The angles of the building are treated as turrets, and inside are foyers at each corner; two domes rise from the centre of the roof, four lounges are built in the sides to back the shelters outside, and the ceiling is flat and specially designed for decorative effect. Behind the orchestra is a balcony for open-air concerts and dancing, so devised that it could be added to the stage. Mr. Freeman estimates the cost of the pavilion at £6,350. So far as the treatment of the present pier-head is concerned, the architect proposes a revolution of the existing accommodation. An open-air dancing-platform would be left; but on each side a width would be covered in like a verandah, where the festivities could be carried on during inclement weather. Provision is also made for a large circular bar facing the sea, with private, smoking, and cloak rooms, and five shops, with kiosks at each corner of the deck overlooking the jetty. The work will probably be commenced at the close of the present season, and be proceeded with as expeditiously as possible. Mr. Freeman's design was also accepted for the extensive improvements being carried out on the North Pier, these including the widening of the structure (which has already been completed) and the erection of a pavilion and other structures at the promenade end of the pier.

Playing-Card Designs.—The Playing-Card Makers' Company offers the "H. D. Philips prize" of £5 5s. for the best special design for the backs of playing-cards, intended for presentation by the company to its guests at the banquet of the masters and wardens in November next. Two other prizes—of £3 3s. and £2 2s. respectively—are offered by the company for the two next best of such designs. The designs must be in colour, and be such as can be reproduced effectively in not more than six printings. The arms of the company and of the City of London are to form a portion of the design. Designs must be sent not later than September 27 next to Mr. W. Hayes, the clerk of the company, Guildhall, London, E.C., of whom full particulars as to the competition may be had.

San Francisco University.—According to the *San Francisco Examiner*, Messrs. J. B. Reinstein (Regent of the University of California) and H. E. Maylock (of the Architectural Corps at the University) have just returned from prolonged trips in the Eastern States and in Europe, where they have consulted architects, artists, and landscape engineers upon the development of the university construction. Professor Guadet, of Paris, will probably arrange a programme by which eminent architects of all nations will be requested to send in sketches of their plans at a given date, and these will be assessed by a jury consisting of one recognised authority each from England, France, Germany, and the United States, and a representative of the University, the understanding being that each architect submitting plans will receive some recompense. At least ten of the best sketches will be selected by the jury, and the authors will be requested to elaborate their plans. The architects so selected will be permitted to name four additional members of the jury, and these nine jurors will select the ultimate plan. It is probable that there will be about thirty buildings in all, each of which will be built of marble or other stone. The considerable expense attending this preparation is unrestricted, and has been borne by Mrs. Phebe A. Hearst.

The town council of Newport, Mon., have resolved to apply for sanction to borrow £21,000 for the proposed town hall extension, and £5,000 for the supply of electric machinery (supplementary estimate).

Mr. William Tomkinson, a leading Liverpool builder, who carried out many large contracts in the city, died on Saturday, aged 62 years. He devoted his leisure to photography, taking an active part in organising exhibitions at the Walker Art Gallery.

Mr. Albert J. Hepper held a Local Government Board inquiry at West Bromwich on Tuesday respecting the application of the town council for sanction to borrow £2,100 for alterations and additions to the public baths, £300 for the erection of an engineer's residence, and £1,149 for the provision of a technical school. The borough surveyor (Mr. A. D. Greatorex) presented plans of the scheme, and said it was proposed to extend the first-class swimming-bath, and also to improve it by putting a gallery round.

The East Sussex County Council have given notice of their intention to withdraw in 1902 from their connection with the town council of Brighton in the matter of asylum accommodation. The Hayward's Heath Asylum is to be left to Brighton, and a new building will be erected for East Sussex.

A special committee of the Manchester Corporation have decided by a large majority to recommend the city council to municipalise the Manchester tramways.

Mr. Brock, R.A., and Mr. T. Graham Jackson, R.A., are making progress with the Benson memorial for Canterbury Cathedral. The memorial takes the shape of an altar-tomb, with a recumbent effigy of the deceased Primate, and a canopy. This will absorb about £2,000, and the balance of the fund, amounting to another £2,000, is to be handed over to the Truro Cathedral Building Committee for the completion of some portion of that edifice.

By invitation of Mr. James Mansergh, V.P.I.C.E., the engineer of the works, a visit to the Elan Valley waterworks (Mid-Wales) for the supply of the city of Birmingham, will take place on Saturday in next week, Aug. 28. This visit is intended for members of the association only, and no visitors will be allowed to attend. Members are to reach Shrewsbury on Friday evening, Aug. 27, and assemble at Shrewsbury Station the following morning at 7.40, in time to leave by the 7.55 train for Rhayader.

At Bromley, near Pensnett, the first sod was cut on Monday on the site of colliery shafts which are to be sunk forthwith. The enterprise is expected to result in the development of the whole of the ungotten solid thick coal now remaining to be obtained between Bromley "fault" and the great western boundary "fault," which up to the present has remained unsurmountable. In addition to practically demonstrating the existence of extensive coal measures of great value, it will prove the existence of a large area of the Permian measures, part of which is believed to contain a good quality of terracotta strata, similar, and supposed to be equal, to that in the Ruabon district. Mr. U. Cox is the engineer, and Mr. John Williams the contractor.

The erection at Edinburgh Castle of the new military hospital, for which a grant of £18,000 was recently voted by Parliament, is now being rapidly proceeded with. The site of the new hospital is at the north-west corner of the castle rock, overlooking Princes-street and Castle-terrace. It will occupy the place where the stores and magazine formerly stood. The buildings are to be treated in the Scottish Baronial style, and will, it is promised, harmonise with the older portions of the castle—more than can be said of some of the hideous modern erections that disfigure the ancient stronghold.

New coal-factor's offices, with coalyard and stables behind, have just been built in Friars-street, Reading, from designs by Mr. G. W. Webb, of that town. The street façade is of red Mansfield stone, Bath stone, and granite. Messrs. Lewis Brothers, also of Reading, were the builders.

The Chester County Police arrested on Sunday at Earlstown, under a warrant, Elisha Lees, of Sandbach, who is charged with misappropriating £750 trust money. Lees has held many responsible positions at Sandbach, having been surveyor to the old local board, collector of Queen's taxes, secretary to the gas company, and a member of the local board. He was brought before the Sandbach magistrates on Monday and Wednesday, when he was committed for trial at the assizes.

Building Intelligence.

Bilston.—The opening took place on Friday of the new waterworks and the technical schools. Bilston has hitherto been supplied with water by the Wolverhampton Town Council. Steps were taken to secure an independent supply, land was secured at The Bratch, at Wombourne, and, water of a pure quality having been found, the necessary plant was laid down. The works opened on Friday include engine-house, well-house, boiler-house, machine-fitting and repairing shop and stores; while the plant consists of two boilers, two engines, and two sets of pumps, with the usual accessories. All the machinery is in duplicate, in case of a breakdown. The total cost of the scheme is £45,000, and the work has been designed and carried out by Mr. Baldwin Latham, M.I.C.E., of Westminster, while Mr. C. L. N. Wilson (the town surveyor) has acted as resident engineer. The technical schools, also opened on the same day, are situated on the Willenhall-road, within a short distance of the Town Hall, and have been erected on 1,433 square yards of land. The architect was Mr. C. L. N. Wilson, the surveyor to the urban district council, and Mr. Thos. Tildesley, of Willenhall, was the builder. The style is Italian, and the first elevation has been carried out in red brick and terracotta. The total estimated cost is £6,000. The building comprises large lecture and examination room, and fourteen small rooms, which will be used as workshops and laboratories.

Birmingham.—The extensive block of premises forming the lower part of Cannon-street and Needless-alley, is about to be demolished, together with the three shops between the two thoroughfares in New-street. The property is, says the local *Post*, one of the most ancient pieces of old Birmingham existing in the centre of the city. The low-roofed old-fashioned buildings, with the shop fronts brought up to the street line, are in strange contrast with the modern commercial houses on either side, and their replacement by handsome shops, erected on the most modern principles, will be a conspicuous improvement to New-street. In the early days of the 18th century two houses stood upon the site. They were built by one William Guest, and in 1729 were in the occupation of William Weeley and Thomas Abell. Attached to them was a close, known as Hipkins's, and there were also four little gardens in front. Some time in the "thirties,") the houses were turned into three shops by the addition of business frontages which occupied the site of the gardens, and brought the shops up to the line of the street. As time went on, the shops were enlarged by extensions at the rear, offices were built, and other houses attached. Now these have become old, and in their turn will give place to better property. A portion of the property having a frontage to Cannon-street of 144ft., to New-street of 66ft., and to Needless-alley of 164ft., has been let on a lease for 99 years to the Clarence Property Company, Ltd., a syndicate which owns a number of central properties in the city. The company propose to demolish the block, and to erect several shops, together with offices, &c., at a total cost of at least £20,000. It is expected that the new pile of buildings will be completed by the autumn of 1898. The new buildings will be erected in accordance with the plans of Messrs. Essex, Nicol, and Goodman, architects, Newhall-street. Provision is made for four shops fronting New-street, to occupy the space of the three original buildings. They will extend to about half the depth of the site—namely, 80ft. The shops are to include the ground floor, a mezzanine floor, interposed in consequence of the considerable rise of the land up Cannon-street, and first, second, and third stories, the central portion over the two middle shops being continued as an extra storey to form an ornamental gable. In Cannon-street there will also be room for four shops about 70ft. in length, and running through to Needless-alley. Over the shops will be built three floors, which, together with the upper stories in New-street, will be let for professional and other offices, and approached from a staircase entrance in Cannon-street. The general style of the design is a Free Renaissance.

Edgware-road, W.—Mr. John Aird, M.P., laid the foundation-stone of the new Metropolitan Theatre of Varieties, Edgware-road, on Tuesday. The new building will stand on the site of the old house. A part of the original structure has been preserved; but the auditorium will be completely reconstructed. It will contain a large balcony and gallery, built on the cantilever principle, which abolishes intervening pillars. Private boxes of white marble will be erected on the ground floor on either side of the stalls, and the seating capacity of the house will be increased to 3,000. The stage will be enlarged, and new dressing-rooms provided, while attention is being paid to exits and precautions against fire. The decoration of the auditorium will be Flemish in style, and the walls of the entrance will be of white marble, surmounted by Indian ornamentation in rich colours. An entirely new frontage is to be erected, additional premises having been purchased on the right of the former house. The work of reconstruction was undertaken three months ago, and it is hoped that the theatre will be completed and ready for opening by the end of November. Mr. Frank Matcham is the architect.

Fulham.—The new Grand Theatre, in the High-street, which has been built from the designs of Mr. W. G. R. Sprague, will be opened on Monday next. The theatre is built of white Portland stone, is Classic in treatment, and is surmounted by a allegorical group, above which is placed a 5,000c.p. arc-lamp. The theatre is entirely isolated, a wide roadway surrounding the building. The front has a semicircular portico, over which is a loggia to be used as a smoking lounge. From the ground-level a flight of broad steps leads to the entrance vestibule, semicircular in shape, constructed to complete the circle of which the portico forms one-half. The inner vestibule has a domed ceiling supported by marble columns with bronze caps; leading from which is the grand crush-room, the ceiling of which is panelled out in a large oval centre. The dress-circle is reached by two corridors from a marble staircase leading from the centre of this room, while entrances to the stalls are on either side. The auditorium is capable of seating 2,239 persons, and is divided into six classes of seats—viz., eight private boxes, stalls, dress-circle, balcony, pit, and gallery. The Louis XIV. style of decoration is adopted throughout the house. The centre panel of the ceiling is dome-shaped, with four medallions in mitres, filled in with painted subjects. The proscenium is finished with open scrollwork and figures. The whole of the decoration is treated in shades of cream and light terra-cotta, and all the ornamentation is richly gilded. The electric light forms a feature in the scheme of decoration. The act-drop has been painted by Mr. W. T. Hemsley. In the auditorium there are no columns, it being constructed on the cantilever principle. The fireproof curtain separating the auditorium from the stage can be lowered in four seconds. Iron doors are also provided in all the corridors.

CHIPS.

The chancel of the parish church of Drax, near Selby, was reopened on Saturday by the Archbishop of York, after complete restoration at a cost of close upon £1,000.

The Dean and Chapter of St. Asaph have decided to reconstruct the cathedral organ, built in 1830, at a cost of £1,200. The new instrument is expected to be ready by Christmas.

The Duke of Connaught opened on Friday afternoon the Aldershot Hospital, of which the foundation stone was laid by the duchess a year ago. The hospital, which has been built at a cost of £3,000, is in style based on English work of the 17th century, and was designed by Mr. Thomas Davison, A.R.I.B.A. Mr. G. Kemp was the builder. The furniture is chiefly of oak.

The Giant's Causeway Defence Committee have decided to proceed with an appeal from the Vice-Chancellor's decision, which was in favour of the syndicate excluding the public from the causeway, except on payment of a fee.

The new Liberal Club in Adelaide-street, Crawshawbooth, near Heywood, is now nearing completion, and will be ready for opening towards the end of October. The building will contain a news-room, committee-room, smoke and card rooms, and a billiard-room to hold two tables. The architect is Mr. Alfred Coates; the contractor for masons' and joiners' work, Mr. Ormerod Ashworth; painting, decorating, and plastering, Messrs. Whitehead and Binns; plumbing and gasfitting, Mr. Miles Lonsdale; and slating, Mr. Tomlinson, Rawtenstall.

The slate quarries at Okehampton, Devon, have been taken on a lease for 21 years from September 1, and consequently will be reopened after being closed for a number of years.

Engineering Notes.

Bremerhaven.—The new Emperor's Dock at Bremerhaven, which is now almost ready to be opened, will provide Germany with a war port and dockyard second only in magnitude to those in England. The new dock, which is entered from the River Weser, comprises an outer basin of 646ft. in length and 478ft. in width, a lock-chamber of 711ft. by 90ft., an inner basin with 5,654ft. run of quay accommodation, a dry dock which is claimed to be the largest of its kind in the world, and another open basin for ships which do not require dry-docking, but wish to complete all kinds of repairs afloat. The old Emperor's Dock, which was constructed between the years 1872 and 1876, at a cost of 7,500,000 marks, has an area of water of 15 to 17 acres. The harbour extension, however, has a water area of no less than 29 acres, and has already cost £918,500 sterling. The lock-chamber is large enough to hold the *Kaiser Wilhelm der Grosse*, which is claimed to be the biggest steamer afloat. It is 226ft. longer and 10ft. wider than the lock-chambers of the North-East Sea Canal.

The New Line to London.—Rapid progress is being made with the Metropolitan and Southern divisions of the Grand Central Railway. Upon the southern division, forty-one miles in length, extending from just north of Rugby to the junction of the Metropolitan Railway at Quainton-road, the earthworks are rapidly approaching completion. Only one viaduct, that at Catesby, remains to be finished, and this is well forward. The important bridge crossing the Birmingham and Oxford canal near Rugby is progressing satisfactorily. The brickwork of the Catesby Tunnel, which is 3,000yds. in length, and at one time presented considerable difficulty, is now entirely completed, and material trains will shortly be running through the tunnel. Twenty-five miles of the permanent way (single line) have been laid. The sorting sidings, locomotive and wagon sheds, the stations at Rugby, Brackley, and elsewhere are being pushed forward rapidly. The engineer in charge of the Metropolitan section has just issued the following report to the chairman and directors of the Company:—The covered ways and tunnels are now practically completed from Finchley-road to the bridge over the London and North-Western Railway. Southwards of that point every effort is being made to urge forward the work. Covered way is progressing at nine and tunnelling at eleven faces. Most of the bridges over the railway are completed. The covered way under Lord's Cricket Ground has been duly and punctually finished, in accordance with the agreement with the Marylebone Cricket Club. Active progress is being made with the Grove-road and St. John's Wood-road bridges, and with the coal yard. The foundations for the goods warehouse are now nearly all in, and those for the terminal station are in full progress. Contracts have been let for the whole of the buildings and roofing of the terminus station, and the work is being actively carried on. Roads No. 6, extending from Lisson-grove to Park-road, and No. 7, leading into Marylebone-road, are in a forward state. At Neasden 212,000 cubic yards of earth has been tipped upon the site of the sorting sidings, and the necessary bridge and culverts are well in hand. The contract for the locomotive and waggon sheds has been let.

The Willesden Board of Guardians have appointed Mr. Alfred Saxon Snell, F.R.I.B.A., as architect for their proposed new workhouse, infirmary, and cottage homes.

The Royal Music Hall, Holborn, was reopened on Monday after enlargement by the acquisition of adjoining premises, the greater portion of which is utilised as luncheon, supper, and grill rooms. The new front of the Royal is in terracotta, the design being in the Renaissance style of architecture, and this portion of the work has been carried out by Messrs. Doulton and Co. The ceiling of the principal approach to the vestibule is treated in a floriated design in fibrous plaster, and a large oval space in the centre has yet to be filled in by an artistic picture in oils. Messrs. Drew and Cadman are responsible for the fibrous plaster decoration itself. The hall has been embellished in blue, chrome, and gold by Bell, of Great Portland-street, and new stall seats in old gold utrecht have been supplied by Lyon and Co., of Holborn. The new scenery is by Mr. Edmund G. Banks, of the Gaiety.

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ILLUSTRATIONS.

THE DUOMO, FLORENCE.—DESIGN FOR LAYING OUT CLIFFS AND ERECTING NEW PIER AT FELIXSTOWE.—OLDHAM BREWERY CO.'S MINERAL WATER AND BOTTLING WORKS.—ARCHITECTURAL ASSOCIATION EXCURSION SKETCHES.—NURSES' HOME, BRADFORD GENERAL INFIRMARY.—CHURCH OF STA. MARIA DEI MIRACOLI, BRESCIA.

Our Illustrations.

THE DUOMO, FLORENCE.

This splendid photograph of this magnificent building needs but little introduction, and so complete an illustration cannot fail to be interesting and useful, particularly to the student. Arnolfo di Cambio, who was born in 1232, is the architect to whom the credit is due for the first conception of the great Duomo at Florence. A decree was passed by the burghers in 1294 to build a church which should surpass in grandeur and magnificence all other known cathedrals. They gave the commission to Arnolfo, the designer of Santa Croce. To say, however, that he was the architect, in any exclusive sense, would be misleading, seeing that, of course, the Duomo became, like the churches of Sierra and Orvieto, a school of architecture and sculpture for centuries. The first stone was laid in 1296. Giotto's Campanile dates from 1334, and Brunelleschi's Dome A.D. 1420. Arnolfo died in 1310, and probably at that date the building had reached the springing of the vaults. The nave and smaller domes were doubtless completed, as we now see them, during the first twenty years of the 14th century. We illustrated the west front of the Duomo in our issue of March 12, 1888; and the mosaics and marble-work of the building, with a view of the Campanile from the east, in our number for April 30, 1886; the baptistery, and the famous monument to Pope John XXIII., by Donatello, in the Building News for Feb. 3, 1893.

SELECTED DESIGN FOR LAYING OUT THE CLIFFS AT FELIXSTOWE.

We illustrate to-day, by perspective, plan, and elevation, the design by Mr. Brightwen Binyon, F.R.I.B.A., of Ipswich, recently selected in competition for laying out about 800ft. frontage of the cliffs and grounds beneath the existing public gardens at Felixstowe. The competition was promoted by the Felixstowe Spa and Winter Garden Company, who offered a premium of £50 for the design placed first, and stipulated that the outlay incurred in carrying out the scheme, including the provision of concert-pavilion, reading and refreshment-rooms, lavatories and cloak-rooms, should not exceed £15,000. It will be seen that Mr. Binyon's design provides for a central building, containing billiard, refreshment, and cloak-rooms, over which is a concert-hall or winter garden, 86ft. by 55ft., with reading, smoking, and dining-rooms, facing the sea, and opening on to a promenade along the front of the site, under which are arranged beach-houses, that will take the place of the present unsightly bathing-huts. The concert-hall is near the new central railway station, now in course of construction, with loop lines of access, by the Great Eastern Railway Company. This hall is lighted principally from the top by a glass pavilion roof, having a promenade round, with a bandstand and wind shelters to the front. The buildings and grounds are entered from the beach in the centre, and also from the cliff gardens. The grounds have been divided into three, and the building is so arranged that it can be carried out in sections:—The first, the centre portion, containing the concert-hall and beach-huts; the second, the portion to the west of the existing zigzag steps and path, containing the spa and baths, and also a continuation of the promenade; and the third portion consisting of a continuation of the promenade to the east, as far as the end of the site. The design has been arranged with the view to the subsequent building of a pier—an attraction urgently needed to enable Felixstowe to take its rightful status as a popular seaside resort—starting from the level of the promenade at the centre of the range of buildings, and the grounds are laid out with paths and tennis courts, with summer huts and seats at intervals.

BOTTLING AND MINERAL WATER DEPARTMENT, ETC., FOR THE OLDHAM BREWERY CO., LIMITED.

These premises have a frontage to Oldham-street of 129ft. and are 58ft. deep; they are divided absolutely into two departments, one being for beer bottling and the other for manufacture of mineral waters. Each department is complete in itself, having separate washhouses, loading docks, &c. In the basement it is divided into two large and lofty cellars, the boiler-house being in centre and under washhouse; the cellar on left-hand is used as bottling cellar, the other as storage for bottled beer. The top floor is devoted to syrup rooms and rooms for storage of empty bottles, &c. Small office and hoist are provided, the latter having Worrall's patent hoist-gates, which open and shut automatically, worked by the mechanism of the hoist itself. The hoist was provided and fixed by Messrs. Barker, of Oldham, who also fixed crane in bottling cellar, used for lifting barrels of beer on and off the stillages. There is a chimney 30 yards high. Cellar floor is formed of concrete, finished with granite face. Centre floor is fireproof, having steel girders and joists filled in with concrete and finished with patent rock asphalte, rendering same waterproof. Top floor consists of 3in. tongued and grooved planking fixed on strong joists and iron beams. The whole of the ceilings are boarded with pitch-pine boards and varnished. Roofs to washhouses have continuous lantern lights, with strong glass louvres, and are glazed on top with patent glazing. Glazed bricks have been largely used in bottling-rooms and washhouses. All staircases throughout are entirely of cast iron. The areas in front are finished with Hayward's patent prismatic lights. All rain-water pipes are of strong lead and are fixed inside, recesses in walls being arranged to receive same, and covered with movable boards, the bottoms of each stack being provided with patent trap and inspection chamber for cleaning out. The whole of inside walls, also front outside, are faced with plastic bricks. The contractors for the building were Messrs. J. and D. Blunn, of Oldham, the architect being Mr. Charles T. Taylor, A.R.I.B.A., 10, Clegg-street, Oldham.

ARCHITECTURAL ASSOCIATION EXCURSION TO LANCASHIRE.

Following up and completing our illustrations of this excursion, we publish this week a double page of reproductions of some excellent photographs of the clipped yew-trees in the front garden at Levens Hall, and the panelled Yellow Bedroom in the same mansion, and the courtyard of Borwick Hall—all three taken by Mr. F. Turner, of Morecambe, and the courtyard at Hoghton Tower, by Messrs. C. Simms and Co., of Manchester. The buildings were described in our last issue, p. 212-4, when other illustrations of Borwick and Levens Hall were given.

NURSES' HOME, BRADFORD GENERAL INFIRMARY.

The foundation-stone of this building (illustrated herewith) is intended to be laid by the Duke of Devonshire on August 30. The total cost of the structure, when complete and furnished, will be about £10,000. Accommodation will be provided for over fifty nurses, the majority of whom occupy a house adjoining the infirmary grounds, now rented by the infirmary authorities, the lease of which expires in three years. The basement will contain kitchen, scullery, larders, storerooms, boiler-room, linen stores, boxrooms, and a porter's lodge at the north end. The ground-floor will contain the main entrance, which will be on the east side, next the infirmary gardens; opposite the entrance is a staircase, which occupies an open well from bottom to top of the building. This floor comprises a matron's-room, visitors'-room, nurses' parlour, probationers' parlour, two studies, lavatory, sewing-rooms, eight bedrooms, and two bathrooms. The first and second floors above are very similar to each other, the first floor containing twenty-one bedrooms and the second twenty bedrooms, one of the latter being double the size of the ordinary bedrooms, and to be used as a sick-room. The contractors' names are:—Masons and joiners, Messrs. W. Ives and Co., Shipley; slater, Mr. James Smithies; plumbers, Messrs. Stead and Hutton; plasterers, Messrs. B. Dixon and Co.; painter, Mr. S. Lupton. The architects are Messrs. Milnes and France, of Bradford.

CHURCH OF STA. MARIA DEI MIRACOLI, BRESCIA, ITALY.

The name of the architect of this church has not been handed down to us. Indications point to some master of the Venetian school, probably Pietro Lombardo, or Scarpagnino, as the designer of the plan. All we know is, that in 1487 the construction was already under way, and that in 1488, one Jacobo made provision for certain enlargements. Burkhardt, who, in his "Geschichte der Italienischen Renaissance," 2nd edition, page No. 123, gives the ground-plan of the edifice, calls it a "centrifugal structure," a "fragment of splendour gone mad." The plan is very peculiar: a square nave, subdivided by four pillars into nine squares, of which four are surmounted by domes differing from each other in dimensions, giving the whole an air of whimsicalness rather than that of a serious solution of an architectural problem. Of far greater moment, artistically, than the interior is the main façade, fronting on a narrow street, the Corso Vittorio Emanuele, it being, at least in part, one of the most sumptuous performances in the Decorative Renaissance style. This façade owes its origin to the labours of several architects, who were successively engaged upon it. The central portion, erected about 1505, which is the older and the finer part of the façade, is undoubtedly the work of Gian Gasparo Pedoni, of Cremona. Four high pilasters, lavishly ornamented, flanking an entrance porch of most peculiar design, with a slender Venetian gable over it, the style of the structural framework, the lack of correct feeling for the logic of architectural forms, notwithstanding the great beauty of detail,—all these points are readily explained by the Venetian origin of the work. The upper story, as also the bare side-wings, which latter stand in no organic relation whatever to the interior of the building, are later additions, dating from 1612. The dry and uninteresting architecture of these later portions which it has been sought to enliven by the addition of clumsy urns and vases, and by statues over the side doors, shows the difficulty of the task of completing, with straitened means, an edifice begun in too lavish and expensive a style. We are indebted to the *American Architect and Building News* for this illustration.

The town council of Aberdeen passed plans on Friday for new buildings to cost about £20,000, including a proposed Unionist club in Union-terrace.

The pulling down of the old buildings on the site of the Oriental Palace of Varieties, Camberwell, has been commenced, and the tenders for the new building were opened on Thursday in last week, at the request of Mr. W. Hancock, the architect, at the office of Mr. H. E. Pollard, who has prepared the quantities. The tenders will be considered at the next board meeting.

A work by George Morland, entitled "Rabbiting," has just been added to the collection in the National Gallery. It is numbered 1497, is hung in Room XX., and has been bequeathed by Joseph Towers Smith.

Collins's music-hall, Islington, was closed on Saturday night for three months at least, for reconstruction by plans by Mr. Woodrow, architect, of Chancery-lane. The works will include an enlarged front with granite pilasters and bevelled windows. The stage is to be of greater width and depth, and there is to be a stage door and extra exits into the Essex-road. The whole of the seating accommodation in the balcony and gallery is to be rearranged, while the boxes also will be remodelled and added to. The ceiling will be treated in plastic decoration, and the general tone of the embellishments will be white and gold. The floors throughout the building—gallery, balcony, stalls, &c.—are to be carpeted. Mr. Charles Dearing, who is to do the rebuilding, is one of the four proprietors of the hall.

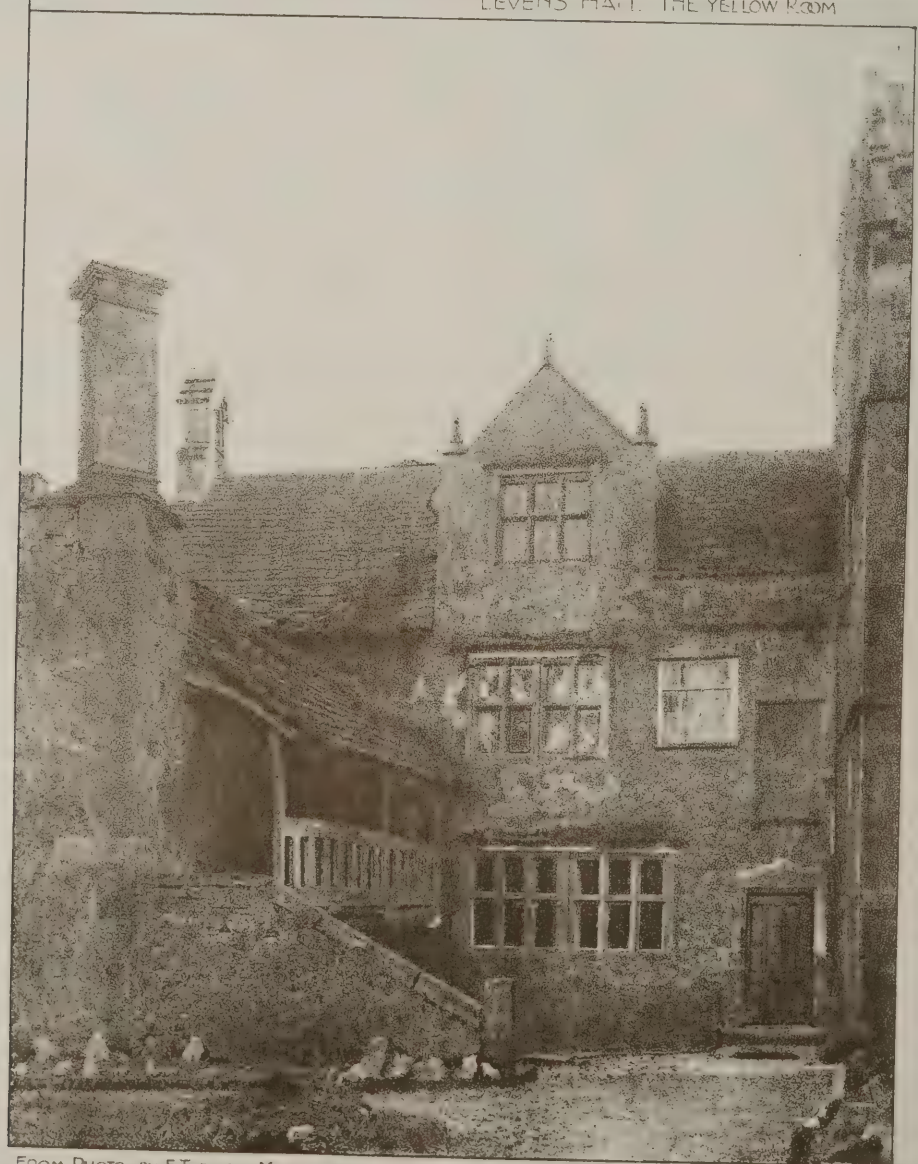
STA. MARIA DEI MIRACOLI, BRESCIA, ITALY.

GROUND PLAN

Photo Lithographed & Printed by James Akerman 6 Queen Square W.C.

LEVENS HALL. THE YELLOW ROOM

FROM PHOTOS B



FROM PHOTO BY F. TURNER · MORECAMBE

BORWICK HALL

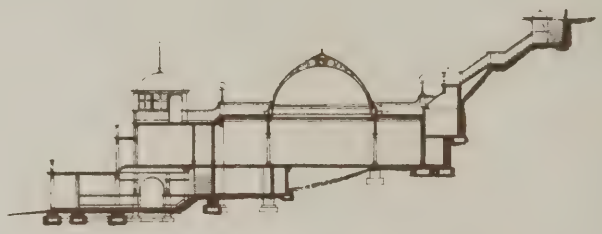
RNER · MORECAMBE

LEVENS HALL GARDENS

HOGHTON · TOWER · COURT-YARD

FROM PHOTO BY · CHAS · SIMMS & CO · MANCHESTER

SECTION AA



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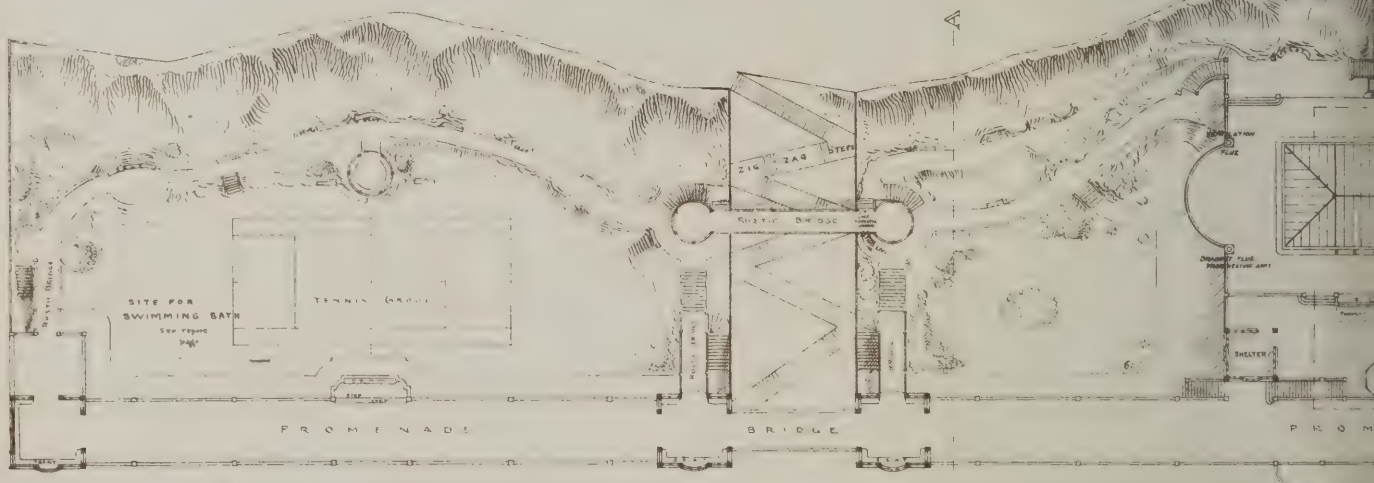
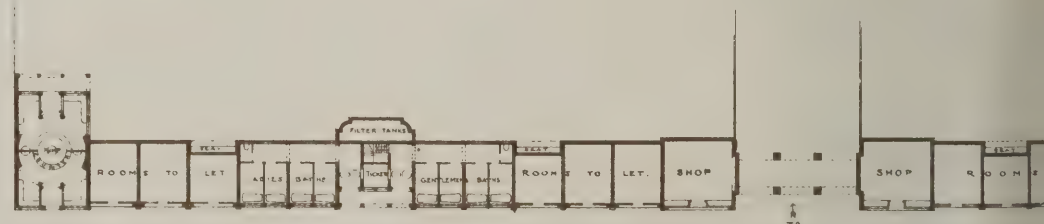
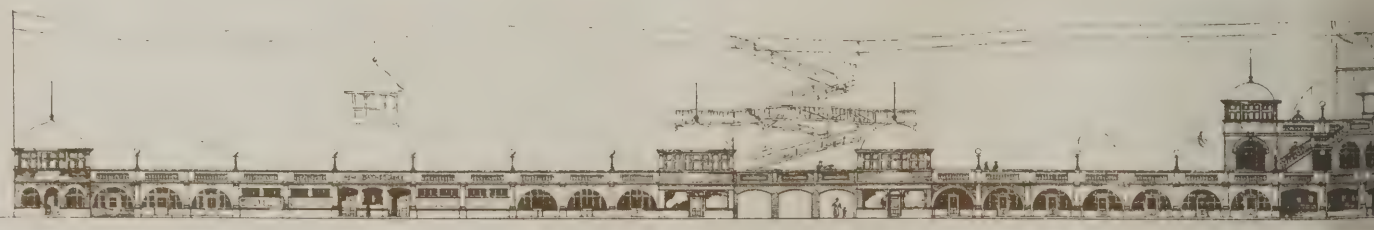


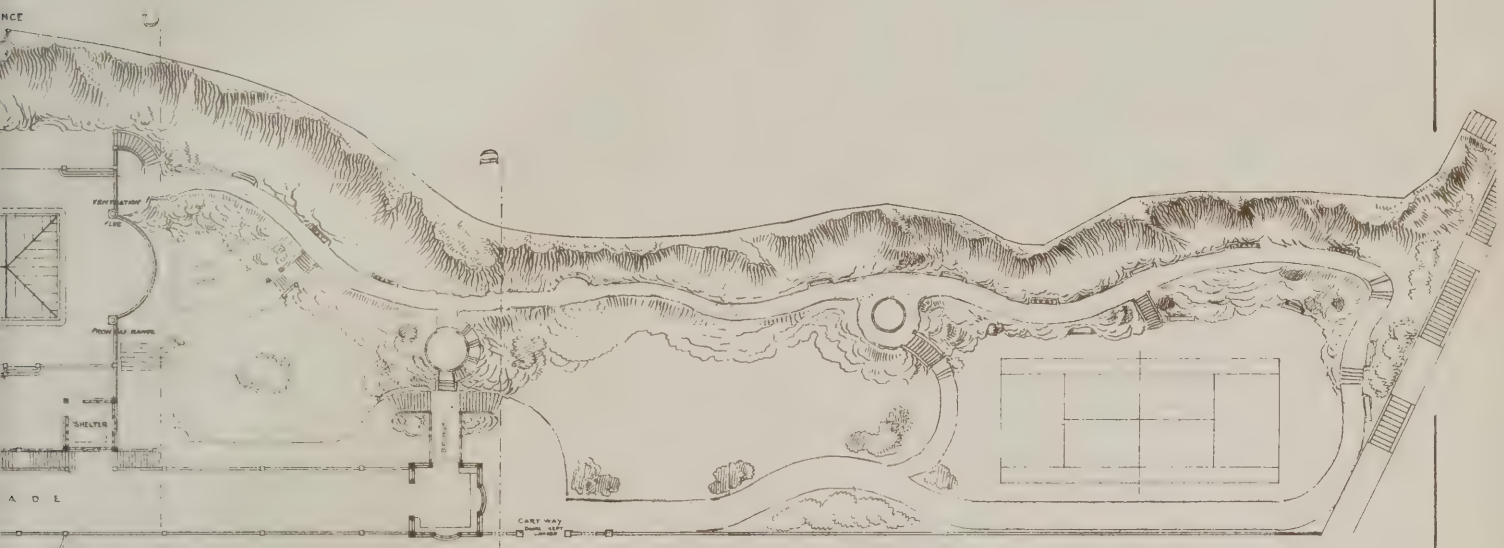


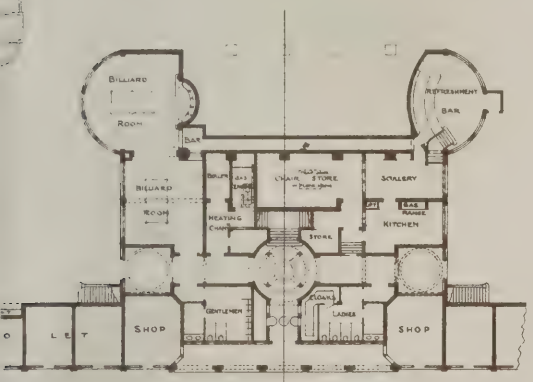


SELECTED DESIGN BY BRIGHTWEN BINYON, A.R.I.B.A.

SECTION C.C.

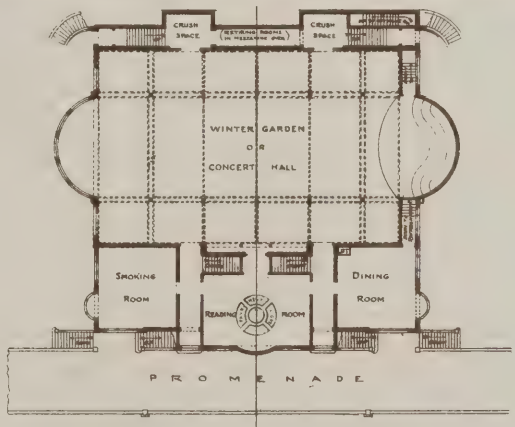
SECTION D.D.





MAIN ENTRANCE

GROUND PLAN



FIRST FLOOR PLAN

PROPOSED EXTENSION OF PROMENADE

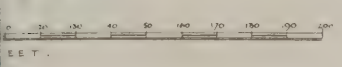


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

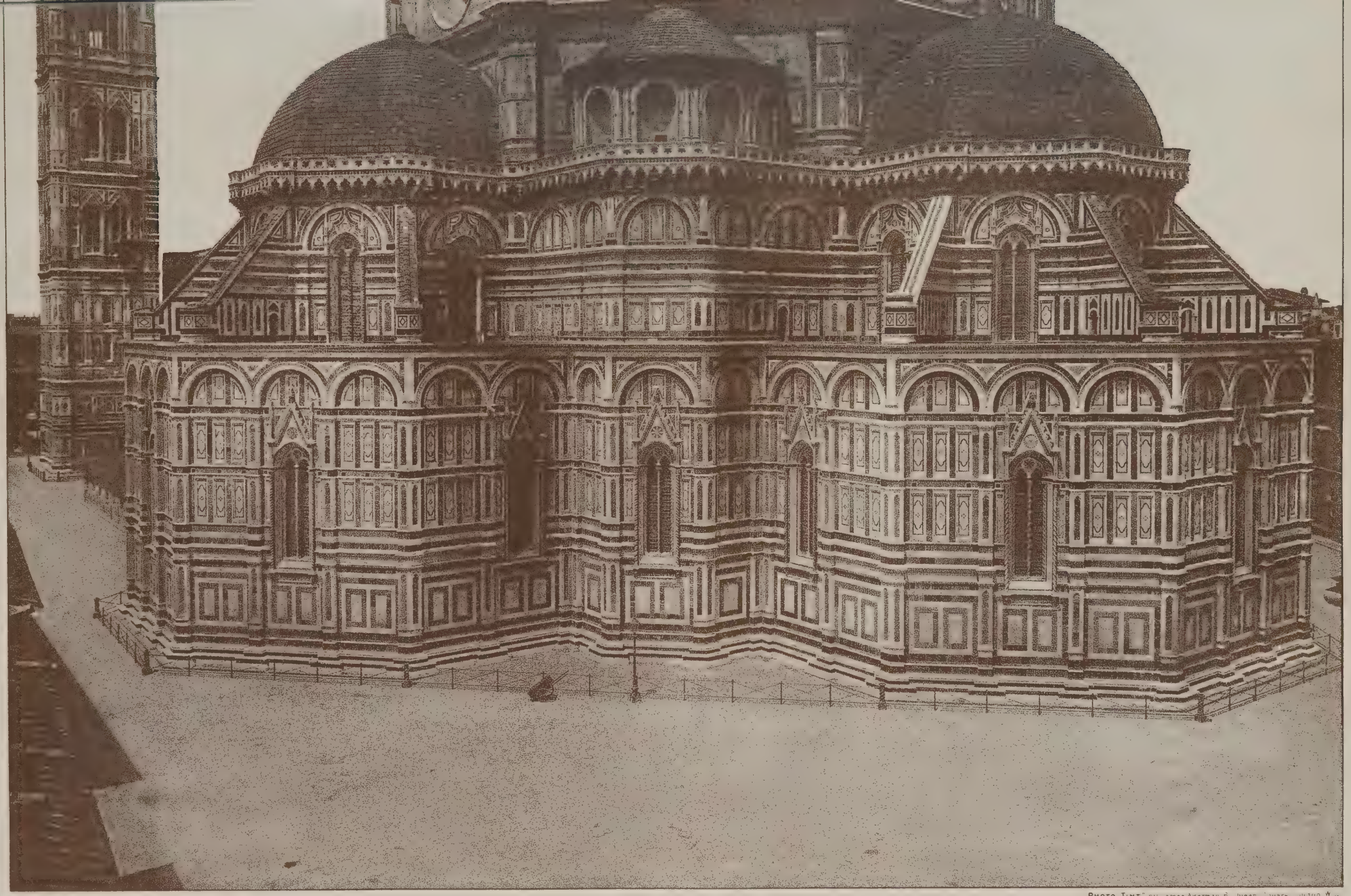


PHOTO-TINT by James Ackerman 6 Queen Square London W.C.

THE DUOMO FLORENCE

"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.

PROPOSED · PIER · FOR · FELIXSTOWE · BRIGHTWEN · BINYON · ARIBA · ARCHT.

NURSES' HOME, BRADFORD.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the Building News, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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NOTICE.

Bound copies of Vol. LXXI. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LIV., LVIII., LIX., LX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Received.—A. F. W.—R. E. I. Co.—P. L. V.—C. P. C. and Son.—T. L. M.

Correspondence.

CARDIFF NEW TOWN HALL AND LAW COURTS.

To the Editor of the Building News.

Sir,—As will be seen from your advertising columns, Cardiff contemplates the erection of a Town Hall and Law Courts on a scale befitting its importance as a centre of wealth and population.

For this purpose the corporation have lately purchased from the Marquis of Bute a finely timbered park of some 60 acres. This magnificent site is bounded on its south by "The Feeder," an artificial but beautiful river by which the waters of the Taff are carried to the docks. There is a singular charm about this rapidly flowing stream, here entirely overarched by trees, with the lawn and garden around the ruins of the Grey Friars Monastery on the one side, and the park aforesaid on the other.

The spot appropriated to the buildings in question is within a stone's throw of "The Feeder," and not three minutes' walk from the centre of the life of Cardiff; yet, scarcely a trace of the near neighbourhood of a great town is visible from it. This is partly accounted for by the fact that the grounds of Cardiff Castle bound the Park to the west, with only a road and canal intervening. It struck the writer on visiting Cardiff that the corporation had secured an unrivalled site for their future municipal buildings.

It is to be hoped, therefore, that something worthy of the opportunity may result from the competition which has been determined upon for the buildings in question. The time allotted for the work is short; but, from the circumstances of the case, cannot be extended. The conditions are, I think, more favourable than usual.—I am, &c., A. Waterhouse.

20, New Cavendish-street, W., Aug. 19.

Intercommunication.

QUESTIONS.

[11740.]—**Decay of Brick and Stone.**—Would some of your readers kindly refer me to any published paper or article dealing with the decay of brick or stone in any description of building? I desire to learn what methods have been recommended with the view of prevention of such weathering.—G. Abbott.

[11741.]—**Bath Rate.**—I have let a bath into a kitchen floor with waste-pipe going under floor on to trap outside. I have no taps whatever connected with bath, but have *L* boiler behind kitchen fire, and tap at front, that I can connect a loose pipe to fill bath. Can the urban council claim bath rate for same?—W. Wrigley.

[11742.]—**Local Surveyor Retaining Plans—Building Line.**—A short time ago I deposited a set of plans for villas with the local authorities of a suburb (seven miles away) of London to submit to the fortnightly meeting of their building committee. The plans were prepared in accordance with the by-laws of the district. After the meeting, I received a letter from the surveyor, stating that the plans were rejected, and several alterations were required. I called at the surveyor's office naturally expecting to take the plans away to make the alterations; but, to my great surprise, the surveyor refuses to let me have them, and will not allow them to be taken away from his office on any account. He says I can alter them there; but, as the plans are the contract drawings, and have been very carefully prepared, also we have no copy, it will be no good doing so. The surveyor will give no explanation of his extraordinary way of doing business, and states his time is too valuable to waste in arguing the matter. I have been in business some 17 years, and passed some hundreds of plans, and never known a similar case. We propose building the villas upon a new estate (no houses on at all at present), and the building line is marked for all the plots. The surveyor insists that we must not build the bay window beyond the building line; but the front wall of bays is to be considered the building line. I have always found that the front wall of the house (main wall) is the building line, and any bays, &c., are allowed to project. If we have to comply with the surveyor's unreasonable demands, it will make a very serious difference in the value of the proposed buildings. There are no houses near at hand for him to refer to as a precedent.—F. C. T.

[11743.] — **Constants.** — In Professor Banister Fletcher's textbook on Quantities, I see there are tables of constants by the multiplication of which the price of labour is obtained. I may say I am unable to ascertain how it is done. Mr. Fletcher says in the following tables it will be necessary to multiply the constant by the rate per hour of the workman, which will give him the price of labour. To this must be added the cost of material, and the total will give the estimated prime cost of the work, and, being in the painting trade, I am desirous of knowing exactly what they mean?

Painting in Common Colours.

First or primary coat, per yard super.	16h.
Second and following coats, each	14h.
First coat on iron	25h.
Second and following coats	16h.
Sash squares, each side, first coat, per doz. squares	50h.
Sash squares, each side, second coat, per doz. squares	40h.

The above are the tables given. Where I am lost is what these figures or constants represent. Are they seconds, minutes, or hours? Could you illustrate to me what priming would cost per yard super. with wages at 8d. per hour? In the constants for joiner's work, he gives doors, if flush one side or bead butt, 2½ framing; the constant is figured like the following, 1·30 hour. What would be the cost of labour per foot. super. with wage of 9d. per hour and a constant like the above?—J. Calderbank.

[11744.]—**Slow Combustion Floors**—I shall be obliged if any of your correspondents can give information *re solid* wood flooring (for warehouses, &c.), known by the above name, now constructed; relative cost and strength compared with ordinary boarding and joists, and whether approved by leading fire insurance companies?—An Old Subscriber.

[11745.]—**Artificial Stone.**—I would thank the writer of an article on artificial stone and marble compound, signed "W. C. S.," on p. 217, last issue, for a formulæ to finish the exposed surface, about ⅜in. thick, of Portland cement concrete to resemble Dumfries red sandstone.—Over Thirty Years a Purchaser of the "Building News."

[11746.]—**Drainage of Street House.**—Will some reader answer the following? There is a soil-pipe coming down the corner of the house and the kitchen offices at the back, which goes into a drain which passes below the rooms of the house to the front. An unpleasant smell is sometimes experienced in the back room—probably through a leakage or defective joints of the drain-pipe. Which is the best course to adopt? Should there be a disconnecting trap at the foot of soil-pipe in the yard, or is a chamber necessary? The soil-pipe has no ventilator. Is it necessary to have one? Does not this require an inlet for air somewhere in front? Advice will oblige.—A Householder.

[11747.]—**Sketch Plans.**—I prepared two or three pencil sets of plans for a villa to be built about 70 miles from London. The gentleman approved of one set, and agreed to have them carried out. He subsequently wrote to say he would get a local builder who had built houses on the estate to carry the plan out. As I have not heard anything since, I suppose he has come to terms. What can I charge for my preliminary plans, (1) supposing the house is being built, and (2) supposing nothing further has been done?—Perplexed.

[11748.]—**Deduction of Brickwork for Window Openings.**—Will a practical reader say how the dimensions are taken in deducting window openings? Whether the width and height should be taken to the inside recess in the case of a wall two bricks thick?—A Young Assistant.

[11749.]—**Height of Chancel.**—Is it not considered better and less expensive to make a chancel the same width and height of nave, so that the same roof can be used? A chancel arch and the masonry of gable, coping, &c., over it adds to the cost I am told. Is this so? Are there other considerations?—Sigma.

[11750.]—**Bending and Jointing Block-Tin Pipe.**—Will any plumber or pewterer who has had experience in working the above kindly give a few hints? I have to replace a 2in. lead suction pipe with block tin, and having had no previous experience in either bending or jointing the above, find I cannot get on with it.—The Old Hand.

[11751.]—**Trigonometry.**—I shall be obliged if one of your readers will give me the solution to miscellaneous question No. 8 in Galbraith's "Manual of Plane Trigonometry":—"Calculate the distance a person must recede from a pillar 60ft. high in order that it will subtend an angle of 45°, the height of his eye above the ground being 5ft.—Student.

[11752.]—**Cement for Marble.**—Can any correspondent recommend a thoroughly trustworthy cement for marble? I have tried recommendations in which water-glass forms a part, but cannot get it dry.—Marmo.

[11753.]—**Floor for Tent.**—I require a portable floor for an army regulation tent, 40ft. in circumference. Will any of your readers who have constructed or used one give me information on the following points? (1) The most portable and strongest form of floor, as the camping ground will be in the Highlands of Scotland? (2) Plan of construction, and method of fastening segments or parts together? (3) What is the strongest and lightest material that can be used? The location of the camp will only be changed once a month or so.—Campstool.

REPLIES.

[11714.] — **Stone Measurement.** — I may have misunderstood "T. M. Garrood's" question. The sketch he gave of four mullion stones cut out of a block 1ft. 11in. by 15in. showed, as I understood, the dimensions allowed by "G." The stonemason says he should be "paid for the square that each block might have come out of." "G." now explains that the mullions were actually cut on the job out of blocks of stone in sections of fours, as shown in sketch. If that is so, I do not see why the stonemason is not satisfied with the measurements allowed. I was under the impression that the mason had cut each out of a separate stone, and that the sketch showed only the way they could be cut out.—Reader.

[11736.]—**Defective Materials.**—"Lex" will find cases that bear on defective material occasioned by architect's neglect in "Rogers v. James," 1891, "Badgley v. Dickson," 1886. These chiefly relate to certifying as proper or complete work which is defective, and in which improper materials have been used. If an architect sues an employer for his commission for services, and the latter counterclaims for damages on the ground that, by reason of his architect's negligence and want of care and skill, the work had been done in a defective manner and with bad material, the counterclaim, if established by evidence, will be maintained. I am not aware of any recent case of an architect being sued for damages for allowing defective material; it is hard to prove that an architect is responsible for bad material, although by neglect in superintendence such material may be introduced, and there an action would lie. Hudson, on "Building Contracts," may be referred to.—G.

[11737.] — **Construction of Subways.** — The Boston subway is one of the most recent. This subway is constructed chiefly of concrete, brick rings in arches, with waterproofing with plaster and asphalte. The cross-sections given in the *Engineering Record* give several kinds. One of these sections shows a double and single-track subway, one track higher than the other, but both constructed of concrete with brick arches, one 13ft. 6in., and the other 14ft. 9in., both forming a "double-barrel subway. Under Tremont-street is a subway double track 25ft. 7in. wide, with side walls, floor, and haunches of concrete, and brick arch tied by a 1¾in. iron rod 2ft. apart, about level with the haunches of arch. The outside of walls and bottom of invert is of waterproofing. The wide subways have arches of 2ft. thick, the side-walls near the middle of their height is 3ft., and is increased to more than double this thickness where it joins the invert. At its foundation the subway of 23ft. width occupies a width of 34ft. The height of crown above invert is nearly 18ft. Refuge niches are hollowed out on side walls at every 20ft. In the sections of double barrel subways, vertical I beams are shown imbedded in the side walls with tie-rods connecting the tops of every pair of opposite beams. The subways have a coating of asphalte entirely round them; in some places a coating of cement plaster is under the concrete. The depth of the subways or inverts varies from 26ft. to 37ft. below the surface of street, so as to permit the water and gas-pipes to remain. New sewers have been laid down on each side, connected with the house-drains. Some of these single-track subways unite with the main subway in a bell mouth, and in these junctions brick arches spring from one side wall to the other; the arches have heavy concrete backing, and are strengthened by vertical I beams 6ft. apart imbedded in the concrete side walls and tied together. I have only given a few details of the main sections, which are illustrated in the journal referred to.—G. H. G.

[11733.]—**Asbestos.**—"A Constant Reader" will find all particulars about this material in R. H. Jones's work, just published, entitled "Asbestos and Abestic," a notice of which appeared last week in the Building News, p. 214. For plastering walls and ceilings, the asbestic plaster is excellent—light, sound, and fireproof, and does not require sand or hair.—An Architect.

[11739.]—**A Disconnecting Trap.**—There are several excellent cleaning traps in the market. I can recommend the "Improved Kenon" disconnecting trap made by Thos. Crapper and Co., of Marlborough-road, Chelsea. It is well known and largely used, and has the advantage that easy means of cleaning are provided by a brass cap, which screws on, and the passage of sewage is facilitated by the egg-shaped section of the trap at the bend. Send for particulars and price-list.—G. H. G.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

North-Western Sanitary Inspectors' Association.—The members of the North-Western and Midland Sanitary Inspectors' Association held their annual excursion on Saturday at Wall Grange, near Leek, on the invitation of the Staffordshire County Council. Representatives from Liverpool, Bootle, Waterloo, St. Helens, Bromborough, Lymm, Wigan, Ince, Hindley, Penmaenmawr, Rhyl, Clitheroe, Crewe, Stafford, Hanley, Burslem, Handsworth, and other districts, assembled at Stoke, from where they proceeded by waggonettes to Wall Grange. A halt was made at the pumping-station of the Staffordshire Potteries Waterworks Company, at Wall Grange, where luncheon was served. Afterwards the chair was taken by Dr Reid (county medical officer of health, Staffordshire), and a business meeting was held. An adjournment was made to the new asylum works at Cheddleton, where the party was received by Mr. Pebworth, clerk of the works to the Staffordshire County Council. Mr. Pebworth read a paper dealing with the drainage and plumbing work which had been executed under his superintendence, and a detailed examination was made of the various sanitary appliances. At 5.45 the members were driven to Stoke, a call being made at the works of Messrs. Johnson, Limited, pottery manufacturers.

Royal Institute of British Architects.—The session 1897-98 of the Institute will be opened on Monday, November 1, when Professor George Aitchison, A.R.A., will deliver his presidential address. The subsequent meetings will be held at 8 o'clock on the following Monday evenings:—November 15 and 29, December 13, January 17 and 24, February 7 and 21, March 7 and 21, April 4 and 18, May 2 and 16.

Yorkshire Sanitary Inspectors.—On Saturday the members of the Yorkshire branch of the Sanitary Inspectors' Association met at Wakefield. The members assembled at the Town Hall, and were formally introduced to Mr. Henry Smith, the Mayor, in his parlour, by Mr. A. Whitaker, the sanitary inspector for the city. The Mayor having offered the members a very cordial welcome to the city, the visitors then drove to Wakefield City Council's large reservoir at Ardsley, which will hold 320,000,000 gallons of water. After luncheon at Wakefield Town Hall the annual meeting was held in the Council Chamber, Dr. T. Pridgin Teale, of Leeds, the president, taking the chair. Mr. A. Whitaker, of Wakefield, and Mr. W. Chadwick, of Sandal, were elected auditors, and the president was unanimously re-elected. Mr. W. Kemp, chief sanitary inspector at Harrogate, read a short paper, intitled, "Should sanitary authorities give a certificate, under the hand of their sanitary inspector, as to the perfect sanitary condition of any house within their district at a fee to be charged by the said authority?" Mr. Kemp said that personally he did not see any objection whatever to this course being adopted; in fact, he thought every householder should have a guarantee that the house he or she lived in was in a perfect sanitary condition. If the system were adopted, it would be the means of bringing to light many insanitary premises which might never come under observation, and it would be a protection to visitors to our health resorts. He contended that no stipulations should be made by the authorities as to the conditions upon which a certificate should be granted; it should be left to the inspector to satisfy himself whether the premises were in such a sanitary condition as would justify him in giving a certificate without jeopardising his reputation as a sanitary inspector. A discussion on the paper was opened by Mr. Denham, of Tadcaster, and was taken part in by Messrs. Sykes, of Holmfirth; Wilkinson, of Altofts; Lindley, of Batley; Darley, of Leeds; Drake, of Huddersfield; and the president. The visitors afterwards inspected the County Council's buildings.

The Corporation of Ipswich have under consideration an extensive scheme proposed by the Great Eastern Railway Company for greatly extending the siding accommodation in the neighbourhood of the dock, river, and waterside works. Some years since the corporation obtained a private Act for making a dam and bridge across the river near the main entrance to the dock, but allowed its powers to lapse, and the G.E.R. Co. now propose to carry out a similar undertaking, provided the consent of the coporation and of Parliament are given.

LEGAL INTELLIGENCE.

In re Dixon Brothers.—At Barnstaple, on Friday, before Mr. Registrar Bosson, Messrs. Dixon Bros., the contractors for the construction of the Wooda Bay Pier, near Lynton, appeared for their final examination in bankruptcy. The statement of affairs disclosed the gross liabilities to be £10,102 14s. 6d.; expected to rank, £10,092 14s. 6d.; assets, £943 17s. 3d.; and deficiency, £9,148 17s. 3d. The Official Receiver (Mr. George Philpott) observed that the partnership between the brothers was entered into in October, 1892, without any capital on either side. Mr. John Dixon, the father, appeared to advance money from time to time. In 1895 the partnership was dissolved. Although the statement gave the assets as £943 17s. 3d., £940 of that amount was not likely to be realised. Mr. Thomas Oliver Dixon, examined, admitted that a young man named Edward Britton, whom he had since discovered was then a minor, was employed on the works at Wooda Bay Pier. He supposed Mr. Britton, who had accepted three bills, was a creditor of the firm. Walter John Dixon, the other debtor, also examined, said that he did not know Britton was a minor when he first saw him. The arrangement was that Britton should take a quarter share, otherwise a half of his debtor's share in the business. Britton was an architect, and lived at Torquay. He had accepted the bills drawn by debtor, amounting to £208. The examinations were closed.

Registration of Tile Designs.—Godwin and Hewitt v. J. H. Barratt and Co.—In the Lord Chancellor's Court on Saturday, August 7, an application of considerable interest to tile manufacturers was heard by Mr. Justice Stirling. This was a motion on the part of Messrs. Godwin and Hewitt, tile manufacturers, of Hereford, for whom Mr. Jenkins, Q.C., and Mr. Philpot appeared, for an injunction against Messrs. J. H. Barratt and Co., Boothen Road Tile Works, Stoke-on-Trent, to restrain them from selling the design of a tile registered in the plaintiffs' name at the designs branch of the Patent Office, Chancery-lane, and numbered 218,298, and from applying the same or any colourable imitation thereof to any substance or article of manufacture, and in particular for manufacturing any tile made so as to resemble those of the plaintiffs', and from selling, or offering, or exposing for sale any substance or article of manufacture to which the said design had been applied. The defendants denied that the tiles sold by them were an imitation of the plaintiffs' registered design, which had been registered in September, 1893, and through their counsel (Mr. Graham Hastings, Q.C., and Mr. Sebastian) moved in return for an order to rectify the Register of Designs by removing therefrom the plaintiffs' registered design, number 218,298, on the ground of anticipation, and that there was no novelty or originality in such design. The plaintiffs' design was applied to a 6in. square tile, and was of the ordinary brick pattern made by many manufacturers—that is, divided into 4in. by 2in. and 2in. by 2in. alternately, with the exception that the plaintiffs' tile was bevelled all round, and the sub-divisions were also bevelled, giving it the effect of a combination of bevelled edge briquettes or small tiles. They claimed for it that they were the first to apply this combination to a bevelled tile. The defendants admitted this; but alleged that as early as 1890 small bevelled-edge tiles were made, which, when placed together, had precisely the same effect as the plaintiffs' design, and unless a piece of work were examined very closely, it would be impossible to detect the difference or to say whether it were composed of separate small tiles or of the plaintiffs' registered design of a combined tile. Upon the question of imitation, defendants pointed out important differences which existed between their design and that of plaintiffs, which they were charged with imitating. The plaintiffs' design was the ordinary brick pattern, with a right-angled bevelled division and a bevelled edge. The defendants' was a brick pattern; but their bevel was of the slightest possible character, so as to admit of being easily cleaned, and each briquette into which the tile was subdivided had a pronounced white line running round the edge of the bevel, which made it impossible for the one tile to be mistaken for the other. Numerous affidavits were read on both sides, and the points for decision were whether the application of a bevelled edge to a divided tile, which produced an effect already obtained by means of separate tiles, and which was already in use in connection with a grooved tile, were a novel and original design which ought to be admitted to registration under the provisions of the Patents' Designs and Trade Marks Act, 1883-1888; and if so, whether the defendants had infringed the design of the plaintiff. Mr. Justice Stirling, in giving judgment, said: "This is a motion to restrain the infringement of copyright in a design claimed by the plaintiffs in the action. The copyright is granted in respect of a claim which is in these terms: 'Design for pattern of embossed tile to be made in any size.' Therefore, what is granted is copyright in a design for a pattern. The motion is met, not merely by denial of infringement, but by motion for rectification of the register, by taking off the plaintiffs' name from the register in respect of this design, on the ground that it was not made novel or original, which it must be in order to satisfy the words of the Act. Now, it is proved—and it is not denied—at the time when this copyright was granted, tiles had been made of the form before me, the pattern of which consists of three rectangles and three squares, put together in this form; and the pattern is embossed on the tile by straight grooves of varying depth in the tiles, which had actually been made before the date, and have been exhibited before me. Now, what does the pattern of the plaintiff consist in? The pattern consists exactly of the same straight lines, with the difference that, instead of being made by a simple groove, there is a bevel, and the bevel is found not merely along these several marks, but at the edge of the tile itself. First of all, what is the law applicable to the case? That was settled by the Court of Appeal in the case of 'Le May v. Welch,' reported in the 28th Chancery Division, p. 24. Lord Justice Fry put it very shortly: 'Unless the design be in substance either novel or original, it is not novel or original within the meaning of the Act.' He further laid down that, in determining whether that design is substantially novel or original, you must have regard to what you see, and answer it mainly by the eye. Then I have a very short question before me: I have to look at the two tiles which I have before me—that which was in use before the plaintiffs' copyright and that which the plaintiffs have copyrighted; to say whether, as I see them, the plaintiffs' design, the plaintiffs' pattern, is novel or original. It appears to me that it is not. I cannot see that the shape of the grooves or bevelling of the edge of the tiles really makes a substantial difference in the pattern. In my judgment, therefore, the defendants' motion succeeds, and the plaintiffs' application therefore fails. That is quite independent of any conclusion which I might come to on the plaintiffs' motion as to infringement; but I must say that, as regards the infringing tile, to my eye, again—I speak simply by the eye—the defendants' bears much less resemblance to the plaintiffs' than does the plaintiffs' tile to the one which preceded it." Plaintiff's counsel thereupon applied that the motion might be treated as the hearing of the action, to which the defendants' counsel made no objection, and the action was then dismissed with costs for the defendants.

Unsuccessful Claim against an Employer.—The Judge of the Rochester County Court and a special jury on Saturday investigated a claim for £300 made by a journeyman carpenter named Varrall against his employer, Mr. Charles E. Skinner, a builder, of Chatham, for the loss of four fingers while at work at a circular saw, which the plaintiff alleged was defective. After hearing evidence the jury returned a verdict for the defendant, being of opinion that the saw was in good condition and that the accident arose through the plaintiff's handling the wood and saw unskilfully. The Judge said he was glad that by a recent Act of Parliament such cases would be settled by arbitration in future.

Neglect to give Notice.—George Walsham, of 35, Woodland-hill, Norwood, was summoned to the South-Western Police-court on Saturday, at the instance of Mr. Percy Hunter, district surveyor for Norwood, for infringing the Building Act by failing to give notice of his intention to begin a building at 33 and 35, Woodland-hill, and neglecting to comply with a notice of the surveyor requiring him to do certain work. Mr. Hunter said the premises in question were divided into two parts, one being used as a laundry and the other for a dwelling house. The defendant had cut down the party wall that divided the premises, and the Clause 74 of the Building Act of 1894—which required the erection of such party wall—had been inserted in the Act because of a fire that had occurred in the district at a milliner's shop, whereby some shop assistants lost their lives. The defendant had now re-erected the wall, so that all danger was removed; but the existence of such a wall was very necessary for the protection of workpeople. Mr. Marsham fined the defendant 20s. for the first offence; but on the second summons decided that the surveyor need not have called on the defendant to do the work, as it was done before the notice was sent. He accordingly dismissed the second summons, with 10s. 6d. costs against the surveyor.

"Quite Legal in America."—At the Liverpool Police-court on Friday, John George Houston, alias Davies, was charged with obtaining £60 from sundry persons by means of a false advertisement. He had advertised in Liverpool and Leeds papers that J. Davies and Co., 62, Dale-street, Liverpool, required a time-keeper over some building operations on an estate in Cheshire, and when the applicants presented themselves he required from £10 to £50 deposit as security. Several complied. The prisoner, who is a naturalised American, when apprehended, said he intended to engage a man at 40s. a week to work at a house he intended to build, and then when the ground floor was reached

he would mortgage the house, and pay back the security money. That kind of business, he added, was quite legal in America. The prisoner was committed for trial.

STATUES, MEMORIALS, &c.

Lymington.—At the last meeting of the town council approval was given to the plans of the monument which is to be erected over the grave of the late Mr. Coventry Patmore. The memorial will be subordinate to a churchyard cross, which is to be placed near the centre of the Roman Catholic portion of the inclosure. It consists of an obelisk, placed on a square pedestal, raised on three steps, symbolical of the Trinity. There will be at each angle of the junction of the obelisk with the pedestal a sculptured lion, the meaning of which in connection with the obelisk will be readily understood by the readers of "Religio Pœta." On three sides of the upper portion of the pedestal will be engraved the name of the poet, and the dates of his birth and death. At a lower level they will be adorned with panels symbolically carved. Above will be represented the Cross and Host, rising from a stem from which spring lilies entwined with the initial letter of the Virgin's name, and below will be the laurel wreath denoting that the poet's powers were devoted to the honour of Christ and His mother. This design will be inclosed by a band in the form of a vesica piscis, on which will be the legend, "My covenant shall be in your flesh," and in the spandrils the letters A.M.D.G. In the corresponding panels on either side will be inscribed passages from Patmore's writings in prose and verse. The fourth side, which will be immediately in front of the churchyard cross, is to be left plain. The material will be Irish limestone. The memorial has been designed by Mr. Basil Champneys, B.A.

Mr. C. H. Shannon has been awarded a gold medal of the first class at the International Exhibition of Munich for his picture, "The Wounded Amazon," which appeared in this year's "Pageant." Sir Edward Burne-Jones also received a first-class gold medal for his "St. George and the Dragon" series, and Mr. John Swan for his drawings of animals.

Last week Mr. Robert H. Bicknell, inspector to the Local Government Board, held an inquiry into the application of the Croydon Corporation to borrow sums of money amounting in the total to £72,300 for improvements within the borough, including £32,000 for new waterworks at Waddon. Evidence in support of the application was given by Mr. Thomas Walker, the borough engineer, who was supported as to the waterworks by Sir Frederick Bramwell, Mr. W. Whitaker, Mr. Edward Easton, and Professor Boyd Dawkins.

The finance committee of Aberdeen Town Council had under consideration on Friday the question of the appointment of an assistant burgh surveyor in succession to Mr. Lynam. After a discussion and division, it was decided that the duties pertaining to the office of burgh surveyor and city architect respectively were so separate and distinct that it was inexpedient to combine them, that the committee appoint an assistant burgh surveyor, and that the question as to the office of city architect be continued for further consideration. Mr. Gordon, at present in the surveyor's office, was recommended to the appointment of assistant burgh surveyor at a salary of £200 for the first year, rising by £25 per year to £300. The report was adopted by the town council on Tuesday.

The Viscountess Raincliffe opened on Friday, at the Mechanics' Institute, Scarborough, a bazaar in aid of the restoration of the church of All Saints', Thwing, near Hunmanby. The church dates back to the 12th century, and contains Norman work. It is proposed to preserve all its ancient features, but the pews will be replaced by open seats. The old font, which had been removed from the church and was lying in a garden in another parish, has been repaired and restored. An estimate of partial restoration is £750, and of entire restoration £1,000. The parish is purely agricultural; it contains a population of 375, has no resident squire, and is six miles from a railway station.

The new station at Mauchline, on the Glasgow and South-Western Railway, with increased waiting-room accommodation, was opened last week. The new premises, situated a little to the north of the old buildings, are built of Ballochmyle redstone and rough-cast, consist of a large booking-hall, agent's room, parcels office, and booking-office, ladies' waiting-room, gentlemen's first-class waiting-room and dressing-room, and a general waiting-room. On the opposite side of the main line there are now two waiting-rooms.

The Gloucester Union Board of Guardians have appointed Mr. Alfred Saxon Snell, of London, and Mr. Walter B. Wood, of Gloucester, as joint architects to their proposed new workhouse, infirmary, and cottage homes.

Our Office Table.

The curriculum for the session 1897-98 of the Architectural Association has just been published, containing particulars of the various classes and courses of lectures held in connection with the "A.A." at the studios, 56, Great Marlborough-street, W. The lecturers and instructors include Messrs. Henry Adams, Percy Buckman, Max Clarke, A. O. Collard, J. E. Drower, F. R. Farrow, Alfred H. Hart, F. E. Hulme, W. G. B. Lewis, F. W. Pomeroy, H. B. Ransom, H. E. Satchell, R. Elsey Smith, and A. W. Weedon; and among the prizes offered is the Association Travelling Studentship, value £25; the A.A. Medal, with ten guineas; the Essay Prize, value ten guineas, with silver medal; the Architectural Union Company's Prize, value ten guineas; the Arthur Cates Scholarship, value ten guineas; Measured Drawings Prize, value five guineas; and the Andrew Oliver Prize, value five guineas. Scholarships are also awarded in the school of design, and silver and bronze medals in the studio. The annual courses of lectures recommence on Monday, October 11.

On the previous Friday evening, October 8, the ordinary session of the Architectural Association will be inaugurated at the R.I.B.A. meeting hall, 9, Conduit-street, W., by an address from the President, Mr. Hampden W. Pratt, to be followed by the distribution of prizes gained last session. The subsequent meetings for the session will, as in previous years, be held as nearly as can be arranged on alternative Friday evenings at 9, Conduit-street, commencing at 7.30. The following are the names of the lecturers and the subjects of the papers:—Oct. 22, "Practical Lessons from the Bazaar Fire at Paris," by Mr. Edwin O. Sachs; Nov. 5, "Classification of Trades," by Mr. S. Flint Clarkson; "Some New Materials for use in Building," by Mr. H. D. Searles-Wood; Nov. 26, Conversazione; Dec. 3, "The Planning of High Schools and Endowed Schools for Girls," by Mr. J. Osborne Smith; Dec. 17, "House Painting," by Mr. L. A. Shuffrey; Jan. 14, "Composition in regard to Public Buildings," by Mr. Frank T. Baggallay; Feb. 4, "Hampton Court Palace," by Mr. John Belcher; Feb. 25, "Lead Work, Plain and Decorative," by Mr. F. W. Troup; March 11, "Scottish Ecclesiastical Architecture in the 14th and 15th Centuries," by Mr. Hippolyte J. Blanc, of Edinburgh; March 25, "Constructional Steelwork," by Mr. T. C. Cunnington; April 22, "The Morality and Economy of Competitions," by Mr. H. B. Cresswell; April 29, Members' Soiree; May 6, "Interior Lighting by Reflected Lights," by Mr. W. Eckstein, and "Electric Lighting as Applied to Architecture," by Mr. Tom Ekin; May 20, "Foundations as Applied to London Bridges and Riverside Foundations," by Mr. A. T. Walmisley; and May 26 (Thursday), Annual Dinner. The dates of the Saturday afternoon visits are fixed for Feb. 5 and 26, March 12 and 26, April 23, May 7, June 4 and 18, July 2, 16, and 30, and August 20, the annual excursion being arranged to occupy from August 8 to 13, 1898.

One of the first effects of the report of the Commons Committee as to the risk of fire at the South Kensington Museum will be the removal of the "Brompton Boilers," which have so long been an eyesore to the neighbourhood. The work of demolition of these ugly store-chambers will be commenced at once. H.M. Office of Works has decided, with the concurrence of the Treasury, that the unsightly iron building which was constructed three years ago on the quadrangle in the very centre of the museum, adding greatly to the risk of fire, is to be removed without delay. Protests against the erection of this temporary shed were made at the time, and have been frequently renewed. Further structural alterations with a view to minimising the danger of fire are also to be undertaken by the Office of Works, these including, it is said, the construction of new refreshment-rooms for the use of students of the Royal Colleges of Art and Science.

Mr. M. H. Spielmann writes that, although by the Treasury minute of July 22 it was stated that Mr. W. H. J. Weale, the Keeper of the Art Library at South Kensington Museum, and who has reached the age limit of 65, would "be allowed to serve another year before retiring," he has been summarily dismissed from his post. Mr. Spielmann adds: "People will assuredly see in this action swift punishment, an act of retributive injustice, in respect to the witness from the Science and Art Department who dared to give hostile evidence before the committee as to the administrative faults of South Kensington Museum so far as they came under his notice. It may fairly be asked—What will be the effect of this strange act on any other South Kensington official who may be called upon to give evidence when the committee resumes next session? There can surely be but one answer."

The unique street of Georgian houses known as Church-row, Hampstead, which has preserved its charming air of seclusion up to the present time, is now threatened by the speculating builder. The site of the "fine, old, well-set-back house" at the right of the row as we enter opposite the church, with its cottages and garden, the freeholder now proposes to clear and build over. The houses on either side of the other end next the churchyard have each a strip of land next them, and in the case of each of these it is the ambition of a speculating builder to acquire the house and land and erect a block of buildings over the site thus obtained. It is pleasant to learn from Mr. Ambrose Poynter, the secretary to the National Trust, that in these two last cases there are obstacles which will most likely make it impossible for the schemes to be carried out. In the other instance, the only hope of preserving the present old-world aspect of the building is for those interested to buy the property and maintain it in its present condition, and to this end a meeting of those who wish to preserve Church-row will be convened early next week, at which a definite practical proposal will be brought forward.

The current generalisation that the bigger an order the cheaper you can get it, the larger the quantity produced the greater the economy in production, does not apply universally. At the last quarterly meeting of the Ipswich Town Council the paving and lighting committee reported that they had accepted the tender of Messrs. Jewson and Sons, of Norwich, for the supply of 250,000 wood blocks at the following prices:—First 50,000, £5 5s. per 1,000; second 50,000, £5 7s. 6d. per 1,000; for 150,000, £5 10s. per 1,000. A good deal of surprise was expressed at the graduated rise in price. One of the town councillors explained that the difficulty had been in getting the larger number of blocks. Merchants were not able to supply so many within a given time, while they found it comparatively easy to supply 50,000 only. Hence a smaller quantity was obtainable at a cheaper rate.

The borough surveyor of Blackpool has submitted to the members of the town council his scheme for widening the promenade. He shows that the present promenade varies in width from 24ft. to 70ft., and the footpath from 5ft. to 17ft. The scheme, which will probably be put before Parliament for sanction, provides for a footpath 10ft. wide on the east side next the houses, a carriage-way 55ft., an island footpath 10ft. wide, a raised track for a double line of trams the whole length of the Promenade 20ft. 9in. wide, and then the promenade footpath, with a uniform width of 42ft., faced at the side by a sloping hulking of 15in. granite sets. The sea-wall will be exactly like that on the North Shore works, and will run on the same level till it meets the new promenade opposite the south end of the Tower, where it will join the upper one. The concrete of which it will be constructed will be 7ft. thick, and faced above the granite hulking with concrete blocks and coping. The estimates state that the cost of the section from the south end to the Manchester Hotel will be £117,896; the second section, from the Manchester Hotel to the Royal Hotel, £98,661; and the third section, as far as the North Shore Promenade, £132,424, a total cost of a little under £350,000. The scheme has already been considered by the Council, and awaits final decision.

A meeting was held at the Queen's Hotel, Huddersfield, on Friday, of a number of master builders from most of the Yorkshire towns—particularly the districts of Holme, Colne, and Spen Valley—to consider the advisability of forming a federation for Yorkshire. The chair was occupied by a local master builder, and the meeting was well attended. Representatives were present from the Lancashire Federation of Master Builders, who explained the objects and working of that society, and the success which had attended it working. It was mentioned that since the federation had been formed there had been fewer strikes, and a mutual good feeling had been engendered between the masters and opera-

tives. The meeting passed a resolution affirming the general desirability of establishing such a federation, and steps were taken to form one. Preliminary rules, on the basis of the Lancashire Federation, were adopted. Broadly, the objects of the federation are to enable contractors to make more satisfactory terms with architects and engineers with respect to agreements and the carrying out of contracts; also, for the better conduct of the working rules with the operatives. It is part of a general movement which is taking place in the North of England. The next meeting will be held at Leeds on Sept. 15.

MEETINGS FOR THE ENSUING WEEK.

Saturday (to-morrow).—Architectural Association. Visit to Sutton Place, Guildford. Waterloo Station Main Line. 12.45 p.m.

CHIPS.

The organ in Linton Parish Church, Kent, was reopened on Saturday after having been enlarged by Mr. James Turrell, of Greenhithe.

The last ceremony performed by Prince Ferdinand during his visit in Rustchuk was the inauguration on Sunday of the works of the new railway from Rustchuk to Tirnovo, which it is proposed to extend across the Skipka Pass to Adrianople, forming a new route to Constantinople.

The city council of Truro received at their last meeting a report from a committee recommending that the cattle market be paved. The city surveyor reported that the estimated cost would be £661 if paved with bricks, £671 if paved with old granite setts taken from streets, £1,068 if paved with new granite setts, and £1,173 if paved with wood blocks. The committee recommended the last-named course, and, after a long discussion, it was adopted.

Another fatality occurred on Friday morning at New Brighton Eiffel Tower, now in course of construction. Thomas M'Grath, labourer, of Derby, was working on a platform 80ft. high, when by some mischance he slipped, and, falling to the ground, was instantly killed.

The extent of building operations in London is illustrated by the returns of the great water companies. In July of last year these companies supplied 832,120 houses, while in July of the present year they were supplying 846,646. Thus, within the twelve months there has been an increase of 14,526 separate services—or, to put the matter in another way, there have been built 14,500 houses.

Colonel Durnford, R.E., a Local Government Board inspector, held an inquiry at Levenshulme on Friday with reference to an application of the Levenshulme Urban District Council for the Board's sanction to borrow £3,850 for works of private street improvement in Clare-road, Griffin Grove, Henderson-street, Berrie-grove, May-grove, and Manchester-street, which will be paved and put in repair.

The death occurred last week, at Bâle, his native city, of Dr. Jakob Burckhardt, who co-operated with Kugler in the second edition of the "Handbook of the History of Art." He was a graduate of Berlin, and became professor of the history of art in the University of Bâle. He was the author of a number of books on art and history, the best known, perhaps, being his "Cicerone," a guide to the ancient and modern art of Italy.

The work of relaying the roadway in the centre of North Bridge-street, Edinburgh, to suit the gradient of the new North Bridge, was commenced at midnight on Saturday, and was carried on throughout Sunday and during the week. The new roadway had to be raised about 4ft. at its lowest end, where it meets the southern end of the bridge, and in order to accomplish this, and leave the pavement on each side untouched, the edges were constructed of brickwork, on which the gradient was carried out southward till it met the old street level at the Tron Church. The centre of the street will now accordingly present one gradient from the Register House to the Tron Church. Along with the roadway there had also to be laid a new track for the tramcars. The contractors, Messrs. Dick, Kerr, and Co., have about 300 men and over 100 horses and carts engaged. The material requisite to raise the roadway amounts to about 900 tons.

Mr. W. R. Slack, R.E., a Local Government Board inspector, held an inquiry at the Salford Town Hall on Tuesday with reference to an application of the town council for permission to borrow a sum of £1,500. The Salford borough engineer has recommended that a new bridge be built, connecting Lower Broughton with Peel Park. The present footbridge, which is of the suspension type, was erected in 1869, and is only 6ft. wide. It is proposed to erect a substantial bridge at a cost of £1,500. It will be 3ft. wider than the existing one. There was no opposition to the application.

Trade News.

WAGES MOVEMENTS.

State of Trade during July.—The monthly memorandum prepared by the Labour Department states that during the past month the state of employment on the whole remained stationary, and is still better than a year ago. In the 113 trade unions making returns, with an aggregate membership of 465,561, 12,371 (or 2·7 per cent.) were reported as unemployed at the end of July, the same percentage as at the end of June, compared with 3·1 per cent in the 109 unions, with a membership of 427,441, from which returns were received for July, 1896. Employment in the building trades continued brisk; the percentage of unemployed in unions making returns was 1·3, compared with 1·5 in May. The percentage for July, 1896, was 1·8. The furnishing trades, though still well employed, were scarcely so busy. The percentage of unemployed union members at the end of July was 1·9, compared with 1·5 in June and 2 per cent. in July of last year. Sixty-five fresh disputes occurred in July, 1897, involving 46,539 workpeople, as compared with 66 involving 15,871 workpeople in June and 85 involving about 19,000 workpeople in July, 1896. Of these, sixteen disputes took place in the building trades. Of the 79 new and old disputes, involving 12,380 workpeople, of which the settlement is reported, 35 involving 2,429 workpeople were successful from the workpeople's point of view, 19 involving 4,829 workpeople partially successful, and 25 involving 5,122 workpeople unsuccessful. Changes in wages affecting about 32,200 workpeople were reported during July, of which number 31,500 received increases and 700 sustained decreases. The net result is an average advance estimated at 1s. per head on the weekly wages of those affected. Changes affecting about 3,100 workpeople were preceded by strikes, and changes affecting 20,000 workpeople took place under sliding scales. The remainder, involving about 9,100 workpeople, were arranged by negotiation or otherwise.

Belfast.—The plumbers' strike in Belfast, which had lasted six weeks, was amicably concluded on Friday. The men are to receive an advance in wages of ½d. per hour, and a satisfactory arrangement was come to with regard to the apprentice question. As a set-off to the concessions made by the masters, the men have conceded several points required by the employers. The men returned to work on Monday.

Kilmarnock.—At a meeting of the operative joiners of Kilmarnock on Thursday night in last week, it was resolved to come out on strike on Saturday, in consequence of the masters having refused to grant an advance of ½d. per hour in the rate of wages, the present rate being 8d. per hour. The employers, replying through their secretary to the men's demand, which was made three months ago, say that the state of trade does not warrant an advance.

Lord Penrhyn's Quarrymen.—A large number of quarrymen arrived in the Bethesda district on Saturday evening, owing to a report that the negotiations for a settlement were pending, and that the quarries, which have been closed nearly a year, would be in full swing the next week. To their disappointment, it was stated there was not the slightest foundation for the report, and that the prospects of a settlement there are as remote as ever.—It was announced, however, yesterday (Thursday), with some show of authority, that the terms of settlement of the Penrhyn quarries dispute have been agreed to between Mr. Young, the manager, and the men's committee, and only await confirmation by Lord Penrhyn, who is in Norway, and the men, who meet on Saturday night. The terms have not been disclosed.

Painters and the Eight Hours' Day.—The National Amalgamated Society of Painters and Decorators, the members of which number nearly 8,000, have passed a vote in favour of the eight-hours' day. The society belongs to the federated trades, the other members of which are now voting to the number of 20,000.

Peterhead.—A meeting of masons, carpenters, plumbers, painters, blacksmiths, and others concerned in the building trade in Peterhead was held in the Palace Hotel there on Thursday night in last week for the purpose of forming a building trade association. There was a large attendance, and it was resolved to form the association, with Mr. Wm. Stuart, builder, as president; Mr. John Stuart, plasterer, as secretary; and Mr. John Ferguson, plumber, as treasurer. The aims of the association are to put every tradesman on the same level in making estimates for work by the adoption of schedules. Hitherto most of the new work in and about Peterhead has been undertaken from plain measurement and specification; but the trade in all departments have resolved now to insist upon schedules, so that "extras" may be executed at scheduled prices.

Plymouth.—The second step towards the complete settlement of the strike in the Three Towns building trade has been arrived at. The dispute with the carpenters was the first to be smoothed away. Now it is the plasterers' turn, and the labourers are alone left in the field against the masters. Several meetings between the Plasterers' Society and the Master Builders' Association have taken place lately, and chiefly as a result of a concession on the part of the men, by which employers are permitted to take an extra apprentice on during the last six months of the service of their eldest apprentice, the Association have agreed to the terms of the plasterers. The strike, so far as this body is concerned, has lasted fifteen weeks, although (as Mr. Denbow, the secretary of the local branch of the Society, points out) during the past eight weeks it has been merely the semblance of a dispute, as the branch has only recorded an average of eight men on strike, the numbers at times having dwindled down to two or three. Strike pay has been given at the rate of 24s. per week.

Staffordshire Nailmakers.—The 5,000 wrought-nail makers in the Staffordshire and Worcestershire districts, who have been out on strike during the last five weeks, returned to work on Monday afternoon, the whole of the employers having granted an advance ranging from 10 to 12½ per cent.

The Brickmakers' Strike in the Black Country.—One of the largest strikes which has been known in the Oldbury district for many years past commenced on Friday, when between 700 and 800 brickworkers turned out for an advance of 20 per cent. in wages. An unusual amount of bitterness appears to have been introduced into the strike, and the men allege that this is owing to the action of the employers in refusing to concede any advance whatever, and in declining to meet the men or their representatives in conference, and, finally, in deciding to close the works after Friday. A mass meeting of the men was held in Hunt-street, Oldbury. Mr. S. Lakin (district secretary to the National Union of Gasworkers and General Labourers), who presided, said the masters had treated the men's application with contempt. All the brickworkers in the country had received an advance except those in South Staffordshire. Many of the Oldbury brickworkers were being paid 25 per cent. below the rates paid to their fellow workmen in other districts. The masters in the Birmingham district would not assist the employers in the Black Country, and the Birmingham operatives were willing to support them during the struggle. He alluded to the conditions under which the operatives laboured, and mentioned that a gang of ten female workers in the Oldbury district received 13s. 4d. for making 18,000 bricks. Those bricks were sold for 30s. per thousand, and yet the masters said they could not afford to pay an advance. He found that the price paid for moulding bricks in Birmingham was 4s. 10d. per thousand for common bricks, and 12s. 6d., 18s., 19s., and even £1 per thousand for the better qualities, and yet at Oldbury the masters were getting 18,000 made for 13s. 4d. The Building Trades' Federation had expressed their sympathy with the men on strike. It was decided to continue the strike, and to take steps to obtain funds for the support of the men. In reply to Mr. Lakin, the employers say: "The conditions of manufacture in Staffordshire are altogether different to Garrison-lane, where hand-labour only is employed; but when we have to make bricks under similar conditions we pay from 7s. to 8s. 6d. per thousand, as compared with 4s. 10d. in Garrison-lane. We deny that we get 18,000 bricks made by machinery for 13s. 4d., the lowest price being at least 25 per cent. more than this, and in many instances makers are paying more than 50 per cent. over these figures." Letters have been written to the papers stating 3s. per day was paid to marlhole-men. In reply, the employers say: "The lowest price paid to marlhole-men is 4s. per day, ranging up to 4s. 9d." The manufacturers add: "Having regard to the fact that in 1890 we gave an advance of 15 per cent., when bricks were selling at the same prices as they are now being sold at, and that during four to five years of very bad trade, in which low prices were obtained, we continued paying the increased wages, as we are doing at the present time, we consider that their present demand is most unreasonable and unjust, and one which leaves us no alternative but to strenuously resist. The prices of bricks to-day are at least 30 per cent. lower than stated by Mr. Lakin." In various parts of the Black Country building operations have come to a standstill. The local demand for bricks appears to be exceptionally brisk, and it is expected that the stocks in the yard will soon be exhausted.

Mr. E. Moir, the agent of Messrs. S. Pearson and Son, the contractors, during the construction of the Blackwall Tunnel, has been presented by the staff engaged on the tunnel with a pair of handsome silver candelabra as a mark of esteem and a souvenir of his association with this great engineering triumph.

LIST OF COMPETITIONS OPEN.

Barmouth—County Schools	No premium	John Lloyd, 1, Glanywersedd-terrace, Barmouth	Aug. 24
Bury, Lancs—Art Gallery and Public Library (£16,000 limit)	£75, £50, £25	John Haslam, Town Clerk, Bury, Lancs	,, 31
Wadhurst—Memorial Hall, Club, and Library (£2,500 limit)	£20, £10	W. Larcomb, Hon. Sec., Wadhurst	,, 31
Lower Bebington—Sewerage Scheme	£50, £35, £20	Joseph Young, Surveyor U.D.C., 72, Stanley-terrace, New Ferry	Sept. 1
Sunninghill and Sunningdale—Sewerage Schemes	No premiums	The Clerk, Windsor R.D.C., Park-street, Windsor	,, 4
Ipswich—Higher Grade School, Tower-st. (local Competition)	No premium; 5 per cent. com.	J. Hepburn Hume, Clerk to School Board, Ipswich	,, 14
Skipton—Cottage Hospital (16 beds, £2,500 limit—no assessor)	£15, £5	W. H. Dawson, Hon. Sec. to Committee, Skipton	,, 16
Battersea—Baths and Washhouses, Battersea Park-road	£100 (merged), £50, £25	W. M. Wilkins, Vestry Clerk, Municipal Bldgs., Lavender Hill, S.W.	,, 22
Blaenau Festiniog—County Police Buildings	£15 15s.	J. Morris Jones, County Surveyor, Trawsfynydd, Merioneth	,, 25
Morecambe—Sewerage Scheme	£100	Jno. Bond, Surveyor, U.D.C., Morecambe	Oct. 1
Ludlow—Electric Lighting Scheme	£20 (merged)	John H. Williams, Town Clerk, Ludlow	,, 1
Leeds—Wholesale Dead Meat Market and Abattoir	£100 (merged), £50, £25	John Harrison, Town Clerk, Municipal Buildings, Leeds	,, 8
Mexico—Legislature Palace (1,500,000dol. limit)	15,000dol. Mex.	Secretary Public Works, Mexico City	Nov. 30
Cardiff—Town Hall and Law Courts (A. Waterhouse, R.A., Assessor—£200,000 limit)	£500 (merged), £300, £200	J. L. Wheatley, Town Clerk, Town Hall, Cardiff	Dec. 4
Newcastle-on-Tyne—New Infirmary (local Architects)	(No first) £150, £100, £50	Secretary, Building Committee, Newcastle	(1898) Jan. 1
Carlton, Victoria—Children's Hospital	£100, £50, £25	J. Nicholson, Hon. Sec., Pelham-street, Carlton, Australia	(1898) ,, 30
New York—Sun Dial (Plaster Model)	500dol., 250dol.	Sec., National Sculpture Soc., 215, West 57th-street, New York	(1898) Feb. 28
Brighton—Artisans' Dwellings (local Architects only)	£75, £25	F. J. Tillstone, Town Clerk, Brighton	—
Lewisham—Free Library (£4,000 limit)	25gs.	Edward H. Oxenham, Clerk, Town Hall, Catford, S.E.	—
Boscombe—Hospital Enlargement, Shelley-road		J. Pratt, Assistant Sec., 126, Christchurch-road, Boscombe	—
Tottenham—School Board Offices		J. F. Adams, Clerk, School Board Offices, Tottenham, N.	—
Forest Hill—Free Library (£4,000 limit)	25gs.	Edward H. Oxenham, Clerk, Town Hall, Catford, S.E.	—

LIST OF TENDERS OPEN.

BUILDINGS.

Salisbury—Additions to Lying-in Wards at Workhouse	Guardians of Union	Francis Hodding, Clerk, Market House Chambers, Salisbury	Aug. 21
Cardiff—Roof Repairs at Workhouse	Guardians	Arthur J. Harris, Clerk, Queen's Chambers, Cardiff	,, 21
Oswaldtwistle—Rebuilding Barn at Gaulkthorn Farm		E. C. Kenyon, Burnley-road, Rawstenstall	,, 21
Great Yarmouth—Residence, The Park	H. D. Sayers	Chas. G. Baker, Architect, Town Hall Chambers, Great Yarmouth	,, 21
Ballyvollogue—Labourer's Cottage	Guardians of Limerick Union	J. O'Malley, Architect, 10, Glenthworth-street, Limerick	,, 21
Winwick—County Asylum Buildings	Lancashire Asylums Board	F. C. Hulton, Clerk, County Offices, Preston	,, 21
Leeds—Shop Premises, Roundhay-road	Joseph Staines	Thomas Winn, Architect, 99, Albion-street, Leeds	,, 23
Thorne—Twenty Cottages, Moor Ends		Captain Livingstone, North Field, Thorne	,, 23
Pontefract—New Warehouse, Southgate	W. R. Maud, J.P.	Tennant and Bagley, Architects, Pontefract	,, 23
Shelf—Rebuilding Victoria Mills		Isitt, Adkin, and Hill, Architects, 12, Prudential Buildings, Bradford	,, 23
Sunbury-on-Thames—Engine House	Urban District Council	John Austie, C.E., Engineer, 17, Victoria-street, Westminster	,, 23
Derby—Brickwork for Six Refuse-Destructor Cells	Corporation	H. F. Gadsby, Town Clerk, Town Hall, Derby	,, 23
Redruth—Two Semi-detached Villas, Clinton-road	R. Dunn	Horace W. Collins, Architect, Penryn-street, Redruth	,, 23
Huddersfield—Foundations for Generating Plant	Electric Lighting Committee	F. C. Lloyd, Town Clerk, Town Hall, Huddersfield	,, 23
Derby—Refuse Destructor Cells	Corporation	H. F. Gadsby, Town Clerk, Town Hall, Derby	,, 23
Colchester—Shoe Factory	J. Kavanagh	Chas. E. Butcher, Architect, 3, Queen-street, Colchester	,, 23
Knottingley—Two Dwelling Houses	J. Brook	Tennant and Bagley, Architects, Pontefract	,, 23
Leeds—Alterations of Warehouse Premises, Cookridge-street	Chorley and Pickersgill, Printers	Thomas Winn, Architect, 90, Albion-street, Leeds	,, 23
Batley—Five Villas, Wilton Park, Upper Batley	John Blackburn	Walter Hanstock, Architect, Leeds and Batley	,, 23
Trimdon Grange—Enlarging and Reseating Wesleyan Chapel		W. R. Woodhead, Trimdon Grange, Co. Durham	,, 24
Brixham—Enlargement of Fish Market	Harbour Committee	Wm. B. Spark, Clerk, Brixham	,, 24
Stroud—Banking Premises	Wilts and Dorset Bank	G. M. Tilley, Architect, 17, Craven-street, W.C.	,, 24
Southwell—Two Houses, Westgate		Sheppard and Harrison, Architects, 17, Kirkgate, Newark	,, 24
Bexley Heath—Repairs Tower and Spire, Church	Committee	J. Russell Willmore, Hon. Sec., Bexley Heath	,, 24
Carbis Bay—Villa		A. C. Jenkin, 3, Parade-passage, Penzance	,, 24
Everton—Chimney Shaft, Refuse Destructor, Cobb's Quarry	Liverpool Corporation	Town Clerk, Municipal Buildings, Liverpool	,, 24
Halifax—Brass Foundry, near Albert Reservoir		Medley Hall, Architect, 29, Northgate, Halifax	,, 24
Aberdare—Detached Villa, Abernant-road	R. Howell	Watkins and Davies, Architects, 4, Canon-street, Aberdare	,, 24
Parc Gwyllt Asylum—Temporary Block		T. T. Lewis, Solicitor, Bridgend	,, 25
Hull—Junior Department, Scarborough-street School	School Board	W. Botterill, Architect, 23, Parliament-street, Hull	,, 25
Ripponden—Wooden Storeroom		Ryburnedale Paper Mills Co., Ltd., Ripponden, near Halifax	,, 25
Ellenborough—Enlargement and Alterations, Infants' School	School Board	C. Eaglesfield, Architect, Maryport	,, 25
Dewsbury—Alteration of Warehouse, Church-street, into Shops		Holtom and Fox, Architects, Westgate, Dewsbury	,, 25
Morley—Congregational Sunday-school and Institute		Luke Bradley, Architect, Morley	,, 25
Muirkirk—Two-storied Tenement	Co-operative Society	John Armour, jun., Architect, Irvine	,, 26
Stainton-in-Cleveland—Rebuilding Blacksmiths' Arms Inn	Cameron and Co.	A. Baxter, 16, Finkle-street, Stockton	,, 26
Tooley-street, S.E.—Union Offices and Board Room	St. Olave's Board of Guardians	E. Pitts Fenton, Clerk, 30, Tanner-street, S.E.	,, 26
Kingston-upon Thames—Extension of Electric Light Buildings	Corporation	Harold A. Winser, Town Clerk, Clattern House, Kingston-upon-Th.	,, 26
Willenhall—Cemetery Buildings	Urban District Council	C. J. Jenkin, Engineer, Willenhall	,, 26
Colne, Lancs—Refuse Destructor, Burnley-road	Health Committee	T. H. Hartley, Borough Surveyor, Town Hall, Lancs	,, 26
Burnley—Additions to Chancel, St. Andrew's Church		Austin and Paley, Architects, Lancaster	,, 26
Swansea—Warehouse, Victoria Wharf	Harbour Trustees	T. Strick, Clerk, Harbour Offices, Swansea	,, 26
Cork—Temporary Buildings at Lunatic Asylum	Commissnrs for Control of Asylums	W. H. Hill, Architect, 28, South-mall, Cork	,, 26
Kelso—Shop and House, Roxburgh-street		John Gow and Sons, Kelso	,, 26
Stainton-in-Cleveland—Rebuilding the Blacksmith's Arms Inn	Cameron and Co.	W. H. Linton, M.S.A., Exchange, Stockton-on-Tees	,, 26
Aghalee—Dispensary, Folly Hill	Guardians of Lurgan Union	Edwin. Jas. Donaldson, Clerk, Lurgan	,, 26
Ladywell, S.E.—Building, Reopening Graves and Vaults, Supplying York Ledgers, &c. (Three Years), at Cemetery	Vestry of Lewisham	Edward H. Oxenham, Clerk, Town Hall, Catford, S.E.	,, 27
Mardy and Merthyr Vale—Police Stations	Glamorgan County Council	T. Mansel Franklen, Clerk, County Offices, Westgate-street, Glam.	,, 27
Charlton Kings—School Buildings	School Board	James Villar, Architect, 1, Cambray, Cheltenham	,, 28
Bournemouth—Tower and Steeple, St. John Evangelist's Church		T. Stevens, F.R.I.B.A., Richmond Chambers, Bournemouth	,, 28
Blackburn—Electricity Works Extension	Corporation	R. E. Fox, Town Clerk, Blackburn	,, 28
Belfast—House, Antrim-road		Jas. A. Henner, Architect, 102, Donegall-street, Belfast	,, 28
Dinas Powis—Truant Industrial School	Cardiff and Barry School Boards	John J. Jackson, Clerk, School Board Offices, Howard-gdns., Cardiff	,, 28
Weston-super-Mare—Laundry Buildings		S. J. Wilde, Architect, Weston-super-Mare	,, 28
Harrington—Two Houses and Warehouse, Church-road	I. Roberts and Sons	W. G. Scott and Co., Architects, Victoria Buildings, Workington	,, 30
Grangemouth—Established Church, Kerse-road		John P. Goodsir, Architect, Newmarket-street, Falkirk	,, 30
Stotfield—Villa		John Milne, Architect, Elgin	,, 30
Harrington—Clubroom and Two Cottages		W. G. Scott and Co., Architects, Victoria Buildings, Workington	,, 30
Dewsbury—28 Houses, Hill Head, Malkroyd-lane	Pioneers' Industrial Society, Ltd.	Holtom and Fox, Architects, Westgate, Dewsbury	,, 30
Norham-on-Tweed—Additions to Farm Buildings at Mount Carmel		R. Archer, Narrowgate, Alnwick	,, 30
New Barnet—Detached Residence		E. Furgusson Taylor, Surveyor, 70-72, Chancery-lane, W.C.	,, 31
Salisbury—Sorting Office, near Station	H.M. Office of Works	The Secretary, H.M. Office of Works, 12, Whitehall-place, S.W.	,, 31
Uxbridge—Fire Escape House	Urban District Council	Wm. Garner, Clerk, 159, High-street, Uxbridge	,, 31
Rathmines—Bank Office	National Bank, Ltd.	William Butler, Surveyor, 58, Mountjoy-square, Dublin	,, 31
Falmouth—Residence and Studio	Herbert C. Sheppard	Horace W. Collins, Architect, Penryn-street, Redruth	,, 31
Llanwrtyd Wells—Detached Villa		H. Teather, Architect, Andrew's Buildings, Queen-street, Cardiff	,, 31
Fishponds—Ward Accommodation, &c., Bristol Lunatic Asylum	Committee of Visitors	Town Clerk's Office, Council House, Bristol	,, 31
Willersey—Converting a Cottage into a Chapel	Wesleyan Trustees	Rev. John R. Newall, Wesleyan Chapel House, Evesham	,, 31
Coleham, Salop—Engine and Boiler Houses	Shrewsbury Corporation	John Taylor, Sons, and Santo Crimp, 27, Gt. George-st., Westminster	Sept. 2
Bridlington—Board Room and Offices	Board of Guardians	Chas. Gray, Clerk, Bridlington	,, 3
Leith—Public Baths at Great Junction-street	Corporation	T. B. Laing, Town Clerk, Leith	,, 4
Mytholmroyd—Vicarage, Cragg Vale-road		Jackson and Fox, Architects, 22, George-street, Halifax	,, 6
Brentwood Asylum—Boiler House	Committee of Visitors	W. P. Gepp, Clerk to Committee, Chelmsford	,, 6
Bolton—Inland Revenue Office	H.M. Commissioners of Works	Hon. Reginald B. Brett, C.B., Secretary, 12, Whitehall-place, S.W.	,, 7
Highgate Hill—Workhouse Infirmary	Islington Board of Guardians	E. Davey, Clerk, St. John's-road, Upper Holloway	,, 7
Nelson—Walverton Board School	Nelson School Board	W. C. Murgatroyd, Clerk, Town Hall, Nelson	,, 7
Gravesend—Police Cells at Town Hall	Town Council	Chas. E. Hatten, Town Clerk, Court House, Gravesend	,, 7
Llanfihangel-y-Creuddyn—Restoration of Church Tower		Rev. J. P. Evans, Vicar, Llanfihangel-y-Creuddyn	,, 11
Devon—Lighthouse, Dwellings, &c., Foreland, near Lynton	Admiralty	Chas. A. Kent, Secretary, Trinity House, London, E.C.	,, 13
Wood Green, N.—Higher-grade Schools	Tottenham School Board	A. M. Butler, Architect, 16, Finsbury-circus, E.C.	—
Rawdon, Leeds—Four Terrace Houses, Apperley-lane		Fred. Mitchell, Architect, 71, Albion-street, Leeds	—
Llandrindod Wells—Hotel	Gwalia Hotel Co., Ltd.	Swash and Bain, Architects, Midland Bank Chambers, Newport	—
Gleedless—Alterations to Heeley and Sheffield House		W. T. Rhoden, Archt., Buckingham Chmbrs., St. James's-st., Sheffield	—
Ipswich—Additions Rose Hill Schools	School Board	E. F. Bisshopp, Architect, 32, Museum-street, Ipswich	—

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DEVELOPMENTS OF BUILDING.

A FOREIGN expert in architecture, if asked to describe our English modern development of the art, would certainly find it difficult to do so. He would, no doubt, describe the buildings in our great thoroughfares as a mixture of English and foreign types—mostly foreign; and if asked to give a more particular answer, he would probably say that Italian and French Renaissance prevailed, but that nearly every conceivable style could be found. And this opinion would express the fact. No country is so eclectic in its tastes as England, or has borrowed so much from other countries. Even our language has been derived from about a dozen different sources; our literature is enriched by the myths and legends and poetry of every Classical and Oriental nation. And this great diversity in literature and art may owe its origin, not merely to our insular position, but chiefly to the diverse elements which have combined to produce the race and civilisation. In other Continental countries the expression of architecture has been more definite and special. In France, for instance, as in Italy, it has been distinguished for its maintenance of Classic traditions. Sometimes a Baroque or Rococo character prevailed, as it did in the reign of Henry IV. and Louis XIV., when all restraint was thrown off; but generally it has preserved that dignified Classical taste which began with the Early Italian Renaissance of Francis I., and was afterwards succeeded by the style of the Empire early in the century. Even now she is still French Classical in her taste, and has never given way to those wild and eccentric tastes like the Louis Quatorze or Rococo, which for a short time held sway. Other countries, like Germany and Spain, preserve a national character—the Classical feeling prevails more or less. The German Renaissance is less pronounced than it was before the War; but in both these countries the Classical taste has been modified by national peculiarities and temperament, as in Spain we find a decidedly Moresque spirit in the details. Perhaps our American cousins are more like ourselves in their versatile tendencies; but of late a decidedly French Renaissance spirit has prevailed. But the conditions of architecture in this country are somewhat different. Latin influences or Italian tastes have never been strong; and then, the very opposite elements which constitute the English have tended to neutralise any particular partiality. We had a strong national Gothic architecture, and we cannot even now forget it; and all these influences have been detrimental to any strong individuality or pronounced style. And it must be remembered we had our Renaissance developments, the earlier phase of which was the Elizabethan, from which period till the later Revivals, we might boast of a distinctly national style of Domestic architecture. Who can deny, for instance, that in buildings like Rushton Hall, Kirby, Aston, and Moreton Halls, and other buildings of the 16th century, there is a distinctly English character, despite the Italian or French influences? These old Domestic buildings are clearly not of the same character as those of the same age abroad; they show that the Classical details were thoroughly adapted and naturalised to the vernacular or Gothic modes of building, and that the spirit of the latter actuated the architects. It was perhaps an unfortunate circumstance for our national architecture that the later revival of Classic checked this development, and retarded by half a century the present condition of architecture.

Entering a little more minutely into the buildings of our streets, the stranger will find an equal diversity in the construction, in the materials used, and details of various kinds. There is greater evidence than can be found in any other country, save perhaps America, of engineering, iron construction, and other technical trades elbowing art. The critical observer cannot fail to notice that architecture, as an art, is struggling to retain its hold against great odds, and that it is even changing its tactics and altering its methods to do so. Faith in art for its own sake is no longer a power; men's minds are seeking direct results and commercial ends. The shop or the façade may be smothered in ornament; but it is apparent through all, however disguised, that the main effort has been to make the building, be it house, church, town-hall, shop, or factory, as cheap and commercial as possible. If it is a large shop or warehouse, the skeleton structure of iron pillars and rolled beams is scarcely hidden, but reveals itself in all its naked ugliness in every story, while the exterior walls form a thin shell of brick or terracotta on which all the architectural decoration has been expended, flimsy in its detail and exuberant in its excess. Solidity is absent altogether, and is sacrificed to the exigencies of space or to cheapness. All structural pillars and girders are incased with plaster, tiles, or thin slabs. Next door one sees a more substantial-looking block of offices of red brick, Georgian in character, with gauged arches, moulded and cut architraves and pediments, with white-painted sashes and dormers in the roof. The mouldings of brick and wood are well designed and solid looking, and the internal rooms and details show careful study and taste. A third block of offices has a stone front of several stories carried high up above surrounding buildings, its back wall broken by a deep recess, or open court, in the centre, lined with white glazed bricks to reflect light to the suites of offices, according to the regulations of the London Building Act. Such a diversity of buildings may be seen east of the Temple Gardens, in the new area for a long time a kind of "no man's land" between Tudor-street and the Victoria Embankment, where blocks of offices, large warehouses, as well as three well-known schools are built. We point to this area as one specially typical of our modern architectural development. Almost close to one another may be seen three or four important edifices. One devoted to education, another a theological library and college, a third dedicated to Euterpe. These are built of stone and red brick: the two schools are in different phases of the Renaissance, and the library and offices of the Thames Conservancy Board in Late Gothic. Thus in this restricted area we may see varied types of Renaissance, Georgian, the modern warehouse, and other nondescript styles which have been developed out of the exigencies of iron construction and the demands of commercial life. From Westminster to Blackfriars Bridge the silent highway passes by a few of the most typical modern buildings. One sees two or three recent examples of hotel architecture, in versions of Renaissance and Tudor, the modern office and residential blocks in a version of the French Château style, School Board offices, one of Chambers' stately Italian structures, and other new edifices in which the different schools of the Renaissance are represented. The critical stranger may fairly exclaim, "Where is the national English style?" as he beholds this array of modern buildings, where all schools and phases are represented. They are nearly all good imitations of the styles they represent, and show an intelligent appreciation of the features of each. It would be hard to detect a preference for one style. In Sion College we have a specimen of Late Gothic that shows an intimate study of the period chosen, and the details are on the whole good; while next to it, the bold and well-proportioned City of London School is quite as strong an example of Italian Palladianism, and as a modernised example of Late Tudor verging on the Renaissance, Mr. Pearson's unique little block of offices at the corner of Essex-street may be mentioned. With these examples, the stranger's impression of our architecture will be somewhat mixed; but one thing he will notice, namely—a thorough study of each style, and an endeavour to honestly adapt features from each for our modern wants. Such opposite specimens of the Classic as those just mentioned to the red brick Georgian front of a block at the end of Bridewell-place are, indeed, almost startling, as showing how stone and brick can be utilised. In the last everything is of red brick—the brick modillion cornice, and the moulded work round the windows. We do not compare, on the other hand, the Fire Brigade Station, or even the Thames Conservators' Offices with the Gothic of Sion College, but they show a recrudescence of Late Gothic feeling for business purposes.

The employment of materials is equally remarkable. Thus, in Surrey and Norfolk streets, pile after pile of offices and commercial blocks may be seen, in which terracotta has been combined with brick; the City Bank on Ludgate-hill is one of Mr. Collcutt's best attempts to use the two for a bank. It is a greater success than the former; for the architect, to give breadth and produce a better result, has done precisely what we advocated the other day, namely, has built the lower story—the bank proper—in plain terracotta blocks, introducing a large arched window; while in the upper stories the material is used with brick, the details and turret being executed in the former. Even a bolder treatment is visible in a few of our recent buildings. At the corner of Wellington-street and the Strand, a very imposing block of shops and offices is erected, and nearing finish, in which both fronts are faced with terracotta of a warm buff colour. The style is a Free Renaissance; the upper stories are decorated with three orders of pilasters, ornamental window-dressings, and the low cupola-crowned turret on the return front is effective. Being at the corner of so important a thoroughfare from one of the principal railway stations to the south, it will be sure to attract notice. The work has been executed with much care, the terracotta has been supplied by the Burmantofts Company, and the work has been carried out by Messrs. Foster and Dicksee. The circular corner is varied by engaged three-quarter columns of the same material. The windows of the first floor have broken pediments, and the square architraves have joggled joints; a wide broken gable forms a feature in each front, and the roof is high, of green slates. The lower shop story is divided by polished granite pilasters. Other examples in Holborn, Oxford-street, &c., show how this material is developing a style of its own. The chief fault is the imitation of stone details which many of them affect.

Then various mechanical contrivances have influenced design, especially in the interior. Lifts, iron girders, metal construction, facilities for trade, lighting, sanitation, are gradually being recognised, but as yet in a tentative way. We have not yet the steel-frame building amongst us, but many approaches to it. No one will say they have been successes. So long as we use iron, and cover it up in all manner of ways, and make the outside something very different, this factor in the evolution

of our modern buildings will be destructive and unsatisfactory. At present we can only turn to the engineer's work, his bridges and railway structures, as being in any way a direct outcome of the iron utilitarian age. The question still remains: Which, if any, of these modern developments of our architecture can be said to possess any permanent value in the future? Is there any one style more than another likely to be made a starting point for a new departure? It seems impossible to believe that we can go on repeating half a dozen different styles, or that by constantly varying them according to individual taste, any agreement will be derived; but at least this may be asserted, that the multiplicity of modern wants and tastes favour the concurrent use of several methods of building, and render the adoption of one national style as a thing of the past.

RESPONSIBILITY OF ARCHITECTS.

CONSIDERABLE doubt exists among many in the profession as to the question of responsibility of architects. Very frequently correspondents write for information—as, for example, whether an architect is responsible for any defect in workmanship or materials discovered in a building which he has certified? It is, of course, impossible, in the absence of circumstances and details, to give any definite answer to these questions; but it is well that the younger members of the profession should be acquainted with certain legal principles and decisions by which general conclusions may be formed. We may first suppose a case of this kind. A building is intrusted to an architect in the usual course to superintend. Something is done wrong. The drains are improperly laid, or the roof is not watertight, and the client looks to the architect. Is he responsible if he employs a clerk of works, or delegates the details of the work to another? We may imagine a case where the architect has many works on hand, and that he can only give a general superintendence to any of them. It is unreasonable, if not impossible, to expect him to see to all the work—the laying and jointing of drains, the mixture of the concrete, and to look after the courses of the footings. At the same time, according to one decision ("Moneypenny v. Hartland"), he is liable to his employer for defects, whether he delegates work to another or not. According to one ruling he is not entitled "to put implicit trust in a clerk of works appointed by the employer," for if he passes inferior work he is liable in damages ("Lee v. Lord Bateman"). These decisions are, it must be confessed, a little hard on the busy architect, who cannot inspect every part of a foundation, or see that every brick or slate is laid properly, or that every load of bricks that comes to the work is according to specification standard. If he engages a clerk of works, surely this ought to exempt him from such labour, and it does as a rule. We do not believe a clerk of works entitled to the name would allow any default of this kind to pass. But it may occasionally happen that a clerk of works has something else to engage his attention just when the concrete is being put in or the drains laid.

Official interpreters of the law are not all the same in their opinions. What is called "an ordinary and reasonable degree of skill" may mean very different things, as shown by the way various judges have expressed this rule. The skill of the architect need not be extraordinary: he must bring to the exercise of his profession an "ordinary degree of skill," says one judge. In a recent case, another judge said an architect could not be held responsible for the defective joints in a drain, and if we extend the principle, it is unreasonable to expect him to see that every brick or stone is equal to the requirements. As to the delegation of the architect's duties, an authority on the law writes: "An architect's or engineer's duties being personal, he cannot delegate or transfer them entirely to another; but he may make use of the skill and labour of others in performing his duties, provided that he does not abdicate his general duties as to superintendence and supreme control of the work." And this more reasonable view of the architect's responsibility has been upheld. In the case of "Clemance v. Clarke" a very important decision was given which seems to have set at rest the question as to superintendence. Therein it was held that the architect's "duties could not be performed if he were expected individually to go over every matter in detail, and it cannot be that his certificate should be held bad by a court of law because he has not himself gone into every detail." Recent decisions in America have supported the same view. In the measurement and estimation of work it is unreasonable to expect that the architect can do the work entirely himself. If he deputes an assistant to measure, and revises himself, he is carrying out his contract. As regards estimates, a reasonable degree of accuracy is expected. It has been said that a man should not estimate a work at a price at which he would not contract for it;—a healthful principle if it can be obeyed.

There are occasions in which the architect's responsibility is limited, as when the the employer orders alterations and supersedes his architect's instructions. Let us suppose a not infrequent case. A house is being built according to plans and specification by a contractor. In the absence of the architect, and unknown to him, the employer orders casements to open inwards, and without specifying the right kind of joint to keep out the rain. These are found very defective, and allow wind and rain to blow through. The architect cannot be held answerable if the work is done without his knowledge. But if the architect follows his client's orders, without pointing out the consequences of this altered construction or giving proper details, he may be held liable for any defect. An experienced architect would not hesitate to point out the consequences of any alteration made by his client to him, as by so doing he holds himself harmless in case of any accident or defect. Sometimes a professional man is required to carry out the plans of another architect—say, in the case of the decease of the latter. In such a case he ought to carefully examine the plans and specifications of his predecessor, for if he neglected to do so, he could be held liable for any error or defect that may be discovered. An employer may wish his own plans carried out by an architect who may be let into a trap unwittingly if the plans turned out impracticable or defective. No doubt, if any mistake arose, which had not been pointed out to the employer, the architect might be held liable. The test of liability in all these and similar cases is to be found by proving that the architect has not used reasonable care and skill. Whether any men in the same profession would have done the same thing in like circumstance, or come to the same conclusion, is one means of discovering the liability or otherwise of the architect. The responsibility of the architect depends largely as to his use of usual and skilful means. If he neglects to employ them, he is liable for any damage resulting to the employer. It would be neglect on his part, for instance, if he failed to examine the site and foundations, the rights of support, of light and other easements, before making his plans; if he failed to comply with statutes and by-laws as to buildings; and he would also be liable if he neglected to test by his own skill plans made by others, which he undertook to carry out.

THE LAW AND BUILDING SOCIETIES: AN IMPORTANT CHANGE.

ON Wednesday, one of the most important sections in the Building Societies Act, which was passed upwards of three years ago, came for the first time into full force and operation. The section is the one which will in future regulate the power of these societies to receive money on deposit or by way of loans, and the far-reaching effect of this section was the reason which, at the last moment, led Parliament in 1894 to defer the operation of the clause for three years from the passing of the Act, which received the Royal Assent on the 25th August, 1894. Up to the time that this Act received the sanction of Parliament, building societies were, by a previous Act of 1874, enabled to receive money on deposit or by way of loans to an amount not exceeding two-thirds of the aggregate sum which had been lent on properties by way of mortgage. The disclosures which followed the failure of the Liberator and other less famous building societies led Parliament to call for a return from all building societies of what is known as their "properties in possession." Out of 2,249 societies in England and Wales, 210 failed to give a return, "notwithstanding repeated applications by the Secretary of State," whilst 681 acknowledged that their properties in possession stood in their books at £2,565,309, upon the security of which they were able to receive deposits to an amount not exceeding two-thirds of that sum. It was upon this startling return that the Government inserted in their Bill the clause, which takes effect from and after Wednesday, prohibiting building societies from receiving any money on deposit, or as a loan, upon the security of any property in the possession of the society, or upon any property on which the mortgage repayments are more than twelve months in arrears. At the time of the introduction of this clause into the Bill it was fully recognised that many building societies would have to overcome considerable difficulties in complying with its provisions, and to avoid forcing societies into liquidation, the House of Commons suspended the operation of the clause "until the expiration of two years from the passing of the Act," and protected existing depositors by the insertion of a proviso, "That this section shall not affect the validity of any deposit or loan which was within the limit provided by law at the time when it was received." In this form the Bill was sent to the House of Lords, where the operation of the clause was extended for a further period of twelve months, making three years in all. From the returns which have recently been made by building societies, it is much to be feared that, notwithstanding the three years' grace allowed by Parliament, little or no effort has been made by some societies to reduce their deposits and loans to within two-thirds of the amount of the mortgages upon which repayments are more or less regularly paid. This is in part due to the great difficulty of realising properties in possession for the purpose of paying off loans and deposits. Although the failure of a society to reduce its loans and deposits may not be held to affect the validity of the loans and deposits already taken, future depositors will do well to make sure that the sum already held by a building society on deposit or loan is well within the limits allowed by the new Act. Fortunately, the detailed series of accounts now required from all building societies clearly sets forth this information. Since the passing of this clause, the Chief Registrar of Building Societies has reported that, of the 210 societies which failed to make any return to Parliament of the properties in their possession, 61 have now sent in returns showing that they have properties in possession amounting to £1,117,709, and that 22 societies "who stated that they had no properties in possession" now acknowledge that they have properties to the amount of £23,263.

ANGEL HOTEL, BRIGG, LINCOLNSHIRE.

THE old building, which has stood some centuries, has undergone demolition and rebuilding as shown in the illustration. The new premises comprise commercial and coffee rooms, carriage entrance to the covered courtyard, and buildings in the rear; sitting and bed rooms, with a central balcony, on the first floor. The style adopted is half-timber Renaissance work overhanging the ground story. The ceiling timbers are in view, the windows and door panels are glazed with leaded glass, and all the internal

THE ANGEL HOTEL, BRIGG, LINCOLNSHIRE.

fittings are of suitable character, harmonising with the style of the buildings. The work has been carried out by Mr. H. Dent from the designs and under the superintendence of Messrs. Freeman, Son, and Gaskell, architects, of Hull, for the owner, Mr. J. H. Skevington.

THE BRITISH ASSOCIATION AT TORONTO.

We give, in accordance with our custom for many years past, abstracts of some of the addresses delivered and papers read before the members of the British Association during the meetings in Toronto just concluded, likely to be of interest to our readers.

CANADIAN GEOLOGY.

In his address, as president of Section C, Geology, Dr. G. M. Dawson, C.M.S., F.R.S., pointed out that the nature and relations of the more ancient rocks of North America are problems particularly Canadian, for these rocks, in their typical and most easily read development, either constitute or border upon the continental protaxis of the north. A reasonably satisfactory classification of the crystalline rocks beneath those designated as palæozoic was first worked out in the Canadian region by Logan and his colleagues, a classification of which the validity was soon after generally recognised. The greatest known connected area of such rocks is embraced within the borders of Canada, and the further understanding of the origin and character of these rocks is likely to depend very largely upon work now in progress, or remaining to be accomplished here. Dr. Dawson recapitulated from the time of Logan the first steps made in the classification of the crystalline schists in Canada, dwelling upon the substantial accuracy of these first observations. The general tendency of our advance in knowledge appeared to be in the direction of extending the range of the palæozoic downward, whether under the old name Cambrian, or under some other name applied to a new system defined, or likely to be defined, by a characteristic fauna; and under Cambrian or such new system, if it be admitted, it was altogether probable that the Animikie and Keweenawan rocks must eventually be included. In other words, the somewhat arbitrary and artificial definition of the *Olenellus* zone as the base of the Cambrian seemed to be not only not of world-wide application, but not even of general applicability to North America; while as a base for the palæozoic æon it was of still more doubtful value. In the Cambrian period, as well as in much later geological times, the American Continent did not admit of treatment as a single province, but was to be regarded rather as a Continental barrier between two great oceanic depressions, each more or less completely different and self-contained in conditions and history—that of the Atlantic and that of the Pacific. The lecturer regarded the comparatively recent attempt to introduce an "Algonkian System," under which it was proposed to include all recognisable sedimentary formations below the *Olenellus* zone, assumed for this purpose to be the base of the Cambrian, as a retrograde step, wholly opposed not only to the historical basis of progress in classification, but also to the natural conditions upon which any taxonomic scheme should be based.

THE TRAINING OF ENGINEERS.

Mr. G. F. Deacon, M.Inst.C.E., of Liverpool, in opening Section G, that of Mechanics, devoted the greater part of his address to the question of the training of engineers. The work of an engineer demanded for its right performance the best energies of well-balanced minds working upon a store of knowledge which nothing but years of untiring study and observation could give. Yet there was no hesitation shown to enter the lists. The number of candidates was appalling. In the old country, at least, there certainly was not work for all; but when one pointed this out, anxious parents only replied that the difficulty was as great in connection with any other profession. Of those who entered the business or profession of the engineer, the enormous majority were not born engineers. Mr. Deacon continued: At the time I began practice, the large majority of young engineers were left entirely to their own devices so far as the attainment of any scientific knowledge was concerned. As pupils or apprentices, articled or not, they entered an engineer's works or office; for a certain number of years they had the run of the place and some encouragement if they worked well, but it could not, in the nature of things, amount to much more. Except to a few, such a training was entirely ineffectual in the production of that well-balanced attitude of mind which an engineer must hold towards every engineering problem which he is called upon to solve. In Westminster of late years, the young engineer enters an office at a much more advanced age than formerly. When it is essential that he should be earning something soon after he comes of age, anything like a complete training is an impossibility; his work ceases to be general, and his practice is more or less confined in a much narrower sphere than need be the case if the pursuit of further knowledge continues to be his chief duty. But whatever course his circumstances may permit him to adopt, the difficulty of gaining the required knowledge in the time available is a serious one. It is not desirable that when he leaves school his training should be specialised in view of the particular branch of the profession or business he is likely to follow. The fundamental principles of any branch of mechanical engineering are broadly the fundamental principles of any branch of the profession. The training demanded for the various branches of civil engineering in its narrower sense is precisely the same as that required in its earlier stages for mechanical engineering pure and simple. Experience of the results as judged by the students who have come directly under my notice, and examination of many calendars, has aroused this thought: Are we not in some cases attempting at too early a stage the teaching of subjects instead of principles? Does not subject training at college, for the sake of some little anticipation of his office work, divert the attention of the student from the better mastery of those principles which it is so essential for him to grasp at the earliest possible time, and which do not limit his choice in the battle of life to any one branch of the profession or business of an engineer? If we observe the careers of exceptional men in our profession, we find the very reverse of specialisation. Of no class of men can it be said with greater truth than of engineers that their standard should be sound knowledge of the principles of many things and of the practice of a few. There is some danger in the usual limitation of compulsory subjects in examinations for certificates and degrees. When an examination has to be passed, subjects not made compulsory are too often entirely neglected, however important to the engineer they may be. As to that physical and mental training gained laboriously, and somewhat wastefully, at the joiner's bench, in the fitting and turning shops, the foundry and the forge, during the whole course of mechanical engineering apprenticeship, the kind of knowledge which comes of thoughtful chipping and filing and turning and forging, though only applied to a few of the materials with which in after life the engineer has to deal, is quite as important as tables of density and strength to his future sense of rightness in constructive design. The use of such work is not merely to teach one the parts and combinations of any particular machine; in a still higher degree it is the insensible mastery of a much more subtle knowledge or mental power, the application of the senses of sight and touch and force, to the determination of the nature of things. But the great workshop training has still further advantages. The apprentice is surrounded by skilled workers, from whose example, if he be wise, he learns a great deal; and apart from this, it is no small profit to have rubbed against the British workman, to have discovered what manner of man he is, and to comprehend how little the world knows of his best parts. The whole time spent in large engineering works cannot, however, be equally beneficial; the apprentice must take the work as it comes, and he often feels that some of his time is being well-nigh wasted. The impossibility of including experience in a workshop without neglecting something equally important led Mr. Deacon to view with satisfaction the introduction of workshop training into certain schools of applied science in England.

AN IMPERIAL HYDROGRAPHIC SURVEY.

Professor Alexander Johnson, of M'Gill University, read a paper in which he sought the advice and aid of the British Association in inducing the Imperial and Canadian Governments to act together in making the necessary arrangements for tidal observations, which, if found satisfactory, might possibly be extended to other colonies, and thus the basis of an Imperial hydrographic survey might be laid.

THE WORLD'S FUEL SUPPLY.

Lord Kelvin, speaking on the fuel and air supply of the earth, observed that all the known fuel on the earth is the residue of ancient vegetation. One ton of average fuel takes three tons of oxygen to burn it, and therefore its vegetable origins, decomposing carbonic acid and water by the power of sunlight, gave three tons of oxygen to our atmosphere. Every square mètre of the earth's surface bears ten tons of air, of which two tons is oxygen. The whole surface is 124 thousand millions of acres, or 510 million millions of square mètres. Hence there is not more than 340 million million tons of fuel in the earth, and this is probably the exact amount, because it is probable that all the oxygen of our atmosphere came from primeval vegetation. The surely available coal supply of England, Scotland, and Wales was estimated by the Coal Supply Commission of 1831, which included Sir Roderick Murchison and Sir Andrew Ramsay among its members, as being 146 thousand million tons. This is approximately six-tenths of a ton per square mètre of area of Great Britain. To burn this quantity would take one and eight-tenths of a ton of oxygen, or within two-tenths of a ton of the total oxygen of the atmosphere resting on

each square mètre of Great Britain. The Commission estimated 56 thousand million tons more of coal as probably existing at the present in lower and less easily accessible strata. It might, therefore, be considered as almost quite certain that Great Britain could not burn all its own coal with its own air, and, therefore, that the coal of Great Britain is considerably in excess of the fuel supply of the rest of the world reckoned per equal areas, whether of land or sea.

FORESTRY IN INDIA.

Lieutenant-Colonel Fred. Bailey read a paper on this subject in the Section of Geography. He pointed out that in early times the greater part of India was covered with forest, but the land not cleared for cultivation was, for the most part, denuded by over-cutting and over-grazing with burning. If denudation had not affected the climate generally, it had without doubt resulted in the drying up of springs and streams rising within the areas deprived of the shelter of a crop of trees; and this was a serious matter in connection with the question of irrigation by canals led from rivers not snow-fed, as well as in localities where damage had resulted from the formation of ravines and torrents. The permanence of the supply of timber and other forest produce for the use of the native population and for State purposes had also been endangered. When the Government wished to take action, its powers were found to be uncertain, for the destructive usages of the people had come to be regarded as inalienable rights; and it was necessary to pass a special Forest Law, which, among other things, provided for the formation of reserved forests, after a full inquiry had been made into claims, and for the regulation of proved rights within limits which would not endanger the permanent maintenance of the forests. In order to secure the forests from overfelling, and to insure that all work done might tend towards the production of the largest quantity of wood of the kind most desired, working plans were a necessity, and considerable progress had been made in their preparation. During the dry weather the forests became extremely inflammable, and vast areas have been annually burnt over from time immemorial, with the result of reducing the crop to the poorest possible condition, or of destroying it entirely. Measures had been taken to meet this great evil. The controlling staff of the Forest Department was trained in England, but the candidates followed a course of practical instruction in Continental State forests. The native Executive officers were trained at the Imperial Forest School at Dehra Dun. What had been done could not have been accomplished by private enterprise. The Government had set an example which had been followed by several of the more important native States. Much more remained to be done, but forest conservancy in India had reached a stage at which its steady progress could not be arrested.

THE STRENGTH OF COLUMNS.

Mr. Gaetano Lanza showed that an attempt to compute the strength of any given column by the various rules and formulæ commonly found in different handbooks, and books written by so-called authorities, would speedily reveal considerable discrepancies, not only in the formulæ, but also in the results. Hence it became a matter of importance to make a careful study of the tests that have been made, under practical conditions, on columns of such sizes and proportions as are used in construction. A summary was therefore given of the principal experiments that have been made of columns of practical sizes. The greater part of the tests contained in the list were made on the United States testing machine of 800,000lb. capacity, located at the arsenal at Watertown, Massachusetts. The details of these tests are published in special yearly reports issued by the Ordnance Department of the United States Government. Diagrams were presented showing (1) the results of the tests of cast-iron mill columns; (2) the results of the tests of wrought-iron bridge columns, and also empirical formulæ representing in each case the right-hand portion of the curve, which is concave upwards; (3) the results of tests of timber columns. A perusal of all the diagrams shows that, whenever the load on a column is so applied that its resultant acts along the axis of the column, the breaking load per square inch of sectional area is practically constant up to a certain ratio of length to radius of gyration, which in wrought-iron bridge columns varies from 60 to 80, and in a corresponding way in timber columns. For higher values of the ratio of length to radius of gyration the breaking strength per square inch decreases, and the law of decrease can only be expressed empirically in each case. When, on the other hand, the load on the column is eccentric, this must be taken into account in our calculations, and the greatest fibre stress should always be computed by adding the direct stress per square inch to the greatest fibre stress arising from the bending moment due to the eccentricity of the load; and the column should then be so proportioned that the total greatest fibre stress shall not exceed a certain allowable fibre stress, which last must be a sufficiently small fraction of the breaking stress per square inch corresponding to the ratio of length to radius of gyration of the column. In the paper the results of the tests and the modes of computation, both for central and for eccentric loads, were treated in detail, and a discussion was given of the theories and formulæ commonly found in the handbooks which are, for the most part, based on the results of Hodgkinson's tests on small samples. Fuller attention was also called to the disagreement of these latter with the facts.

CALIFORNIAN CONIFERS IN ENGLAND.

Mr. G. P. Hughes gave a description and measurement of coniferous trees, grown from Yosemite Valley seed, conveyed by the author in 1874, and cultivated in England. The description of these conifers tends to show that most of the Californian and British Columbian species thrive well on congenial soil and stations in Great Britain, and that as trees or ornament, shelter, and commercial value they are well worth cultivating. Californian and British Columbian red wood now produced 1s. 11d. per cubic foot in the English market, yellow pine 2s. 6d., pitch-pine 1s. 6d. per cubic foot.

A WOOD-DESTROYING FUNGUS.

Professor Marshall Ward, the president of the Botany section, read a paper on "Sereum Hirsutum, a Wood-destroying Fungus." He has cultivated this fungus from the spores on sterilised wood blocks, and has not only obtained very vigorous pure cultures, and traced the action of the mycelium week by week on the elements of the wood, but has obtained spore-bearing hymenia, and worked out the life-history very completely. The fertile hymenium arises in about three to four months. In destroying the wood the fungus delignifies the inner layer of the walls of the wood elements, and in three months' cultures and upwards these turn blue in chlorzinc-iodine, and are shown by other reagents to undergo alteration to cellulose-like bodies before their final consumption by the fungus.

ELECTRIC TRAMWAYS.

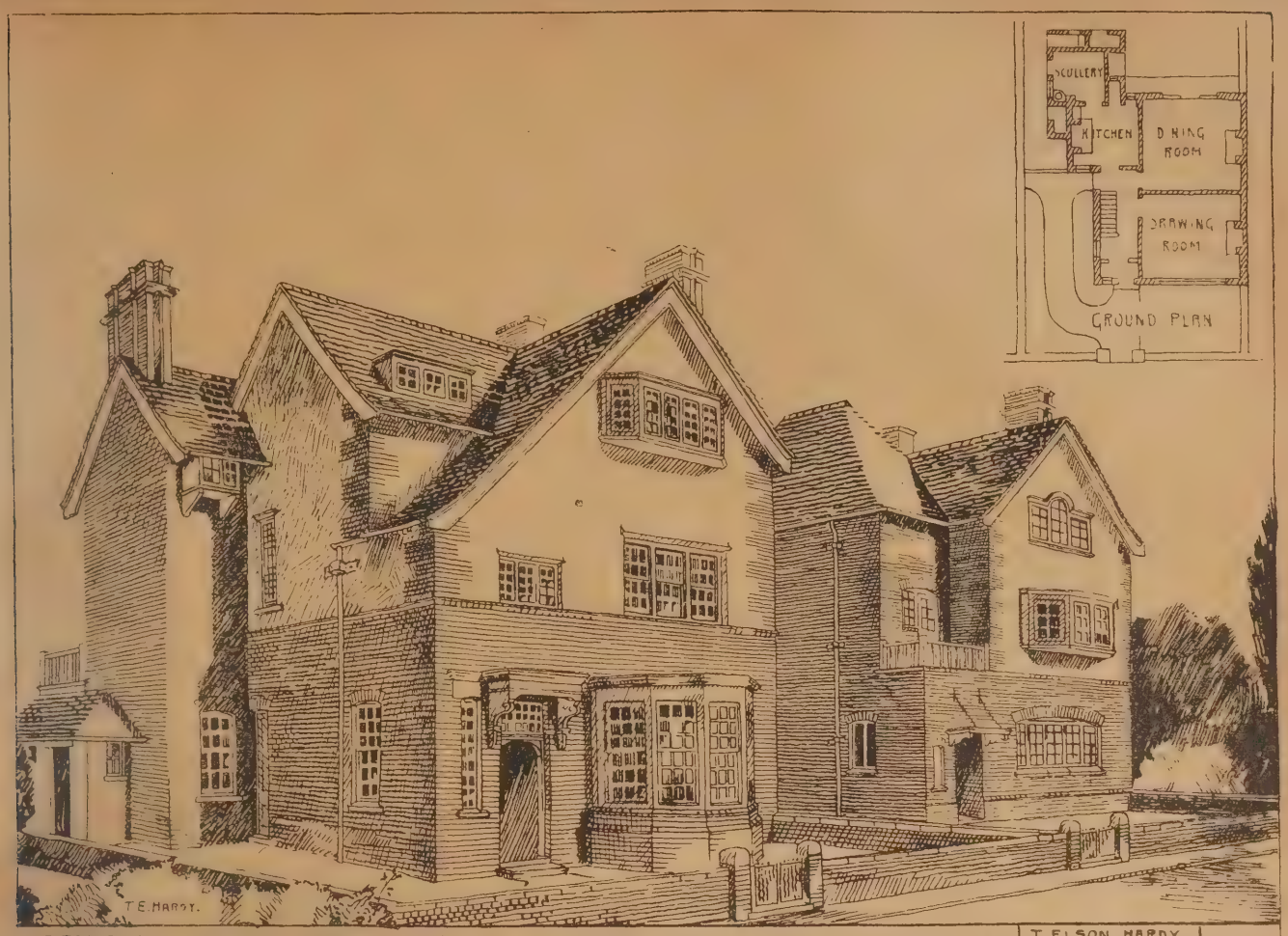
Two papers were read in section G, Mechanics, on Tuesday, on electric tramways by Mr. J. G. W. Aldridge, of London, and Mr. G. C. Cunningham, chief engineer of the Montreal street railway system. Mr. Cunningham pointed out that though the first electric tramway was only opened in 1884, there were now 16,000 miles of such tramways in the United States and 1,200 miles in Canada, as compared with only 700 miles in the whole of Europe. He also compared the extremely low cost of electric as compared with horse traction. In the Brooklyn Heights Railway the cost was only 86c. per car mile, while in Liverpool the cost of horse-power was 5d., and in Glasgow 3½d. per car mile. (Here the cost of renewing the horse stock was included.) Perhaps the costs were not strictly comparable, but with every item included there could be no doubt that electric power was enormously cheaper than horse-power. Mr. Aldridge said in his paper that the United Kingdom had practically 130 miles of electric tramway at work or under construction: of this length 103½ miles were operated on the trolley or overhead wire system, 15¾ miles by means of a third rail conductor, six miles by means of storage batteries, and only four miles on the underground conduit system. These proportions might be taken as fairly representative of other countries also, as far as could be ascertained. They seemed likely to be maintained, or even increased, in favour of the overhead wire system, unless radical improvements could be made in the direction of a cheaply built and maintained conduit method, or more durable and light accumulators for placing direct upon the car. Objections to the overhead trolley wire system were almost entirely æsthetic; but, at the same time, had such great weight and force that every incentive was offered to the genius of invention to make improvements in other directions. The ordinary underground conduit with open slot was most expensive to instal and troublesome to maintain efficiently; it could not be built for less than £10,000 or £12,000 per mile. Even its latest form (consisting practically of an underground trolley wire) must require an outlay of nearly double the cost of an overhead-wire system. Closed conduits with surface-contacts, usually operated by means of an electro-magnetic switching device in boxes under the street level, were complicated and, it was to be feared, unreliable. The great weight of lead required on each car for accumulator traction mean practically that the live paying load could never reach 25 per cent. of the gross weight of loaded car, whilst the combinations of trolley wire and battery, attempted on systems like those of Hanover and Dresden, were obviously ill-designed, the dead weight of battery being carried throughout the entire journey, though only required for part thereof. The author concluded with a description of his own system, in which the continuous overhead wire was done away with, the car itself carrying a short length of wire overhead, and a series of pillars and studs in the roadway feeding the current to the car. The length of the car wire was such as to bridge over the gaps between the studs and pillars. The studs were only live while the car was over them, thus obviating any danger to the ordinary traffic. The current was conveyed to the studs and pillars by an armoured cable buried underground.

The protracted discussion which followed was joined in by Professors Ayrton, Thompson, and Perry, Mr. Scott, Major-General Webber, the President, the Recorder, and others. The general conclusion was that for suburban traffic, and for streets in large cities where the vehicular traffic was small, the simplicity and economy of the overhead wire system made it the only possible system to adopt, and that the wires need not be at all unsightly if the feeders were underground. For the important streets of great cities, on the other hand, the more costly system would have to be adopted.

THE NEW CONGRESSIONAL LIBRARY, WASHINGTON.

THE old Congressional Library at Washington has been closed, and the work of removing the books to the new building has been commenced, a work which it is expected will take about three months. Mr. Green, the superintendent, has an ingenious arrangement for removing dust from the books before they are placed upon the new shelves. He has attached an ordinary rubber hose to the air compresser of the pneumatic tube system, and, to use his language, will just "turn the hose" on the dusty books. Instead of water, however, a stream of air, under heavy pressure, will do the work. At the end of the hose is a broad nozzle, $\frac{1}{16}$in. by 4in., which will enable the air to play on the books in a stream the shape of a brush. Assistant Librarian Hutchinson says the new library is "the most gorgeous public edifice in America. It has the largest golden dome in the world, with 10,000sq.ft. of surface. It is lighted by 1,800 windows. There are 25,000,000 bricks, and 1,250,000dol. worth of granite. Congress appropriated 6,000,000dol. for its cost. The builder turned over 300,000dol. to the Treasury of this money when he handed over the keys." In the rotunda or reading-room there will be room at the table, allowing 4ft. to each person—for 260 readers at one time, and this is exclusive of the alcoves for students pursuing some special line of research. On the great dais in the centre will stand the librarian and his clerks, taking orders for books and telephoning to the men in the distant book-stacks. From the stacks the books will be sent to the reading-room in travelling trays, like those employed in retail stores for conveying bundles and money. A tunnel 3ft. underground, and containing an endless chain railway, connects the library with the Capitol, so that when a member of either house needs a book, even in the middle of a speech, it can be supplied at a moment's notice. The library of Congress ranks sixth among the libraries of the world in its present contents.

The foundation-stone of a new Roman Catholic orphanage was laid at Sidmouth last week. It is being built from plans by the Rev. Canon Scoles, of Yeovil.



PREMIATED DESIGN FOR HOUSES ON THE BROOM WATER ESTATE TEDDINGTON | T ELSON HARDY HAROLD G. COYNE | ARCHTS.

PREMIATED DESIGN FOR HOUSES AT TEDDINGTON.

THIS design was awarded third premium in a recent open competition for houses on the Broom Water Estate, Teddington. According to instructions, they had not to be more costly, or to cover a greater area, than the smaller houses already built upon the estate. No other materials than those already used upon the estate had to be employed, and the designs had to be of a character suitable to be placed amongst the houses already built. The authors of the design are Messrs. T. Elson Hardy and Harold G. Coyne.

AN HISTORIC VARNISH FACTORY.

THE people of West Ham have a double interest in the firm of Messrs. Robert Ingham Clark and Co., Limited. In the first place, Mr. Robert Ingham Clark, J.P., the managing director, to whom the success of the present business is mainly due, is a gentleman well known in the borough, and is a man of such high character that wherever he is known, there he is honoured and esteemed. Secondly, the firm have a large factory on historic ground at West Ham Abbey, and here they have built up a huge business, with a reputation second to no firm in England. This is equivalent to saying that as manufacturers of japan and varnish they have no superiors in the world, for whatever foreign competitors may have achieved in other departments of trade, it is admitted that in the production of these goods England still stands easily first.

Perhaps the only resemblance modern West Ham Abbey, in its guise as a varnish manufactory, bears to its illustrious predecessor, is in the fact that it is surrounded by a wall of considerable height, and flanked by the Channelsea river —a tidal tributary of the Thames.

Established originally in the year 1846, in the City of London, Messrs. Robert Ingham and Co., about 25 years ago, to meet the requirements of their rapidly-increasing trade, purchased the West Ham Abbey freehold, and arranged and fitted-up these works upon the most advanced scientific principles for the economical production of this important article of commerce. From time to time additions have been made, and the storage capacity greatly increased. Being by far the largest manufactory in England devoted exclusively to varnish, it may fittingly be taken as generally typical of the industry. Recently, the firm have purchased the freehold of the adjoining Langthorne Chemical Works, bringing the total area at their command to between six and seven acres.

The business has steadily developed until the output at the present time, averaging as it does considerably over a thousand gallons per day, is believed to be the heaviest in the trade. The firm are contractors to Her Majesty's Government, the Admiralty, the Indian Government and State Railways, and other Government departments, as well as many of the largest English and foreign railway and tramway companies; they have agencies and depots in most European countries, the Australian Colonies, New Zealand, Canada, South Africa, India, China, and Japan; and, it may be added, there is scarcely a possible market in the civilised world to which, during the last 30 years, their goods have not been sent. Some idea of the enterprise which characterises Messrs. Ingham Clark and Co.'s operations may be formed by the fact that their representatives have repeatedly made "the round trip" of the globe, visiting the established depots, and organising and developing fresh connections.

The offices of the firm are at 6, St. Helen's-place, E.C., and they have also an establishment in Paris. Lately they have combined with their business that of Messrs. Pratt and Lambert, varnish makers, of New York and Chicago. During the past few months, Mr. R. Ingham Clark and other directors of the company have been to the United States to complete the negotiations, and the American house has been reorganised, with a capital of £70,000, in which Messrs. Robert Ingham Clark and Co. (whose capital is £300,000) take the controlling interest. A factory is being equipped at Long Island City for the manufacture of the English brand, and the existing factory in that city is also being enlarged in order to give more storage accommodation. The amalgamation is largely due to the heavy import duty, which, already 25 per cent. on English manufactured varnish, has been increased a further 10 per cent. under the Dingley tariff, and to the conviction forced upon Mr. Clark that the only way to effectively distribute the celebrated "Britannia" brand of his firm in the United States was to manufacture over there. Messrs. Robt. Ingham Clark and Co.'s goods have such a high reputation on this side of the Atlantic that this will doubtless prove an excellent method of opening up an extensive American business. The varnishes made by the firm in the States will be identical with those manufactured in England, which have hitherto been sold in the States through their agents and representatives.

At their commodious city offices the firm have a collection of fossil resins which is undoubtedly the finest in the world. Displayed in its entirety at the Paris Exhibition of 1878, where the firm obtained a prize medal, it commanded universal admiration, and at the Manchester Jubilee Exhibition, where some of the more striking specimens were shown, it attracted the attention of some of the leading scientists. Messrs. Robt. Ingham Clark and Co. have also gained the silver medal at Sydney, 1880, the award of the First Order of Merit at Adelaide, 1887, and the same distinction at Melbourne, 1888—in each case the highest honour obtainable.

RESTORING CHIMNEYS TO THE PLUMB.

TO whatever cause it may be due, probably in the majority of instances to the unequal settlement of the foundations, the fact incontestably remains that every nine chimney shafts out of ten ultimately develop a tendency to imitate the example set them by the famous campanile of Pisa. Independently of permanent leanings in that direction, every chimney shaft of a height worth mentioning, undergoes temporary terminal deflections during a bit of a breeze. Observations made with standard surveying instruments have recorded swayings to and fro to take place in tall chimneys to a

maximum amount of some 9in. and 10in. Instead of these alternate deflections of the shafts from the perpendicular constituting, as some might imagine, a radical weakness and dangerous source of insecurity, and possibly of the future collapse of the structure, their occurrence is favourable to its stability. In every architectural and engineering structure

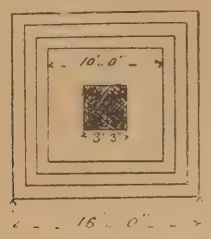


Fig. 1.

there must be, under an external force of any description, a certain amount of "yielding." Nature affords the best example: a good stick always bends before it breaks, and trees which, from their especial formation, cannot bend, or refuse to bend before the blast, are simply swept away, literally deracinated. In the Building News of the 2nd of this month we drew attention to the general transportation of buildings of every description in America, in which, it must be

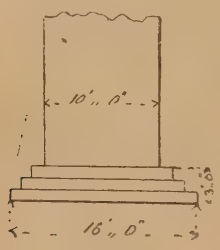


Fig. 2.

conceded, our Transatlantic friends are past-masters. The particular example selected for quotation was that of a chimney shaft. For one of these structures which require to be transferred intact to another site, there are at least some dozen or so which demand, owing to their aberration from the normal, not a change of site, but a rehabilitation of their former perpendicular and graceful contours. We intend now to place before our readers an instance of the manner in which the restoration of a chimney shaft to the

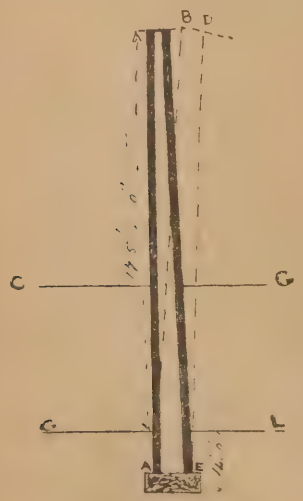


Fig. 3.

plumb has been successfully accomplished by means very different from those usually employed.

As an example, among many others, with which we are acquainted, we select that of a shaft 175ft. in height in the United States, which has been restored to its original position by the ingenious devices which are now before us. In Fig. 1 is represented a plan at the foundation level of the shaft, and in Fig. 2 is shown the elevation of the basement portion. The necessary dimensions are marked on the drawings, so they need not be recapitulated in the text. The total weight of the chimney was about 280 tons, of which 160 tons may be credited to the foundations. Before proceeding with the actual operations required to effect the desired result, a few particulars respecting the nature of the substratum upon which this shaft was erected will be of interest. The site itself, or rather the underlying soil, is composed for a very great depth of alluvial deposits, intermixed here and there with thin and intermittent layers or veins of sand. At what depth any rock, or even any comparatively solid ground, was to be found is not apparent, since the foundations were "got in" on the unreliable bottom already mentioned. Shortly after erection it was perceived that the shaft commenced to evince signs of leaning in one direction; but for some time nothing was done, although a very careful watch was kept upon the chimney shaft. It was not until the deflection from the plumb attained the dimension of 2ft. 4in. that it became evident that some measures must be adopted to insure, not only the safety of the shaft, but, what is of much greater importance, the limbs and lives of the public. The object to be satisfactorily accomplished was to pull back the chimney to its original position, which was effected in the following manner:—The original or normal position of the chimney shaft is represented in Fig. 3, and the position which it had assumed, when it was considered imperative to adopt some measures to prevent it completely collapsing, is shown by the dotted lines A, B, D, E. Owing to the small scale upon which Fig. 3 is necessarily plotted, the derivation from the perpendicular of the summit of the shaft has been a little exaggerated—that is, in other words, that portion of the illustration has been drawn to a slightly distorted scale. It was some time after the erection of the shaft before the "list" began to be in evidence. It commenced with a deviation from the plumb of 1ft. 3in. before any particular attention was drawn to it, when the deflection was carefully and accurately measured with a view to watch very

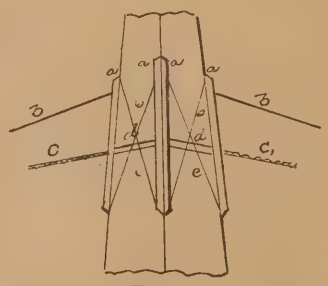


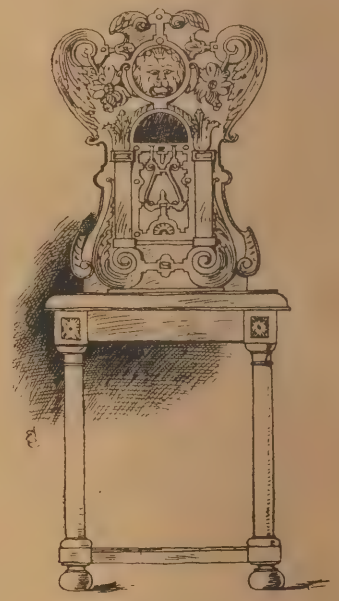
Fig. 4.

closely any future movement in the same direction. It is not only tall chimney shafts, but towers, spires, steeples, beacons, and lighthouses which are subjected to the same conditions. As examples, witness the celebrated leaning-tower already mentioned, and the steeple of the parish church of Chesterfield, popularly known as the town of the crooked spire.

When a tall chimney shaft, or any other of the lofty edifices enumerated, commences to "get out of the plumb," as the sensible and practical workman's phrase has it, there are two general ways in which it evinces its failing and calls for help. It may begin by bending increments of individually so small an amount that a long and, perhaps, very regrettable period of time may elapse before any real mischief becomes apparent. On the other hand, it may develop such sudden and serious indications of failure, that, as a precautionary preliminary, a certain length, usually about a third of its total height, is immediately shored up. The means adopted in the present instance will be readily intelligible on a reference to Fig. 4. At a point in the neighbourhood of the centre of gravity of the shaft a strong temporary scaffolding or framework of stout timbering was erected, completely encircling it, and braced and tied together, both transversely and diagonally. Guy ropes, *b b*, attached to the upright balks, *a a a*, maintained the shaft in equilibrium, while its restoration to the normal was in progress. A couple of wire cables, the one *c*, which was 2¾in. in diameter, acting as the hauling, and the other *c* as the regulating cable, as well as two small ropes at right angles to the former, were connected to the framework. The power or motive force was obtained by a suitable arrangement of tackle, pulleys, and other auxiliary machinery and gearing. Before, however, actually commencing the operation of lineal rectification, the earth round one-half of the circumference of the chimney was excavated down to the level of A—E in Fig. 3, so as to prevent it from offering any resistance to the return of the shaft to the perpendicular. As might be expected, the pressure or first haul was made very gently and gradually, and, indeed, the whole work demanded the exercise of considerable skill, caution, and patience. Nearly a month elapsed before any perceptible movement in the direction desired could be measured and recorded. No sooner had the whole *modus operandi* got into full swing than the shaft gave evidence of a visible retrogression towards its original vertical position at the rate of about ½in. per day. When the operation was successfully terminated there was not the least indication of any crack or fissure in any part of the structure. T. C.

OAK CHAIR FROM THE CLUNY MUSEUM.

The little Oak Chair now in the Cluny Museum possesses a very curiously-shaped and carved back of free treatment. The circle



near the top contains a lion's mask, and below, the half-circle is pierced through. The columnar legs are characteristic of French work of the 16th and 17th centuries.

MASONRY DAMS.*

A few treatises and articles have been published on the construction of dams, but these have generally been devoted to some special kind of construction to some particular profile, or have been descriptive of works executed. Mr. C. F. Courtney, M.Inst.C.E., assistant engineer, Manchester, &c., has brought together in a small volume a good deal of valuable data, and furnishes the engineer with some practical advice. The author has had experience in dealing with large bodies of water for mining works, and has found the need of information in a compact form. In determining pressures, the graphic system is used, and for many reasons it is a preferable method to calculation, as any error can be detected by the polygon of forces which cannot be made to close. The author deals with his subject from the inception to the finish. Many useful suggestions will be found in the remarks on site and position, location of dam, foundations, and construction. The sites most suitable are lagoons or lakes; those which are neither mountainous nor flat, especially those which command extensive

* Masonry Dams, from Inception to Completion. By C. F. Courtney, M.Inst C.E. London: Crosby Lockwood and Co.

drainage areas, and which will yield more than the required quantity of water from the average yearly rainfall. Large areas of water are, of course, subject to evaporation, and this element must be considered, so that it does not bear a great disproportion to the amount stored. Mr. Courtney gives some useful approximation for calculating the water obtained from a given area, and a table of the cubic feet of water per acre from various rainfalls is appended. Curved masonry dams are, no doubt, of greater strength than straight dams, as a curved dam convex on the upstream face acts like an arch abutting on the sides of valley. Beyond 600ft. radius, the curved form is considered doubtful. "There is a general consensus of opinion that the same principle should be followed in designing a profile, whatever the plan, unless a curve of less than 300ft. be adopted, as it is found impossible to state definitely when a dam may be considered to act as a horizontal arch, the investigation resting on assumption, and being withal exceedingly complicated." The author gives the report of the board of experts appointed by the Aqueduct Commissioners to the Quaker Bridge dam on the profile. Their conclusions are briefly as follows:—That the curved form in plan is safe to close a deep, narrow gorge if the radius is short, the cross section of dam may be produced below the "gravity section"; that a gravity dam, built in plan on a curve of long radius, derives no appreciable aid from such action so long as the masonry remains intact; but in case of yielding of masonry, that form might prove of advantage; that the curved form better accommodates itself to change of volume due to change in temperature. A profile of the Quaker Bridge dam, designed by the board of experts, is given. The chapter on "Waste Weirs" is important, and the author gives the principles to be followed in fixing the width for the discharge of waste weir. The form of foundation, Mr. Courtney says, is no less important, and a section is shown which may be accepted as a good form to prevent filtration or percolation by means of an apron or valance excavated along the inner toe of the wall, and forming a sort of masonry tenon. Several useful suggestions are made on the construction of dams, which are divided into the following four classes: — (1) Cut-stone masonry, (2) rubble masonry, (3) concrete, (4) rubble or concrete, with cut-stone (ashlar) facings. The advantages of each of these is discussed—cut-stone or block masonry is said to be the best and most solid; rubble is more easily worked, and has great strength, and is adapted to any form of profile; and concrete is said to have all the advantages of rubble masonry and is the most easily worked. The last kind is not recommended, as it is liable to uneven settlement. The author treats on "leakage and sweating" failure of dams, and the appendix contains a good form of specification, estimates of cost, and other useful data.

WROUGHT-IRON AND STEEL IN CONSTRUCTIONAL WORK.—XXVIII.

THE system of splaying, illustrated in one form in Figs. 165-66, in the last article, is frequently adopted as a means of imparting lateral stiffness to braced structures; it is found in the arched spans of many bridges, as well as in roof principals. Fig. 176 also shows a method of splaying in the vertical direction, adopted on one of Sir John Fowler's bridges, built of continuous girders. The girders are 12ft. 7in. deep, and are built of top and bottom members, and diagonal bracing for the web; the top and bottom members, A B, are built of a T-section, with horizontal and vertical plates, united with angles. These are connected and braced by means of diagonal angles C, crossing at 45° on each side of the vertical web-plates of the top and bottom members, and set back to back, and so riveted. At intervals, vertical angles D are splayed and riveted to top and bottom members and to the diagonal angles; at the centre they are secured apart with a covering-plate.

The principle of the American hinged, or pin and link bridges, on which principle most bridges are built in that country, is that of leaving the tension and compression members free to adjust themselves to varying strains, and to apportion to each member its own due share of work; each member is hinged on a pin, the stresses are transmitted through the pins, and the members are not tied rigidly to one another, but are free to

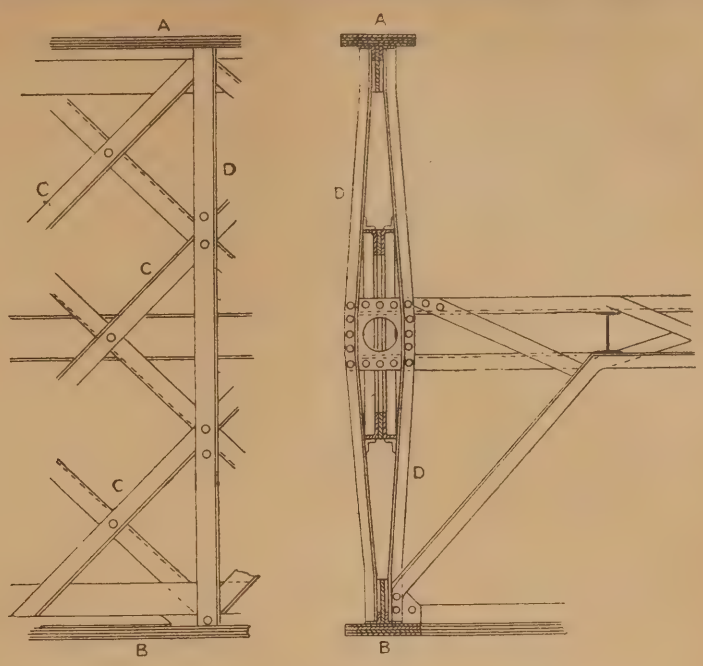


Fig. 176.

move. The tension members are composed of links which are hung on the pins; the compression members are similarly hung, and, as they are not riveted, they are formed of, or reinforced and stiffened with, angles, or channels, or other sections. In this system there is no loss of strength due to reduction of section by rivet holes.

The Clarence Bridge at Cardiff is formed of pin-connected trusses, a method which, though common in America, is little known here. There is so little demand for heavy links for pin bridges that no plant exists in this country for making them; welding is not permissible, and upsetting requires a special plant. The steel eye-bars forming the diagonal ties in the main girders of the Clarence Bridge at Cardiff were sent to New York to be upset; in this process the heads of the blank bars are rolled of the same width as the bar, but of sufficient thickness to allow of their being heated and spread out laterally into the form of the eye. The bar is rolled in a universal mill, having a lower horizontal roller supported on hydraulic cylinders, to admit of its being raised and lowered during the passage of the bar so as to roll the bar with a thin body and thick ends; these ends are afterwards heated in gas furnaces, and spread out by means of a plunger, and die forged. The tie-bars for the roof of the Cardiff market were sent to New York to be upset, as was done in the case of the Clarence Bridge.

In the American pin bridge it is desirable, in order to insure the necessary accuracy, to bore the holes for the pins in both ends of the bars simultaneously. Machines are specially constructed to facilitate this work; a long bed carries two traverse framings, each having a separate drilling-machine, the distance of the framings being adjustable. The bars are slid under the drills from one side, and taken out at the other.

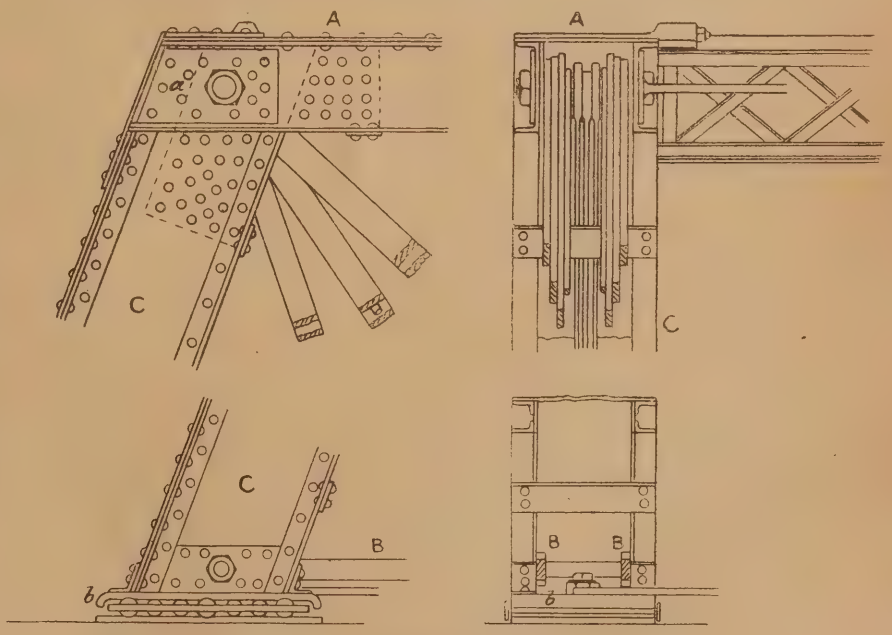


Fig. 177.

The American pin bridges are made cheaply; some few details of the methods of union of one of these are shown in Figs. 177, 178, 179. The top chord, A, is built of 15in. channels, connected by a plate on the upper side and by bracing on the lower; the bottom chord is formed wholly of eye-bars, B, Fig. 177, arranged in groups from panel to panel, the numbers and groups increasing towards the centre. The verticals D, Figs. 178 and 179, are built of channels, braced together on both sides. The end-posts C, Fig. 177, are made of channel sections, compounded of plate and angle, being united with a plate on one side and with bracing on the other; these are abutted with a planed joint, and attached to the chords with internal covering-plates. The central posts are simply hinged to the chords, Fig. 178, strengthening

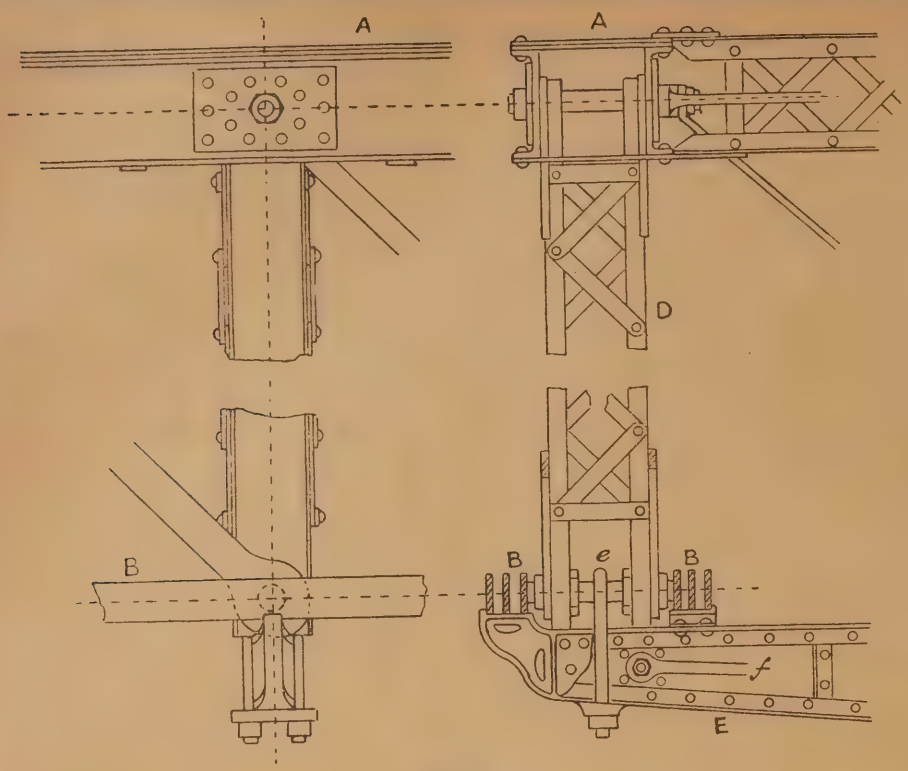


Fig. 178.

The Haarlem River bridge at New York, completed in 1882, is a good example of a pin-connected structure. The details of the joints vary

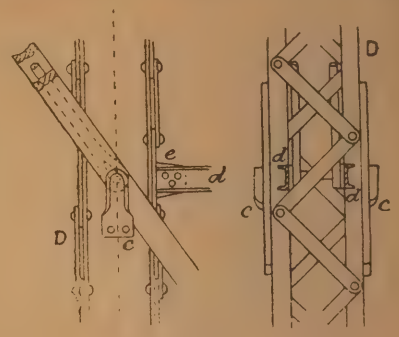


Fig. 179.

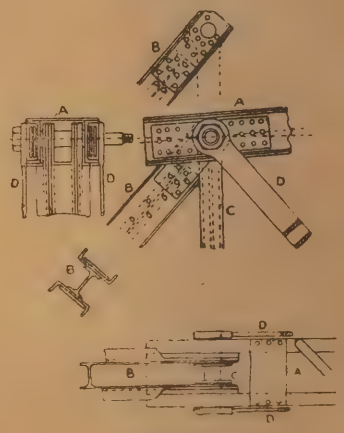


Fig. 180.

plates being riveted to the channels where the pins pass through; the attachments of the hinge-pins at the junction of the end-post and top-chord is shown in Fig. 177. The pin passes through strengthening plates *a*. The pin attachment of the first links of the bottom chord is also seen in Fig. 177, and the abutment of the end-post, and its fastening by angle irons to the wrought-iron plate *b*, which rests on the expansion centre by channels, *d d*, stiffened with cross-bracing and attached with gussets *e*, the last vertical being connected to the top end-pin, Fig. 177, with tension rods; this arrangement thus halves the length of the posts as columns and reduces their tendency to bending. In many trusses the diagonals are pin-connected to the posts at the centre, so halving their length and stiffening the truss. In Fig. 178 the attachment of the floor-beams E is shown; they are suspended from the lower chord pins by stirrups *e*, bevelled washer-plates taking the nuts. Lateral bolts *f* brace the floor-beams. The same fig. and Fig. 177 show the attachment of the overhead girders by means of riveted plates, and bolts passing through lugs, and also lateral rod braces.

from panel to panel, as the forms and dimensions of the members vary. Fig. 180 shows the end joint between top boom A, raking strut B, vertical strut C, and diagonal ties D, and Fig. 181 is the connection at the commencement of the next panel. The top member A is formed of two 12in. channels, connected by a top plate covering the two panels next the end; in the two succeeding panels the plate is discontinued and its place taken by lattice bracing, while beyond these the

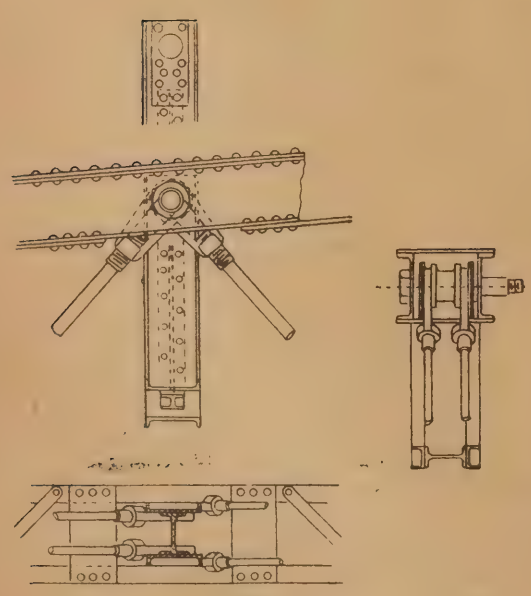


Fig. 181.

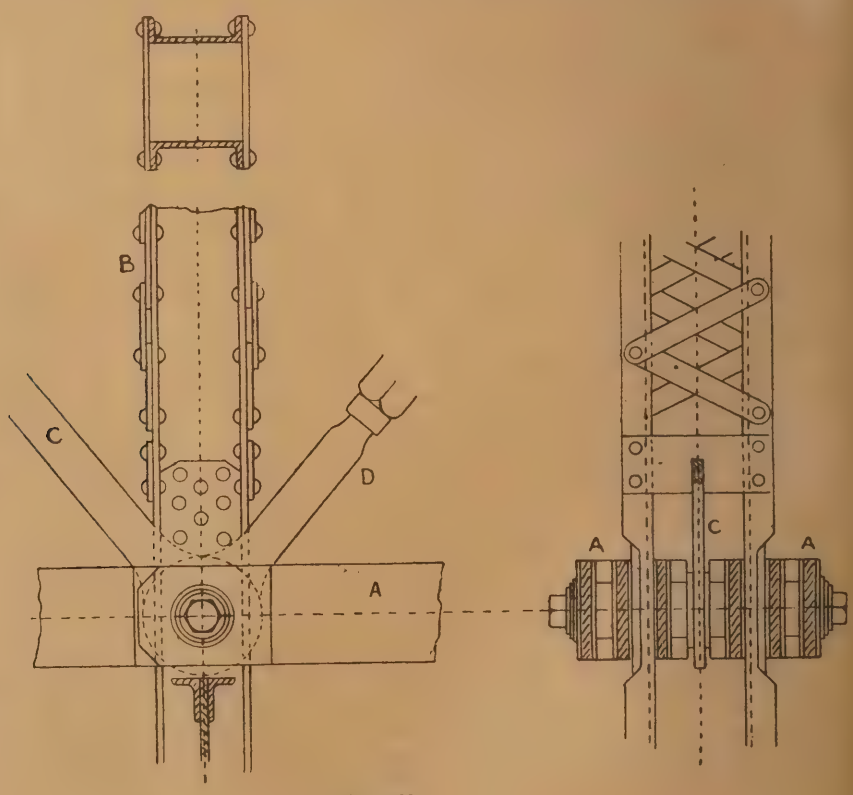
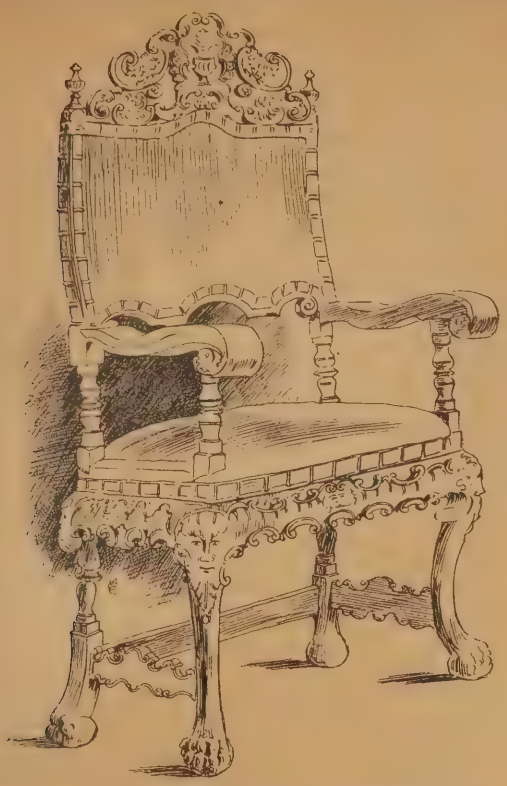


Fig. 182.

roller. The bars B of the lower chord are prevented from sagging by the support rendered by brackets, as seen in Fig. 178, and in some cases on the pin nuts. The diagonals are prevented from sagging and rattling by being made to rest upon cast iron brackets *c* riveted to the verticals, Fig. 179. The verticals are connected at the



AN ARM-CHAIR FROM SALAMANCA.

place of the channels and lattice bracing is taken by links, also pin-connected from panel to panel. The raking strut B in Fig. 180 is built up of 12in. channels united with a joint section; the vertical strut C is a joist section stiffened with plates, and the ties D are two flat bars. The bottom boom is built of channels united by lattice bracing, and is pin-connected to the ties. In Fig. 181 the verticals are formed of channels and joists, and the diagonals are round rods with links and screws for adjusting the tension.

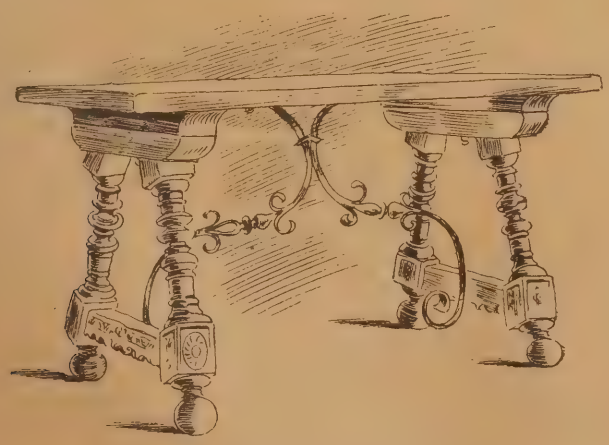
In the Clarence Bridge at Cardiff the top boom consists of two 12in. channels spaced 15in. apart, connected with a solid plate on top and with bracing on the bottom; the bottom boom consists of links in groups, pin-connected. The vertical struts are composed of channels connected with bracing, and the diagonal ties are flat eye-bars, the whole being pin-connected. The centre panel is counterbraced, provided with screw couplings for tightening up. Fig. 182 shows the connection between the bottom boom A, a vertical B, a diagonal C, and a counterbrace D. The bars B were made parallel, because no English firm would undertake to upset them; the ties C were those sent to America.

Since the safety of a bridge depends on the eye-bars the stringency of specifications is necessary. In the Nebraska City bridge, erected two or three years since, it was stipulated that ten full-sized eye-bars should be submitted for test, and, when broken, the fracture had to occur in the body of the bar; these tests were to be made at the expense of the contractor, who might dispense with them only on the condition that he increased the section of the bars by 20 per cent., without extra charge. The amount of play allowed between pins and eyes was only $\frac{1}{50}$th of an inch. J. H.

BOOKS RECEIVED.

The Art of Tracing, by E. W. Fritchley, Architect (Bombay: Education Society Steam Press), is a useful little book for the use of pupils and draughtsmen. Mr. Fritchley's instructions will be found of much value to those who are engaged in tracings of architectural work, the essentials of which are accuracy and expression. The author justly observes that drawing and tracing are two distinct things, and that a knowledge of drawing by no means fits a student for tracing with ink. Many useful hints are given about tracing cloth, and how it should be cut to avoid waste, how the surface of tracing cloth should be prepared by rubbing it over with powdered chalk or with indiarubber—the latter plan is preferred. The hints on preparing India ink, re-using dried ink, arrangement of drawing table; the method of grinding the blades of the drawing-pen—a very important thing, method of filling pen, how to hold the pen, will be found worth the tracer's attention. The chapters on T- and set-squares, "Proportion and Effect," "Colouring Plans and Sections," comprise many useful suggestions. Moist water-colours are recommended, as they are quicker prepared and more uniform when mixed. They do not dry so rapidly as dry colours. The author says: "A little taken from the pan at the end of a penknife blade, and washed off into the colour-saucer by means of a camel's-hair brush and water, produces a thorough uniformity in the depth of colour, absolutely necessary in applying flat washes. When several tints of the same colour are to be used in different parts, it is economical to wash off the colour from the penknife blade with as little water as possible, and to apply the dark tints first, then to add water for the lighter tints." One useful caution is to avoid putting a wetted brush into a moist water-colour pan, as the slightest dampness in the weather would then soon spoil the colour. Again, we read, on applying tints, that they should be put on with a quick hand over the whole area; otherwise streaks and patches of different depths of colour will occur. The author does not say how a thin white edge is to be left between the coloured parts of sections and plans and the inclosing lines. No doubt a finished and neat effect is thereby given; but draughtsmen have seldom the time to observe these finishes in colouring plans. The architect's methods of colouring tracings are rather less methodical and exact than those described, but the suggestions are of value.

——*Illustrated Europe*, No. 173: *Solothurn and Baselland*. The latest volume of this excellent series of sixpenny paper-covered guides to the Continent (published by the Art Institute of Orell Füssli at Zurich) deals with the scenery of the cantons of Solothurn and Jura. Although tamer and less romantic in character than the Alpine districts within sight to the south-east, contain, nevertheless, some beautiful tracts of forest-clad ridges and wide pastures interspersed with quaint villages and old-world towns. The book is brightly penned by E. Zingg and W. von Ar, and contains a key map and fifteen illustrations, by J. Weber, of the Clock House and other features of Solothurn and of hamlets among the Juras.



A TABLE FROM SALAMANCA.

ARM-CHAIR FROM SALAMANCA.

THIS Chair, of ample proportions, is typical of Spanish work in the 17th century, with the florid scrollwork to top of back and underseat. The arms are broad and boldly curved. There is no front rail, but the two side ones are elaborately shaped.

A TABLE FROM SALAMANCA.

THE Table, with sloping baluster legs, is very quaint, and the scroll ironwork, which forms a tie to the two ends, whether part of the original work or not, is a curious mode of supplying the need of a stretching rail.

CHIPS.

The work of repairing the tower and spire of Salisbury Cathedral is being rapidly pushed forward, and Sir A. W. Blomfield, A.R.A., the architect, believes that by the new year the scaffolding will have been removed. He has informed the Dean and Chapter that the north-west turret is in such a bad state that it will be necessary to have it rebuilt.

Extensive alterations are to be made during the next few months in the Admiralty House at Portsmouth, and, until they are completed, Sir Michael and Lady Culme-Seymour will reside at Alderstoke. About £4,000 is to be spent.

The watching committee of Aberdeen Town Council have approved the plans for the new fire-brigade station in King-street. The buildings are estimated to cost £11,896.

At the parish church of St. Chad's, Over, near Northwich, the foundation-stone was laid on Friday of two new vestries and an organ transept, which are being built at a cost of nearly £1,000. This is the first time since the year 1543 that the fabric of this ancient church, which dates from the reign of Edward I., has been substantially enlarged. For more than 350 years its walls have stood very much as they are to-day.

At a special meeting of the Parks and Galleries Committee of Glasgow Corporation, last week, it was decided to acquire 43½ acres of ground on the south side of the Clyde, between the river and Rutherglen-road, opposite Glasgow Green, as an extension to the green, at a cost of £1,000.

LICENSING OF ARCHITECTS.

LETTERS addressed to the secretaries of the various Chapters of the American Institute of Architects are being sent out by that Institute in the following form:—

"At the National Convention of the American Institute of Architects held last October, the following resolution was passed:—

"Resolved: That a committee of three be appointed by the President to obtain expressions of opinions from the Chapters as to the advisability of the licensing of architects by State legislation and the relation which the examination for such license should sustain to that required for examination for admission to membership in the Institute, and, further, if they deem it expedient that the election of Fellows be made more dependent upon professional skill and practice than at present. This report to be made to the next convention.

"The committee are soliciting expressions of opinion and recommendation upon the points covered in the inquiry of the resolution, so that they may be able to make a thorough report to the next annual convention, which is to be held in Detroit in October next. If you can have resolutions drafted and passed by your society which will express the sentiment of your Society or Chapter upon these points and forward the same to the chairman of this committee, you will be conferring a favour upon the chairman as well as putting the American Institute of Architects in possession of valuable data for future action. If the time is not sufficient to get the expressions from your Society or Chapter upon these points before the first of October, will you please bring the matter before the managers, executive board, or committees of your Chapters or Societies, and prominent members of the profession in the locality covered by your Society and forward to the Chairman of this Committee? All data and information and expressions of individual opinion that you may be able to secure, will be appreciated. Please send same before the first of October, so that the Committee may have time to formulate its report for the next convention."

CHIPS.

At Conway on Tuesday the memorial-stone was laid of the new schools for girls in course of erection. The architects are Messrs. Grace and Ould, Liverpool, and the contractors Messrs. Parry and Sons, Llandudno.

A brass Communion-rail has been made for Clonfert Cathedral by Messrs. J. and C. McGloughlin, of Dublin, in accordance with the design of Mr. J. F. Fuller, F.S.A., the architect under whose supervision the work of restoration of this cathedral is being carried out.

The reredos at All Saints', Wigan, has been improved and adorned as a memorial of Canon the Hon. G. T. O. Bridgeman, for many years rector of Wigan. The reredos has been altered and decorated by Messrs. James Powell and Son.

A window has just been dedicated, in the church of St. Martin's, North Nibley, to the memory of Henry Williams, son of the commentator, and formerly vicar of the parish. The design is in the 15th-century style, containing in three lights the subjects of the Annunciation, Visitation, and Purification. The artist is Mr. Percy Bacon, of Newman-street.

The town council of Launceston met on Wednesday evening to receive Mr. Trevail's plans for the public library to be erected by Mr. Passmore Edwards. Mr. Trevail stated that the site in Church-street conditionally selected by the council was a very unsatisfactory one, being much too small. However, in deference to the wishes of the council, he had done his best with the space at his disposal; but the rooms designed were very cramped. He did not approve of the site, and it now rested with the council to say if the building as designed would meet the wants of the town. It was decided to hold a special committee meeting forthwith, to consider Mr. Trevail's plans, and to decide whether the Church-street site shall be purchased.

During the past week a stained-glass window has been put in the apse of the northern aisle of the Abbey Church at Romsey, at the north-east corner of the Abbey. The subject depicted is that of St. George and the Dragon.

The Secretary of State for India has appointed Mr. Edmund Neel, C.I.E., to be Secretary of the Public Works Department at the India Office, in succession to Mr. Clement S. Colvin, C.S.I., who has retired. The salary of the appointment is £1,200 a year.

OBITUARY.

We regret to announce the death of our old contributor and correspondent Mr. Philip Edward Masey, architect, late of Old Bond-street, W., and Mornington-road, N.W. Mr. Masey, who died on Wednesday week at Hope Villa, Harold-street, Camberwell, was in his 74th year. He was for many years partner with Mr. John Norton, F.R.I.B.A.

The death is announced of Alderman John Parker, of Rochdale. Mr. Parker, who was in his 82nd year, was by some years the oldest man in the corporation, in the work of which he had for nearly twenty-one years taken an active part. When, in January, 1896, he completed his 80th year, his workpeople presented him with an illuminated address testifying to the happy relationships which had always existed between him and them. Some of those who signed the address had been employed by him for close upon thirty years. The deceased alderman went from Burnley to Rochdale when he was sixteen years of age to be apprenticed at the machine works of his uncle, Mr. Thomas Robinson. He subsequently, with a Mr. Gibson, started in business as a timber merchant in River-street. The partnership was after a time dissolved, and over thirty years ago Mr. Parker established the business of builder and timber merchant in Molesworth-street, Rochdale, of which he remained the head up to the time of his decease. From 1873 until 1889 he was a member of the board of guardians. Mr. Parker was a member of the buildings, baths, parks, and cemetery and gas committees of the corporation. Mr. Parker married the eldest sister of Edwin Waugh; there were two children of the marriage—a son, who died over twenty years ago, and a daughter, who married Mr. Abraham Tweedale (for many years associated with Alderman Parker in the management of his business), and still survives. Mrs. Parker died many years ago.

The death is announced, at the age of 78, of Mr. William Sutherland, one of the founders of the *Journal of Decorative Arts*, after a long illness. Mr. Sutherland was born in Manchester, his parents being natives of Dornoch, and he was apprenticed to a house-painter, in whose employ he acquired a knowledge of methods which were to serve him in good stead in after years. To a knowledge of graining and marbling he added that of drawing and colour, and associated himself with a small coterie of young men, who met at regular intervals for the study of painting, portraiture being the principal object of their efforts. Mr. Sutherland afterwards went first to Hull and thence to London, where he stayed for a few years, working in some of the leading shops. Between 1847 and 1859 he was in business in Birmingham on his own account. In 1848 he published a small brochure on graining, which, for its time, had a large sale, and two years later Mr. Sutherland wrote a work on sign-writing, issued at the price of one guinea. The great cost of producing the coloured plates, however, and a not too keen capacity for making a bargain, left the author with "his trouble for his pains." For four years he was in business in Rochdale, and in 1863 he left there to return to his native town, where he resided ever since. At Manchester he commenced business as a decorator and grainer to the trade. In 1865 he inaugurated a movement for holding an art workman's exhibition on the lines of the more modern Arts and Crafts. This was held in the then Royal Institution, now the Art Gallery, in Mosley-street, and was in every way a success. Mr. Sutherland was chairman of the committee which carried it through, and not only was an excellent exhibition got together from all parts of Lancashire, but a strong impulse was given to the decorative arts of all kinds, particularly as related to house-painting. In 1866 a second exhibition on the same lines was held in the same place, directed by an enlarged committee. For the first of these exhibitions Mr. Sutherland painted five large panels, to which a critic writing in the Building News referred in the following terms:—"The defects and limitations of Mr. Sutherland's art are those which a definite and thorough training in early life would have obviated. He has great natural talent and grasp of form and colour, which, directed and concentrated into more specific channels, could not have failed to have led to great distinction." In 1863 he published, through Abel Heywood and Son, of Manchester, a "Handbook of Graining and Sign-writing," and a few years later he was invited by Mr. J. Passmore Edwards to write some articles for the Building News on house-painting and decorating. This he did over the *nom de plume* of "An Experienced Workman." The articles ran for something like three years, and, as a writer in the *Journal of Decorative Arts* says, it is no exaggeration to say that, as a technical exposition of the processes involved in the painting and decorating trades, they have never been equalled. They embodied the result of a life-long experience, set out in precise and lucid style. The greatest tribute to their worth is to be found in the fact that they have been the treasure-trove for every plagiarist and scribbler on painting processes ever since. These articles were, indirectly, the cause of the *Journal of Decorative Arts* being launched on to the public. In 1880 an oil and colour journal, emanating from Leeds, but now defunct, was coolly appropriating them, and issuing them as original contributions. A London contemporary of even larger pretensions was doing likewise, but third-hand, through an American source. Steps were taken to terminate this, and a family conclave was held, at which it was decided to venture into the region of journalism. A nervous affection in 1873, and a weak heart, compelled Mr. Sutherland to withdraw from participation in outside engagements, and for the last 20 years he has been more or less of an invalid, his journalistic work in the early eighties being the extent of his labours. Old age and increasing infirmities, consequent on his persistent remaining indoors, sapped a magnificent constitution, and brought about the end.

Mr. Robert Carter, of 88, East-street, Bury, Lancs, died on Thursday evening in last week in his 78th year, from heart disease. He was apprenticed, at the age of 14, with Messrs. James and John Hall, builder, Moorside, Bury. Subsequently he acted as foreman in connection with the erection of several important public buildings in the town, and had charge of constructing Lord Derby's Works at Redvales, from plans drawn by the late Mr. Green, architect, of Portsmouth. For some years he was clerk of the works to Messrs. Maxwell and Tuke, architects, of Manchester, and he also saw several years' service with Messrs. Blackwell and Booth (Mr. Lawrence Booth, formerly of Bury), architects, Manchester. In 1872 he was appointed clerk of the works for the Lancashire and Yorkshire Railway Company, his labours being for the most part in connection with the construction of station and warehouse buildings, a position from which he retired in 1892. He was appointed in 1871 as referee to the Executive Council of the Amalgamated Society of Joiners, an appointment he retained up to the time of his death. For some years he was a prominent member of the Bury Branch of that society, and in 1872, on retiring from the secretaryship of the local branch, he was presented with a valuable timepiece in appreciation of his services. He had an unbroken membership in the lodge of the Manchester Unity of Oddfellows extending over 57 years. For many years he performed the secretarial duties of the lodge, and when he retired from the post about ten years ago he was presented with an illuminated address.

Walter Frost, aged 49, was accidentally injured whilst carrying building materials in Bury St. Edmund's a fortnight ago. Tetanus set in, and he died on Wednesday.

The restoration of the exterior of King's Cliffe parish church is in progress, at a cost of about £500. The windows and masonry are in an insecure condition, and the porches are giving way. Mr. Roberts, of Stamford, is the builder.

On Friday, a meeting of the committee of the Wolverhampton Board of Guardians was held to consider the question of selecting a site for the proposed new workhouse. Several offers were considered, and eventually it was resolved to recommend the board to accept the offer of the New Cross estate, between Heath Town and Wednesfield, for the sum of £11,000. The estate is about 50 acres in extent, and has already met with the approval of an inspector of the Local Government Board.

Mr. H. H. Law, one of the Local Government Board inspectors, held an inquiry at Crigglestone on Friday, with reference to an application by the Wakefield Rural District Council for sanction to borrow £1,000 to extend the waterworks in the straggling township of Crigglestone. Mr. Frank Massie, the engineer to the council, explained that the loan was required in order to provide water for a number of houses in the higher levels in the township.

COMPETITIONS.

Colchester.—The town council resolved in March last to invite six selected architects to send in competitive plans for a new town hall, and offered premiums of £100, £75, and £50 for the designs placed first, second, and third. Mr. Norman Shaw, R.A., has acted as assessor, and has awarded the premiums as follows:—1st, Mr. John Belcher, F.R.I.B.A., of Hanover-square, London; 2nd, Messrs. Baker, May, and Rickards, of Colchester, Clacton-on-Sea, and London; 3rd, Mr. E. W. Mountford, F.R.I.B.A., of Buckingham-street, London. The estimated cost in each case is below £35,000; this estimate being inclusive, in every instance, of the tower. The designs are now on view in the existing town hall. Mr. Belcher's design is Renaissance in style, and three stories in height. On the first floor are the council-chamber, 38ft. by 33ft., and committee-rooms, and over these is the assembly-hall, 84ft. by 33ft.

Hipperholme.—Plans were recently invited by the urban district council for new offices to be built on a site in the Leeds and Whitehall-road. From among ten sets sent in those submitted by Mr. J. F. Walsh, of Halifax, have been selected. The chief room is the council chamber, on the first floor, which is 35ft. by 20ft., and has a panelled ceiling. The facing materials are local wall stones, with ashlar dressings and panels of terracotta. The estimated outlay is £2,000.

Huddersfield.—The scheme for the erection of a tower on Castle Hill to commemorate the reign of the Queen has progressed so far that no less than thirty designs have been received from various parts of the country, as well as three marked "not for competition." The designs are exhibited for inspection by the subscribers to the scheme in the rooms in Byram-street, where the proposed free library and art gallery are expected to be housed, until the end of the present week. Almost every conceivable style of treatment is presented, says a local journal, and in some cases the artists have evidently not had a very adequate idea as to the nature of the situation which the memorial is to occupy, and have indulged in too great elaboration of detail. Those approximating to the keep of a feudal castle seem so far to have met with most favour, although there are several variations upon this idea. In every case almost, the stairs leading to the summit are provided inside the tower, although in one instance, which follows the lighthouse plan, there are winding stairs both internally and externally. The cost of the building suggested to the competitors was £1,500, and most of them have kept this estimate in view, although on some hands it is anticipated that the carrying out of the scheme will involve a larger expenditure. In each instance, the designs provide for the inclusion of a caretaker's dwelling and ticket-office.

Llandudno.—The urban district council of Llandudno received at their last meeting a statement dealing with the proposed municipal buildings, and recommending alterations, representing a deduction from the total cost of £2,175 1s. Messrs. Silcock and Reay, the architects whose design was selected in the recent competition, had written that it was quite impossible to effect anything like a reduction of £2,000, while retaining the original design, and at the same time substituting Portland stone dressings for Bath stone, and asking the committee to again consider the point before incurring further expense in the preparation of new plans and quantities. They suggested that, having failed to accept the original estimate, the interests of the council would now be best served by adopting the last-amended scheme, with the addition of the lavatory accommodation and caretaker's rooms, and they suggested that the business, which had now been under the consideration of the council for over three years, would be greatly facilitated if the architects were consulted, and afforded opportunities of explaining their intentions in the usual way. They asked for the payment of £714 9s. 5d., the balance of their account of £964 9s. 5d. for professional services. Two members, with the clerk, were deputed to consult the solicitor in the matter, and obtain his opinion as to the liability of the council to pay the amount claimed in respect of the new scheme.

Newcastle-on-Tyne Royal Infirmary.—The conditions of competition and instructions to architects have just been issued by the building committee for the reconstruction of the infirmary. The competition is limited to 13 architects, who are requested to send in designs for an infirmary containing 400 beds. It may be necessary to retain for the present the Dobson wing, containing about 146 beds; but the plans must provide for the eventual removal of this wing and its replacement by equivalent accommodation corresponding with the rest of the hospital, and must show how it is to be utilised in the mean time, so far as its ward arrangements are concerned. It will be necessary to construct the new building step by step, and so as at all times if possible to maintain during the construction not less than the present number of 270 patients' beds, and accommodation for the working staff at present residing in the hospital. The architect will therefore be required to show the order in which he proposes to erect the various parts, and also to show to what purpose those parts can be temporarily applied so as to meet the requirements of the hospital during the reconstruction, as well as the purpose for which they are finally intended. The accommodation for nurses, though it may be necessary to place it under the same roof as the rest of the building, must be separated from the working part of the hospital. The principal large wards must be built upon the pavilion system, each bed having a window on either hand. The dimensions of the wards and rooms are for the most part left to the competing architects, and they are requested in their plans to make such provision as is now thought necessary for a large general hospital attached to a medical school. The conditions stipulate that each competitor must furnish, together with his plans, a report describing the buildings proposed to be erected, and must also state the cubical contents of the whole of the erection, including the concrete foundations; must state the materials proposed to be used, and the area to be covered by the buildings. The sum at the disposal of the committee for the new building, exclusive of that part which shall eventually be substituted for the west wing, is £100,000. An estimate must be given of the price per cubic foot at which the designer estimates his building and the entire cost so arrived at. To the author of the selected design will be awarded the work of carrying his design into execution at the usual commission of 5 per cent. The Committee reserve the right to reject the whole or any of the designs should the said designs, in the opinion of the committee and their assessor, be considered unsuitable, and they also reserve the right to call upon the architect whose design is selected to make such modifications or alterations in his plans as they may deem desirable before tenders are invited for carrying out the works. To the authors of the three designs which, in the opinion of the committee and assessor, are next in order of merit to the one selected, will be awarded the respective premiums of £150, £100, and £50. The committee reserve to themselves the right to adopt any feature from any of the premiated designs. It is provided that in the event of any dispute arising between the committee and any architect employed in the work, such dispute shall be referred to Mr. A. Waterhouse, whose decision shall be final and binding on both parties. No perspective drawing will be received, nor any framed or glazed design. All the drawings must be prepared by the competitors themselves, or by their ordinary office staff, and each competitor must make a declaration in writing to that effect. Each set of drawings must be sent in anonymously, but accompanied by a sealed envelope containing the author's name and address and the declaration already referred to above. When each case is unpacked, it and its contents will be marked by the committee for identification; but no distinguishing mark, motto, or device is to be put on the drawings, description, statement, envelope, or case by the competing architects or their agents. The designs will be submitted to Mr. Alfred Waterhouse, R.A., who will advise the committee in their selection. All designs received in conformity with the conditions and instructions will be publicly exhibited after the award is made, and designs must be sent in on or before Tuesday, the 1st day of March, 1898.

Wolverhampton.—The committee who have charge of the new free library scheme have invited a number of architects of the town to send in competitive designs for the new building on the site of the Old Theatre Royal, Cleveland-road, at an estimated cost of £10,000. They offer premiums of £100 and £50 respectively for the designs placed first and second.

SCHOOLS OF ART.

Glasgow.—Mr. E. R. Cattens, the secretary of the Glasgow School of Art, has just prepared a comparative table showing the medals awarded in National Competition to the eight principal schools of art of the United Kingdom:—

	Gold Medals.	Silver Medals.	Bronze Medals.	Total Medals.	Total N.C. Prizes.
Glasgow	3	8	23	34	57
Birmingham	3	3	17	23	56
Nottingham	1	2	6	9	23
*S. Kensington	1	1	6	8	23
Sheffield	—	4	3	7	12
Manchester	—	3	13	16	36
Edinburgh	—	—	3	3	6
Liverpool	—	—	—	—	2

* Exclusive of honorary awards to students of the training class.

He also states that whereas the Glasgow School of Art, of which Mr. F. H. Newbery is the head master, gained 3 gold, 8 silver, and 23 bronze, total, 34 medals, the other schools of art and art classes in Scotland, taken together, only received 2 silver and 11 bronze, or in all 13 medals.

CHIPS.

The Roman Catholic church of the Immaculate Conception at Newtownbutler was on Sunday week solemnly opened, after undergoing thorough renovation.

At the last meeting of the Mersey Dock Board, it was resolved to spend £86,700 in deepening and improving the north docks, in accordance with the scheme which has been in operation some years.

The nave of the parish church of Stratford-on-Avon is about to be reseated from designs by Mr. G. F. Bodley, A.R.A. At the same time the organ will be remodelled.

New carved choir-stalls of oak have just been placed in St. John's Church, Horningblow, and were dedicated on Thursday in last week. They have been executed by Messrs. Jones and Willis, of London and Birmingham.

The foundation-stone of the hall and institute which are being built by public subscription at Fordham to commemorate the 60th anniversary of the reign of Her Majesty Queen Victoria, was laid on Thursday afternoon in last week by Mr. Alexander Peckover, Lord Lieutenant of Cambs. The building, which is being erected by Mr. H. Boon, of Fordham, from designs by Messrs. Gordon Lowther and Gunton, of Finsbury House, Blomfield-street, London, E.C., will contain a hall 56ft. by 28ft., a reading-room, and a room for games, each 18ft. by 14ft. 6in., and rooms for the caretaker. The site is in the chief street of the village.

Mr. R. D. Oldham, officiating director of the Geological Survey of India, is to be deputed for a short time to Ceylon to advise the Ceylon Government regarding the geological survey of the island.

Mr. Mark H. Judge, hon. sec. of the Sunday Society, writes under Sunday's date:—"To-day has been the first Sunday at the National Gallery of British Art. As a branch of the National Gallery it was open to-day as a matter of course. The official returns of the visitors to the national institutions to-day are as follows:—National Gallery of British Art, 3,643; National Gallery, 1,899; British Museum, 1,127; Natural History Museum, 1,345; South Kensington Museum, 2,106; Bethnal Green Museum, 1,389; National Portrait Gallery, exceeding 600; total, 12,109."

A memorial, subscribed for by a number of old Etonians, has just been erected in the ante-chapel of the college, in remembrance of the Rev. John Wilder, late Vice-Provost of Eton, who was connected with the college for more than 80 years. The memorial consists of a tablet of white marble, designed by Mr. Kempe, and executed by Messrs. Farmer and Brindley.

New offices are about to be erected for the newly-formed urban district council at Highbridge, Somerset. Mr. Charles S. Leech, of Victoria-street, Burnham, Highbridge, and Weston-super-Mare, is the architect.

At a meeting of the Art Gallery Committee, held at the Guildhall, Bath, on Friday, it was decided to advertise for tenders for the art gallery, which is to be erected as a permanent memorial of the Queen's record reign. The Duke of Cambridge has promised to lay the foundation-stone of the new building—which will be practically a continuation of the present buildings—on October 18.

The Colonial Office have appointed Mr. T. P. H. King, of the borough engineer's office, Bury, Lancashire, to be State architectural assistant to the Government in Selangor, Straits Settlement. The appointment carries with it an official residence. Twelve months ago Mr. F. Cartwright, son of the Bury borough engineer, was appointed Government engineer at Cyprus.

Building Intelligence.

Bristol.—A group of buildings erected for the Bristol Corporation is rapidly approaching completion at the Novers, for the accommodation of infectious cases. The administration block is a building consisting in the main of brick and freestone, the upper portion being of half-timber work. There are an entrance hall, matron's room, nurses' dining-room, accommodation for the resident medical officer, visitors' waiting-room, kitchen, &c., all on the ground floor. The first floor is devoted to bedrooms and bathrooms. The laundry adjoins, and stables and shelter for the ambulance are also provided. There is accommodation at the hospital for 70 patients, and, in addition, eight beds are reserved for the purposes of isolation.

Carisbrooke Castle.—As a memorial to the late Governor of the Isle of Wight, Prince Henry of Battenberg, Carisbrooke Castle has undergone partial restoration from a fund raised by public subscription. Most of the building is still a block of roofless ruins. The gate-house has now been roofed in, and all the rooms of that portion of the castle newly floored. These are the guard-room, the portcullis chamber with the room above, three rooms in the north-west turret, and the spiral staircase in the south-west turret. No alterations have been made externally to the building, and the original gates, built in 1553, are still subsisting. It is proposed to utilise the rooms newly roofed and renovated as a museum for storing ancient manuscripts and antiquities connected with the Castle and the Isle of Wight. Excavations have recently been made at the top of the ancient keep, and hammer-heads and pike-heads, with remnants of domestic utensils, have been found there.

Carnforth.—A new Congregational church was opened at Carnforth on Wednesday. The building has been erected from designs prepared by the late Mr. E. Howard Dawson, A.R.I.B.A., of Lancaster (who died suddenly in Manchester last January). It is in the Late Gothic style, the dimensions being, length 62ft., extreme width 60ft. 9in., divided up into nave and side transepts, and will accommodate 500 people. The cost, including concrete construction, has been about £2,000. The building externally is of broken coursed shoddies from the Backsbottom (Wray) quarries, with dressings and bands of red freestone from Barrow. The fittings are all pitch-pine, the walls of rostrum end being panelled and ceiling enriched in keeping with the rest of building, and suitably decorated. A handsome pulpit of Jacobean design has been presented to the church in memory of the late architect, by his father, Mr. E. B. Dawson, LL.B., J.P. The completion of the work was intrusted to Mr. C. J. Ashworth, architect and surveyor, of Lancaster. Mr. R. Hall, of Forton, did the masons' and carpenters' and joiners' work; Mr. R. Hall, of Lancaster, the slating and plastering, and Mr. J. R. Tanner, of Kendal, the plumbing, painting, and glazing.

Camus.—Sunday in last week marked the disappearance of the last of the old thatched Catholic churches in Ireland, when a new church was solemnly dedicated to religion at Camus, in the parish of Rusmuck. The poorest house in Connemara could compare favourably, says the *Tablet*, with the old chapel at Camus—a relic of the penal times—in size and architectural form. Its ground measurement was 20ft. by 10ft.; its sides were dry walls—stonework put together without mortar; its roof consisted of rafters of rough bog deal, supporting mountain sod, or "scraw," over which was thrown some mountain sedge as thatch. Two little windows, one in the eastern gable and the other in a side wall, admitted a feeble light. An altar stone laid across an old deal box constituted the altar. The floor was of earth, which was uneven and torn up, due to the building being flooded in winter. The style of the new church is Early English; it is lighted by six pointed windows at either side, and three grouped lights on both the eastern and the western gables. The length of the church is 95ft., width 28ft., and the height to the ridge of the roof 35ft. The roof is of pitch pine; that over the chancel is sheeted with stained work, while over the rest of the building the rafters are still exposed. The walls are wainscoted; the three windows over the altar are filled with stained glass; the floor of the chancel is laid in wood; the body of the church is floored in concrete. The dedication ceremony was performed by the Most Rev. Dr. MacCormack, Bishop of Galway.

Edinburgh.—Some extensive and important works are now in progress at Edinburgh Castle, in connection with the erection of a new military hospital, for which a grant of £18,000 was recently voted by Parliament. The site of the operations is at the north-west corner of the ground towards Princes-street and Castle-terrace. The new buildings will be treated in the Scottish style, and will occupy the place of the stores and magazine which formerly occupied this site. The building, it is expected, will be ready for occupation within one year. The north block will be occupied solely by wards, while the south block will be occupied by doctors' and attendants' rooms, stores, &c. The whole of the sanitary fittings will be placed in specially-constructed annexes. The kitchen apartments will be situated in a detached block connected to the main buildings by a covered glass corridor. The contract for the whole work has been intrusted to Mr. Colin Macandrew, Lauriston-gardens. Good progress has already been made with the preparatory works.

Leeds.—The London Clothworkers' Company, who founded and maintain the Textile Industries and Dyeing Departments of the Yorkshire College, last year granted £10,000 for extensions in these departments, and when it became known that additional land would be required for the proposed buildings connected with the textile section they increased their contribution to £15,000. Negotiations were then opened with the owners of the adjoining house property for its purchase, and possession having now been obtained by the College authorities, the work of demolition has commenced. Plans of the new buildings have been prepared by Messrs. Alfred Waterhouse, R.A., and Sons, of London. In the Textile Department room will be provided for a complete plant of scouring, carding, combing, and spinning machinery for both woollen and worsted yarns, and there will also be rooms for conditioning purposes and for warping, beaming, and sizing machinery. The main feature of the Dyeing Department extension will be a splendidly-appointed laboratory for the pursuit of original research work.

Nottingham.—The Theatre Royal, which was erected in 1865, and which has for the past few months been undergoing extensive alterations, will be reopened on Monday. The entire interior of the building has been reconstructed. The pit floor has been lowered about 2ft., as also has the stage, which has been given an increased dip from the back to the front. This alteration has necessitated the shortening of all the timber supports, and the cellars underneath have had to be lowered accordingly. The stage is about 64ft. wide and 50ft. in depth. A new orchestra, part of which is concealed under the stage, has been built. The upper circle is reached by a new staircase, and, emerging into the crush-room is another fresh staircase. The staircase leading to the gallery is built outside the building, and is connected by a sloping corridor. The old gallery, which accommodated 800, and the upper circle and dress-circle, each capable of seating about 300, have been removed, and new ones of more modern construction have taken their places. The dress-circle saloon is entered by a new entrance. New ladies' cloak-rooms and lavatories have been erected in close proximity to both the dress-circle, upper circle, and gallery, the latter having been provided with a saloon on a large scale. The corridors formerly in use in the dress-circle, upper circle, and gallery have disappeared, and the space thereby gained has been added to the auditorium. All the boxes have been removed, and new ones fixed in their places. The whole of the dressing-rooms have been cut off, and a new block has been built at the rear of the stage, besides new carpenters' shops. The decorations are in fibrous plaster, and of the period of Louis XIV. The theatre, which will accommodate about 3,000, is lighted by electricity. Mr. Henry Vickers, of Nottingham, is the contractor, Mr. F. Matcham the architect, and Mr. Charles Greenman the clerk of the works.

The Old White Horse in Fetter-lane, E.C., one of the last of the numerous coaching inns in the neighbourhood of Holborn, is at the present time being demolished. It had of late been used as a cheap lodging-house.

Engineering Notes.

Avonmouth and Severn Tunnel Railway.—Good progress is being made with the new line of railway to connect the Severn Tunnel with Avonmouth Dock, and the completion of the undertaking is expected to give a fresh impetus to the trade at Avonmouth, inasmuch as vessels will be enabled to ship coal at the dock, instead of proceeding for that purpose to the Welsh ports. The contract for the railway was let to Mr. F. C. Caffin, of Pilning, who made a start with the work last winter, and the line is expected to be completed about this time next year. It will be six miles in length, and, starting from Avonmouth Dock, it proceeds along the flat land facing the Severn Estuary, rising by means of an embankment so as to cross the top of the Severn Tunnel, afterwards joining the old South Wales Railway to New Passage, and forming by means of that railway a junction with the main line at Pilning. At present work is being mainly carried on at the Pilning end, and the material used for making the embankment is obtained from the surplusage from the Severn Tunnel excavations. There are a few engineering difficulties to be encountered, but a good many bridges have to be constructed—viz., five across pills (streamlets), nine under the railway for the accommodation of farmers, and two over the railway. Mr. W. A. Cashman, of Cardiff, is the engineer representing the Great Western Railway Company.

Highgate.—Highgate Archway will shortly be replaced by a single-span iron structure, designed by Sir A. R. Binnie, the engineer of the London County Council. The present archway is about 36ft. high and half as much in width, and is formed of stone, flanked with brickwork, and surmounted by three semi-arches, carrying a bridge wide enough for two carriages. For the new scheme, the tender of Mr. C. Wall, of Chelsea, for £25,126, has been accepted, and a period of 2½ years has been allowed for the execution of the contract.

The Hudson River Tunnel.—The *Scientific American* states that there is prospect of the early completion of the tunnel under the Hudson River, which was begun in the year 1874, and upon which work was suspended in 1892, when about four-fifths of the work had been completed. It is stated by the legal representative of the English bondholders that steps are to be taken to foreclose the mortgage of 2,759,000dol., reorganise the company, issue new bonds, and push the work to completion. The tunnel starts from a shaft on the New Jersey side of the river, which is located at Fifteenth-street, Jersey City, and it is to terminate in a shaft on the New York side at the foot of Morton-street. The total distance will be 5,400ft., and of this about four-fifths have been completed. It was originally intended that the terminus on the New York side should be at Washington-square; but, under the new scheme, it is probable that it will be placed nearer Broadway. The cost of the undertaking has reached about 4,000,000dol., and it is estimated that the tunnel can be completed by 1,000,000dol. more. It is likely that the engineers (*sic—Qy.* contractors) who have just brought to a successful completion the great Blackwall Tunnel, London, will have charge of the tunnel under the Hudson, and the fact that they overcame the many serious obstacles encountered in the prosecution of that work is a guarantee that the Hudson River scheme will this time be carried to a successful termination. One of the chief causes of the abandonment was the difficulty experienced in carrying the tunnel through the bed of the river at the point where the overlying material was extremely shallow. A similar difficulty was met in the Blackwall tunnel, but it was overcome by dumping material from barges and forming a false bed to the river. The unfinished tunnel is at present flooded with water, which, it is estimated, can be pumped in about two weeks' time, and if the work is pushed through with vigour, it will probably take about nine or ten months to complete the whole work.

The foundation-stone of a new children's hospital was laid at Lowestoft on Tuesday week. The building is to be connected with the existing hospital by a covered corridor. It will consist of one ward with six beds. The entire cost is defrayed by Mr. W. Youngman in commemoration of the Queen's Great Jubilee.

THE "DAILY EXPRESS" OFFICE BUILDINGS, PAISLEY. C. DAVIDSON, ARCHT.

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ILLUSTRATIONS.

MANSION HOUSE, DUMFRIESSHIRE.—GROVE FEVER HOSPITAL, TOOTING GRAVENEY.—BEDFORD COURT MANSIONS.—"DAILY EXPRESS" OFFICE, PAISLEY.—DETAIL OF THE ATRIUM, PALAZZO MASSIMI, ROME.

Our Illustrations.

MANSION HOUSE, DUMFRIESSHIRE.

I have nothing to say about Dalskairth House except that it is the new house designed by me for Mr. W. A. Coats to take the place of the present house, which lies low; therefore the site has been changed. John A. Campbell.

THE GROVE FEVER HOSPITAL, TOOTING GRAVENEY.

This is the last of the series of three very large new fever hospitals which have been in course of erection during the last three or four years under the authority of the Metropolitan Asylums Board. The present hospital occupies a site some twenty-seven acres in extent, and the plans for the buildings, prepared by Mr. A. Hessell Tiltman, F.R.I.B.A., were selected in open competition by Mr. Alfred Waterhouse, R.A., the assessor to the Board. These plans were subsequently improved, at the suggestion of the Works Committee, by the adoption of the "échelon" principle of arrangement for all the large pavilions, and this necessitated minor alterations in the general block plan. This is probably the first instance of so large and general an example of arranging pavilion blocks *en échelon*, and now that they are nearly finished, the experiment promises to be both interesting and successful. A reference to the plan now published will show a well-arranged fever hospital capable of accommodating (at present) 518 patients, with capacity for enlargement in the direction of isolation blocks, ambulance station, and other necessary additional buildings in the future. It is intended for cases of scarlet fever, enteric fever, and diphtheria, and for general fever cases accommodated in small isolation wards and blocks for separate treatment. This accommodation is as follows:—

Scarlet fever	8 blocks,	each containing 44 beds	= 352
Diphtheria	4 „	„ „ 28 beds	= 112
Isolation	6 „	containing altogether	= 54
Total accommodation of wards			518

There is also accommodation provided for medical superintendent and five assistant medical officers, a matron, and some 200 nurses; a housekeeper and 90 female servants, and the steward, engineer, and 24 male servants, making in all an administrative staff of 324 persons. Advantage was taken of shape of the ground reserved for the nurses' and domestic servants' blocks to subdivide the dormitory accommodation to a very much greater extent than had hitherto obtained, with the result that better classification, with less liability of risks from fire, has been obtained. The location of these blocks has been advisedly kept upon the highest portion of the site, with good gardens, &c., where all may get rest and recreation away from their work. The whole of the ward pavilions are connected by covered ways (with subways under for mains, &c.) with the administration, laundry, reception, and mess blocks. All the twelve largest pavilion blocks are arranged axially due north and south, and are two stories in height, the ground floors being raised some 5ft. over the level of the airing-courts, to secure a circulation of air under all the pavilions. Each scarlet-fever pavilion contains upon each floor a large ward for twenty beds, and one for two beds, together with ward scullery, bath, sink, and w.c. rooms all arranged in such a manner as to avoid any projections from the sides of the pavilions. The diphtheria and enteric blocks are arranged similarly, but with 12 beds in the large wards instead of 20. The heating throughout is by a system of low-pressure hot water, supplemented in the wards by Galton stoves with open fires. As in the case of the Park and Brook Hospitals, the architect in this has introduced many new features of plan and arrangement entirely personal to himself and the works committee. These, however, are too numerous to mention; but the public will await with some interest the opportunity to decide as to which of the three new schemes has best solved the problem of arranging for and erecting such large establishments as these in the most durable and economical manner; not only as to first cost, but having regard chiefly to the cost of maintenance and periodical repair. The structural part of the work is, roughly, about three-fifths of it done, and is being carried out by Messrs. Kirk and Randall, of Woolwich, under the superintendence of Mr. Tiltman, assisted by three clerks of works, the chief of whom is Mr. Thos. Warburton. The collective costs of the various contracts accepted by the Board are, for the structural portions, about £190,000, and for the engineering portions about £33,000—in all, about £223,000.

BEDFORD COURT MANSIONS: BLOCK E.

This building is now being erected on a prominent site, at the corner of Caroline-street and Bedford-avenue, and forms part of the extensive operations comprising the scheme of development for the new street on the south side of Bedford-square. It is the fifth block of the residential flats known as Bedford Court Mansions, and comprises 21 self-contained suites of from five to ten rooms each. The premises are of fireproof construction throughout, with hydraulic lifts to the several floors. The elevation is carried out in red brick, with Portland stone dressings. The circular bay windows are fitted with wrought iron casements. The contractor for this and three of the blocks already erected in Bedford-avenue, is Mr. A. Kellett, of Old Oak Wharf, Willesden; and the architect is Mr. G. D. Martin, 3, Pall Mall East, S.W.

THE "DAILY EXPRESS" BUILDINGS, PAISLEY.

This group of buildings is erected at the corner of Causeyside and Forbes-place, and, being treated in Dutch Renaissance, forms a pleasing contrast to the Classic buildings of the above streets. The buildings are erected of cream-coloured Fallahill stone as far as fronting the streets, and the business premises behind are erected of brick. The ground-floor is occupied in connection with the business of the paper, and one separate office. The upper floors of the front buildings are principally used by the Young Men's Christian Association as reading-rooms, recreation-rooms, and committee-rooms. The architect is Mr. C. Davidson, of Terrace-buildings, Paisley.

DETAIL OF THE ATRIUM, PALAZZO MASSIMI, ROME.

This vigorous double-page drawing has been made by Mr. J. C. Halden for the *American Architect and Building News*, to which journal we are indebted for its reproduction.

The Streets and Sewage Committee of the Leeds Corporation decided on Friday to accept a contract for about 1,000 tons of coke breeze for the purpose of carrying out at Knostrop Sewage Works Mr. Dibdin's system of sewage purification.

The Consistory Court of London heard on Monday a petition by the vicar and the vicar's churchwarden of St. Mark's, Marylebone-road, for a faculty to confirm certain alterations and additions to the church, including a reredos, a crucifix erected above the pulpit, and pictures of the Stations of the Cross. The people's churchwarden and other parishioners opposed the petition, contending that the services were too Ritualistic, and that the changes which had been made were not necessary. Judgment was reserved.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Society of Estates Clerks of Works.—The members connected with this society selected York last week as the rendezvous of their annual summer outing, arriving at the White Swan Hotel, Goodramgate, on Monday evening, the 16th inst. Those who journeyed to the city included the following clerks of works:—Messrs. T. Smith Burgess (Sir Gilbert Greenall, Bart., Warrington), G. W. Crosbie (Earl of Derby), G. Davies (Lord Hotham), G. Heveningham (Duke of Norfolk), E. Hill (Mr. A. Brassey), W. Marshall (Marquess of Salisbury), R. Parry (Lord Londesborough), T. W. Potter (Earl Manvers), T. Seward (St. Thomas's Hospital), W. Stanhope (Duke of Newcastle), and G. Sutherland (Marquess of Northampton). On the Tuesday the party visited the Minster, City Walls, St. Mary's Abbey, the Museum, &c., and in the evening held their annual meeting at the White Swan. Mr. George Heveningham presided, and Mr. T. W. Potter, the secretary, read the report, which stated that the number of members, with those elected that day, was 98, and the number of honorary members 159. These, compared with previous reports, showed that their numerical strength was fully maintained. With regard to the Shillito memorial tablet, it had been erected in Hatfield Church, and paid for. Mr. Rye, clerk of the works to the Duke of Rutland, and formerly at Duncombe Park, read an interesting *résumé* of the history of Helmsley and Rivaulx Abbey. On the Wednesday the party visited Castle Howard, Helmsley, and Rivaulx; and the Thursday was spent at Beverley.

CHIPS.

The organ which was erected in Peebles West United Presbyterian Church last week was opened on Saturday afternoon. The organ has been built by Mr. J. J. Binns, of the Bramley Organ Works, Leeds.

Plans have been passed for the enlargement of the Blue Boy Inn, Shaw-heath, Stockport, from plans by Mr. Peter Peirce, architect, of the latter town. The estimated outlay is over £2,000.

The parish church of Hopesay was reopened on Wednesday week after restoration from plans by Mr. A. E. Lloyd Oswell, of Shrewsbury. The high-backed pews have been replaced by open seats, a choir vestry has been formed in the belfry tower, the chancel arch has been rebuilt, and choir-stalls provided in chancel. Messrs. Bowdler were the contractors.

The Nelson Wesleyan Circuit's quarterly meeting has passed a resolution to erect two new chapels, each with a holding capacity for about 700 people, to cost £5,000 each, one to be erected at Bradley Hall, the other in Barkerhouse-road. A Sunday school is also to be erected at Barrowford to cost about £2,000.

The annual excursion of the St. Alban's Architectural and Archæological Society was held on Wednesday in last week, when Bedford and Elstow were visited under the leadership of the Rev. Canon O. W. Davys, one of the hon. secretaries of the society.

Messrs. E. H. Shorland and Brother, of Manchester, have just supplied their patent Manchester grates to the new infirmary, Easthampstead, Berks.

Business at the Mart last week was very quiet, the aggregate realisation, as registered at the Estate Exchange, being only £15,360.

Mr. Charles Wyndham's theatre in Charing Cross-road will be designed by Mr. W. G. R. Sprague, the architect of the Grand, Fulham; the Metropole, Camberwell; and the Shakespeare, Clapham. It will be a two-tier house, and in size will be about as large as its neighbour, the Garrick. It is anticipated that the house will be finished early next autumn.

The dispersal of the historic contents of Hengrave Hall, near Bury St. Edmund's, by Messrs. Hampton and Sons, of London, was concluded at the end of last week. Altogether, there were 1,914 lots, and the selling of these occupied eight days. The grand total realised was £12,635 11s. 10d.

The Strandtown (County Down) police have arrested a builder and contractor named Dugan on a charge of wilfully murdering his son, aged eight years. At an inquest, a verdict of wilful murder has been returned against the father.

The contract for the new premises of the London and Yorkshire Bank at Horley has been let to Messrs. Murgatroyd, builders, of Idle. The work has been commenced, and is being carried out from the designs and under the superintendence of Mr. William Bakewell, F.R.I.B.A., Leeds.

ARCHÆOLOGICAL.

Antiquarian Discoveries at Gosforth.—The parish church of St. Mary, Gosforth, Cumberland, now undergoing restoration, has proved rich in antiquarian remains. It is not many years since the mythological character of the cross in the churchyard was elucidated. It is believed to be the tallest ancient cross in Britain, and is pronounced "one of the costliest olden roods in Europe." Of red sandstone, elaborately carved with mystic figures in bas-relief, it has withstood the storms of twelve centuries, and is in excellent preservation. The Rev. W. S. Calverley, vicar of Aspatria, made out the carvings on the four sides of the cross to be illustrative of legends in Scandinavian mythology. It is a Christian monument, and not a heathen pillar surmounted by a cross; but it is curious for its representation of Northern myths and Christian doctrines, and for the way in which one bears testimony to the other. One of the sculptures represents the Crucifixion. The remains of three other crosses, apparently of about the same age, have also been found at different times in the churchyard. During the recent alterations, two hog-back or coped tombstones, supposed to be 1,000 years old, have been found. One was under the foundation of the north wall, built probably in 1125. Another was found at the corner of the nave, forming the foundation of the pillar supporting the chancel arch. The one found in the north wall is in two pieces, and is 5ft. 6½in. long. On one side are carved interlaced ornaments of four patterns, on the other there is a battle scene representing two hostile armies. At the head of one group stands a chief armed with a spear, a circular shield in his right hand; behind him are thirteen warriors, all bearded, and with spears over their shoulders. Opposite stands the chief of the opposing army, holding upright a pole or lance, at the top of which there is a triangular flag, and behind him also there are thirteen men. The second hog-back is in three pieces, and is 5ft. 1in. long. It has quite a different character. At the apex there is a rope or twist much worn away, and between the rope is the plaited body of a serpent, with the head of a wolf, open-jawed, and like those on Gosforth Cross. It gapes upon and seems to do battle with smaller serpents. In a panel 4ft. long there is a design in bold relief of two wolf-headed serpents in fierce conflict with a human figure, which subjugates or rides upon a smaller serpent, and holds one of its jaws in each hand. Hog-backs, whole or in fragments, exist at Bongate (Appleby), Aspatria, Cross-Canonby, and Millom. They are undoubtedly Scandinavian.

The foundation-stone has been laid of the new R.C. church of the Sacred Heart in the Fort-road, Newhaven. The church is to be Italian in style, of cut flints and red brick dressings, with tower and presbytery adjoining. The buildings have been designed by Mr. W. Romain, of St. Joseph's Home, Blackfriars-road, S.E. For the present it is proposed to build only a portion of the church, with seating accommodation for 100 people.

The Cambria Hotel at Aberystwith has just been opened. It occupies a commanding position at the western end of the Promenade, opposite the pier, and has been erected from the designs of Messrs. Ewen and J. Alfred Harper, architects, of Birmingham. The hotel is built of native stone, in the Renaissance style. When completely finished, the hotel will accommodate a large number of guests. The electric light is installed throughout the building; baths are provided on every floor, with a supply of sea-water under the control of the visitor, and a hydraulic lift gives easy access to the various floors. The entrance hall is decorated in a Pompeiian style, and furnished with lounges. A drawing-room, dining-room, coffee-room, billiard-room, smoking-room, and other apartments are provided, as well as suites of private rooms.

Altofts parish church, erected about 18 years ago by the Hon. Mrs. Meynell Ingram, was reopened on Thursday in last week by the Archbishop of York, after complete renovation. About a year ago the roof was repaired, and recently the interior has been redecorated. These alterations and adornments have cost about £700.

The new Theatre Royal, which is being erected in Rolfe-street, Smethwick, will be opened on September 20. The theatre will be capable of accommodating 4,000 persons. The stage is the largest in the district, being 75ft. wide. The building is to be surmounted by three figures symbolic of art, those at the end being 8ft. in height, and the centre one 14ft. The theatre will be lighted with electricity. The builders are Messrs. John Harley and Son, of Smethwick.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the Building News, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

Situations.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is One Shilling for Twenty-four Words, and Sixpence for every eight words after. *All Situation Advertisements must be prepaid.*

NOTICE.

Bound copies of Vol. LXXII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Received.—B. P. and O. G.—I. M. T.—H. T. S.—A. R.—S. F. O. S.—W. S. S.

Correspondence.

THE ESCALLOP IN ARCHITECTURE.

To the Editor of the Building News.

Sir,—The new Gallery of British Art at Pimlico certainly presents a very attractive and ornate appearance, and though details may be criticised (as, per example, the lion and unicorn turning their backs upon Britannia, as if they would have no more to do with her), yet its general aspect is decidedly pleasing to the non-professional eye;—specially from a river steamboat is its position on the banks of the Thames seen to advantage.

But there was a small detail I noticed inside which made me wonder whether there was any ancient connection between the escallop shell and London. Resting on each of the numerous brackets which support the ribs of the ceilings is a conventional escallop, very prominently placed.

My question will not, I think, seem so irrelevant when I mention that each of the square purple-covered posts, ranged up the streets from Temple Bar to St. Paul's, was adorned with an escallop and two half-escallops, in gilt, on each side, in the Jubilee decorations.

At the east end of St. Paul's, outside, in the north and south walls, are two niches, having large, well-cut escallops in the roofs, the niches being empty; and the other niches in the cathedral are without escallops. Below the before-mentioned two niches are two very large escallops, the centre of each being pierced by a circular light.

The east end of the modern choir-house, adjoining the Deanery of St. Paul's, is adorned with three very large, admirably-executed escallops, standing out from the wall in high alto-relievo.

Inside the cathedral, on the base of a marble statue near the south doorway, is carved a small, but well-cut, escallop. And the richly-worked iron and gilt grilles, dividing the sanctuary from the choir aisle, have each twelve niches, containing Prophets and Apostles, each niche having a delicately-wrought escallop in its roof.

Finally, as if the emblem was purposely carried on to the present day, the marble niche surmounting the new reredos (containing the Madonna and Child) has an escallop in its roof.

It seems to me to be utterly impossible to put all this special use of one religious emblem down to mere chance. I, therefore, thought that perhaps some learned reader could explain it. That the escallop was a religious emblem of a remote date is certain; but I will only quote one example:—

"We entered the city Musmeih (in Bashan), the ancient Phœna. The most conspicuous ruin was a temple in a good state of preservation, and the most striking object in the temple was an enormous scallop-shell in the semicircular recess in the back side, opposite the door . . . From an inscription we got the date of the building, about the middle of the second century A.D." (Wright: "Palmyra and Zenobia," 1895, p. 265). As apparently connected with London's greatest temple, it would be interesting to know what the meaning of that connection is.—I am, &c.,

Caius.

CHIPS.

Extensive structural alterations are being made at the Art Gallery and Vaudeville Theatre, Newcastle-on-Tyne, from plans by Mr. J. T. Cackett, of that city. Part of the ground floor of the premises are being reconstructed as a public restaurant, and the theatre is being redecorated and reseated.

At the Newcastle-on-Tyne City Council last week the confirmation of the report of the sanitary committee recommending the extension of the Ouseburn sewer to the river Tyne was adopted. The amount proposed to be expended on the work was £6,000.

The Treasury have promised to contribute a free grant of £20,000 towards the construction of the Forsinard and Portskerra Railway. In the promotion of this line the Duke of Sutherland has taken much interest, contributing the land free, £10,000 of a contribution, and all the sleepers necessary. The construction of the line will now be proceeded with as soon as arrangements can be made.

The annual report of Mr. W. I. Brown, the surveyor for the borough of Northampton, detailing the work done in his department during the 12 months ending March last, states that during 1896 the plans for 319 new houses, seven new factories, two new warehouses, one new workshop, one new free church, eight new stables, and 77 plans for alterations and additions to existing buildings were deposited, approved, and inspected. Forty notices were served respecting dangerous structures, affecting 48 unsafe buildings and properties. Three new streets were taken over by the authorities as public thoroughfares, making a total of 292 streets.

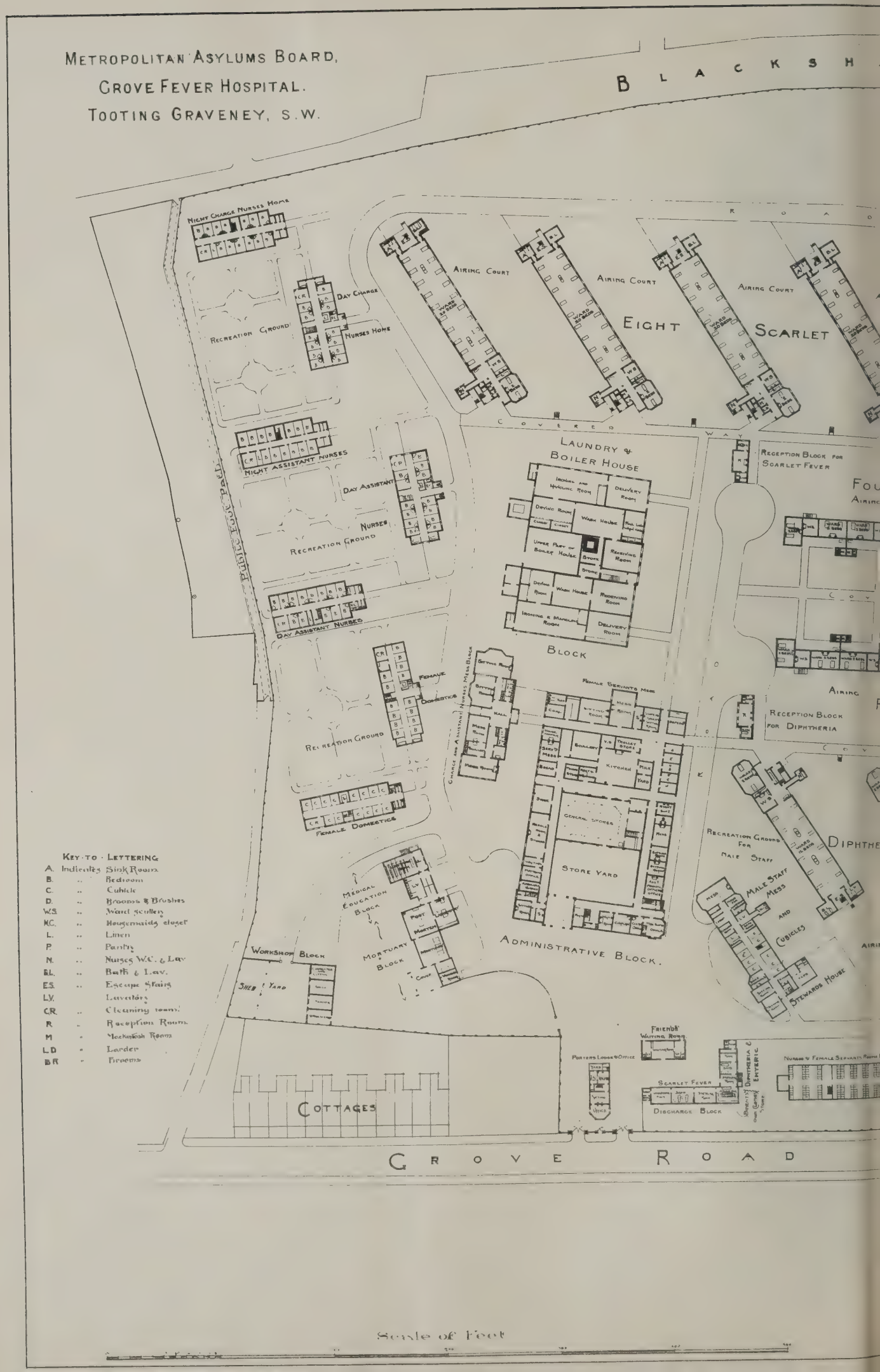
The Bill for the commencement of irrigation works in Cyprus has passed the Legislative Council of that island. It is proposed to spend £60,000 on a test scheme, and, if this is successful, the Government will undertake a general system of irrigation throughout the island.

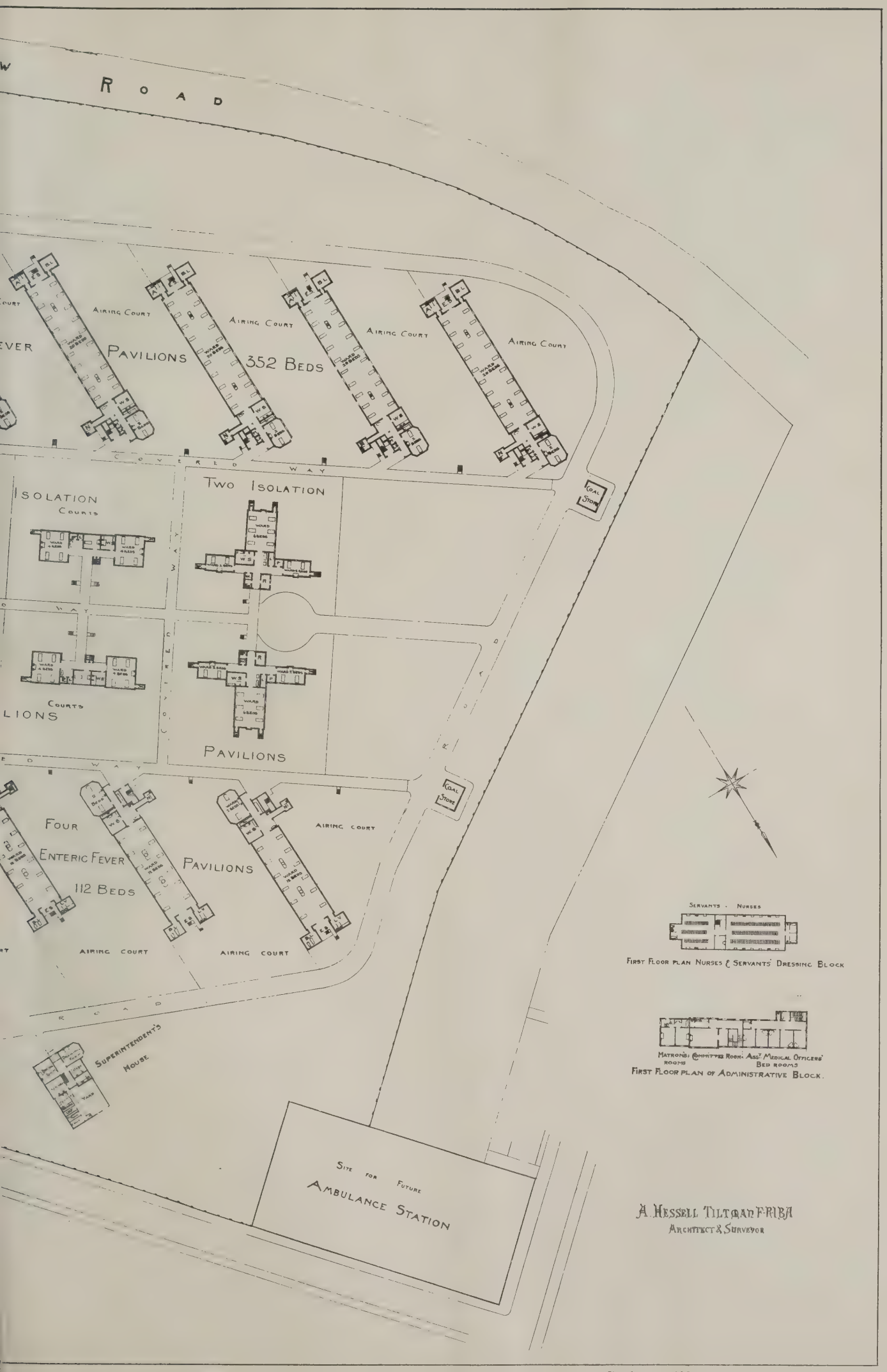
The Sheffield Corporation are about to introduce the electrical overhead system on all the present tramway routes within the city, and to make extensions to many of the populous suburbs. Since the Corporation took over the tramways there has been a remarkable growth of traffic.

Prof. Fabio Gori, the Royal Inspector of Monuments and Excavations, has discovered in the palace of the Marquis Francesco Canali, at Rieti, three hermes in Greek marble, representing Cicero, Sophocles, and Euripides.

The external cement casing on the pseudo-Classic church of All Saints', in the High-street of Southampton, is now being removed preparatory to recementing the unsightly building and carrying out a scheme of repairs and renovations. Messrs. Jenkins and Sons, of Portland-street, Southampton, and Bournemouth, are the contractors.

In commemoration of the Diamond Jubilee, Sir Pyers Mostyn, Bart., has decided to provide the village of Gwespyr with a water supply at his own cost. For years past the village, which is situated on an eminence overlooking the Dee estuary, has suffered severely from scarcity of water. The supply is to be obtained from a spring on Sir Pyers' land, and the works will include a reservoir of large capacity. The inauguration of the work took place last week.


METROPOLITAN ASYLUMS BOARD,
GROVE FEVER HOSPITAL.
TOOTING GRAVENEY, S.W.
BLACKSH
NIGHT CHARGE NURSES HOME
DAY CHARGE NURSES HOME
RECREATION GROUND
AIRING COURT
EIGHT
SCARLET
COVERED WAY
NIGHT ASSISTANT NURSES
DAY ASSISTANT NURSES
DAY ASSISTANT NURSES
PUBLIC FOOT PATH
LAUNDRY & BOILER HOUSE
IRONING AND MANGLING ROOM
DELIVERY ROOM
DRYING ROOM
WASH HOUSE
UPPER PART OF BOILER HOUSE
STORE
RECEIVING ROOM
BLOCK
RECEPTION BLOCK FOR SCARLET FEVER
RECEPTION BLOCK FOR DIPHTHERIA
FEMALE DOMESTICS
FEMALE SERVANTS MESS
CHARGE AND ASSISTANT NURSES MESS BLOCK
KITCHEN
GENERAL STORES
STORE YARD
ADMINISTRATIVE BLOCK.
RECREATION GROUND FOR MALE STAFF
MALE STAFF MESS AND CUBICLES
STEWARDS HOUSE
MEDICAL EDUCATION BLOCK
MORTUARY BLOCK
WORKSHOP BLOCK
SHED YARD
COTTAGES
PORTERS LODGE & OFFICE
FRIENDS' WAITING ROOM
SCARLET FEVER
DISCHARGE BLOCK
DIPHTHERIA & ENTERIC
NURSES & FEMALE SERVANTS ROOMS
GROVE ROAD
KEY TO LETTERING
A. Indicates Sink Room
B. .. Bedroom
C. .. Cubicle
D. .. Brooms & Brushes
W.S. .. Ward scullery
H.C. .. Housemaids closet
L. .. Linen
P. .. Pantry
N. .. Nurses W.C. & Lav
B.L. .. Bath & Lav.
E.S. .. Escape Stairs
L.V. Lavatory
C.R. .. Cleaning room
R. .. Reception Room
M. .. Mackintosh Room
L.D. .. Larder
B.R. .. Brooms
Scale of Feet


ROAD
AIRING COURT
PAVILIONS
352 BEDS
AIRING COURT
AIRING COURT
AIRING COURT
COVERED WAY
ISOLATION
COURTS
TWO ISOLATION
COURTS
PAVILIONS
COAL STORE
COAL STORE
FOUR
ENTERIC FEVER
112 BEDS
PAVILIONS
AIRING COURT
AIRING COURT
AIRING COURT
SUPERINTENDENT'S HOUSE
SITE FOR FUTURE
AMBULANCE STATION
SERVANTS · NURSES
FIRST FLOOR PLAN NURSES & SERVANTS' DRESSING BLOCK
MATRONS' ROOMS
COMMITTEE ROOM
ASS.T MEDICAL OFFICERS' BED ROOMS
FIRST FLOOR PLAN OF ADMINISTRATIVE BLOCK.
A. HESSELL TILTMAN F.R.I.B.A.
ARCHITECT & SURVEYOR

MANSION-HOUSE · DUMFRIESSHIRE · JOHN A. CAMPBELL ARCHT

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"PHOTO-TINT" by James Akerman, Queen Square, London, W.

Intercommunication.

QUESTIONS.

[11754.]—**R.I.B.A. Student's Exam.**—I am a probationer R.I.B.A., and now desire to study for studentship. Would someone recommend me a list of books suitable for study, as I find difficulty in making a selection myself?—W. R. H.

[11755.]—**Architect's Drawings.**—In case an architect does not ink-in and colour his drawings, what is the best thing to do in signing up his client and builder? Is to sign the agreements sufficient?—Assistant.

[11756.]—**Mastic for Cement Sills.**—Would some reader give the best composition for setting the tongues of oak sills on cement? The cement kills the red lead, and I thought if I used the composition used in setting wood blocks, the temperature might upset same? How is it usual to do this in good work?—J. J.

[11757.]—**Asbestic.**—I am obliged to "An Architect" for his reply; but should like to know how the asbestic plastic is used, and whether it is as good for brick as for metal laths. Is not any sand required?—A Constant Reader.

[11758.]—**Willesden Paper.**—Will someone who has used this inform me whether a roof or a rough shed exposed to the weather can be safely covered with it without slates, and what quality is necessary, what pitch of roof, and how fixed to rafters?—Papyrus.

[11759.]—**Inlet Valves for Drains.**—I want to know what kind of valve is considered the best, and will last the longest.—T. B.

[11760.]—**Dadoes and Wall Linings.**—Is there any cheap decorative material that I can use for a dado? Tile is not suitable, and plaster is likely to get chipped.—A Builder.

[11761.]—**Boundary Wall.**—A roadway at the side of a new house has a considerable fall to the main road, and, as I want to build a wall on both sides, I should like to know if it would be best to ramp the wall up in steps, or to build the courses parallel to the roadway. Which would look the best, and how much would the first plan cost relatively to the other? There would be at least four ramps required.—Alex.

[11762.]—**Fleche.**—Can any of your readers inform me whether it would be safe to erect a small wood fleche on the roof of a church (modern)? The roof is high-pitched, well constructed, with principals tied by collars; the walls are substantially and well built. What I want to know is if it would be safe to place the fleche over one of the trusses, and the kind of bracing required. Any example of such framing would be useful. Probably an iron tie-rod would add to the strength. The timbers are sound, and of good dimensions.—A. Z.

[11763.]—**American Bowling Alley.**—I want to construct a bowling alley as it is done in America. Will someone kindly give sizes and description, and mode of construction? Also for an ordinary bowling or skittle alley?—Easton.

REPLIES.

[11714.]—**Stone Measurement.**—"Reader" is in error in stating that because four mullions were cut out of block 1ft. 11in. by 1ft. 3in. that mason is not entitled to measure extreme size of each mullion. The rule in measuring masonry is "the smallest square from which the job can be cut." For having mullions cut as he did, mason would have to pay half as much again. Unless mason can save stone, it is useless paying for sawing.—G. G.

[11740.]—**Decay of Brick and Stone.**—Look up the volumes of the Building News, in which the subject has been treated. For G. Abbott's purpose, I do not think any solution is better than Szerelmey's patent solution. All particulars can be obtained from the firm on application, and a paragraph lately appeared in the "B.N."—L. L.

[11740.]—**Decay of Brick and Stone.**—One of the best means of arresting decay is to treat the wall with "Fluate," to be obtained of the Bath Stone Firms, Ltd., Bath. The process hardens and waterproofs the surface of stone and brick, and the testimonies to its efficacy as a preserving liquid are convincing. Other processes and remedies are in the market, more or less reliable, for the purpose; but no solution is of any value which does not seal up the pores of the stone and produce a waterproof skin.—G. H. S.

[11740.]—**Decay of Brick and Stone.**—"Fluate" is the certain remedy for preserving from decay any building material which is sufficiently porous to absorb the solutions. These are clear and colourless. It is as effectual in arresting the decay of old work as in preserving new work from decay. It also makes the material practically rainproof. Pamphlet and list of references would be sent free on application to the Bath Stone Firms, Ltd., Bath.—H. M.

[11742.]—**Local Surveyor—Retaining Plans.**—The refusal to give up plans which have been submitted but not approved is, I believe, usual with some authorities, though on what conceivable ground I cannot say, unless it is to see whether the objections have been removed and the alterations made. Some time ago I read of a similar refusal to give up plans for alteration, the architect who deposited them being told he must make tracings of them at the surveyor's office, which he eventually did. When the plans submitted are contract plans, and the only copies, the architect is put to great inconvenience by their retention. As to the building line, different rules seem to obtain. As "F. C. T." says, the main wall of house is often taken, but when the bays are large the line is taken to the front wall of bays. I do not think there is any general rule in the matter. There is a strong temptation to throw out large bay windows where the front wall of house is made the line. I am afraid "F. C. T." must submit.—G. H. G.

[11743.]—**Constants.**—The constants given in Professor Banister Fletcher's textbook on Quantities are simply multipliers, and one has only to multiply the rate per hour by the constant given. These constants are useful in making approximate estimates, and are based on the principle that a man works so many hours per day. In the last case mentioned the cost of labour per foot super. would be found by multiplying the rate per hour by the decimal given, or would be 11·70, about 11¾d. per foot.—X.

[11746.]—**Drainage of Street House.**—The best way of preventing the smell complained of is to relay the drain beneath the house, incasing the pipes, which should be cement-jointed, in 6in. of cement concrete all round. The drain should be disconnected from the sewer in front by means of an intercepting trap, and a fresh-air inlet should also be fixed in front, admitting air to the drain on the house side of the intercepting trap. A 4in. outlet ventilating-pipe should also be carried from the other extremity of the drain in a vertical line to a height of at least 3ft. above the adjoining roof, and placed at least 6ft. away from any window or chimney. No trap is required at the foot of soil-pipe; but it would be advisable to provide inspection-chambers for access at each end of drain, in case of a stoppage occurring beneath the house. H. Busbridge.

[11746.]—**Drainage of Street House.**—Cut off the soil-pipe at the foot of the yard before it enters the drain which passes under the house, and insert a disconnecting trap. The soil-pipe should be carried up above roof or eaves, with air outlet. In front, a vertical pipe should be introduced in a convenient position over the drain with a mica inlet valve, so that a current of air will pass through the drain under house and up through the soil-pipe and ventilator. By this means any sewer gas that might escape will be carried through. Of course it is necessary to examine drain-pipes under the house, and see that the joints are sound. The whole drain below house should be covered with concrete.—G.

[11748.]—**Deduction of Brickwork for Window Openings.**—In reply to "Young Assistant," he must first take the deduction of the outer four and a-half work up to the inside of frame. Suppose the window between the outside reveals is 4ft. wide and 7ft. high, then the dimension for deduction will be put down thus:

4	0		
7	0		Dedt. ½ brick.

The height is taken from top of sill to springing of arch. The inside deduction is then taken by adding 9in. to the latter width, or 4ft. 9in. by the height, which should be 3in. higher than the former height. The dimension will appear in the book thus:

4	9		
7	3		Dedt. 1½ brick.

These figures suppose the window is for sashes and frames. If the frame is solid only half the addition to the width is made for the internal opening.—A Surveyor.

[11749.]—**Height of Chancel.**—The chancel should be about the same width as the nave, or very little less, and its length should be about half or a little more. A good proportion of chancel would be about double the length of the space given to the choir. As the chancel contains the altar, it should be at once dignified in size and height, and therefore the most desirable plan is to make it, at least, as high as the nave, the same roof running through. This arrangement is now followed in all modern churches of the best type. By making the chancel narrower and lower than the nave, it loses its importance as the part of the church reserved for the central act of worship, the Sacrament of the Altar, and the appearance internally is sacrificed, as the steps leading to the altar should be at least four (one at entrance to chancel, second at that of the sanctuary, and two within it); a low chancel still further diminishes the height of the eastern end. Generally, instead of four, there are seven—often many more at the altar to give it importance; but these details must be regulated by the size of the church.—G. H. G.

[11752.]—**Cement for Marble.**—Perhaps there is nothing better for cementing marble than plaster of Paris mixed with alum-water; but it is important to make the edges thoroughly clean, and the plaster should be rather thin unless the edges are soaked in water. If for coloured marble, the cement must be tinted to suit.—N. E. C.

[11753.]—**Floor for Tent.**—Bamboo poles cut suitable lengths and closely strung ladderwise on two or more strong cords would probably answer the purpose. It could be easily rolled up for removal when necessary.—D. W. G.

The proposed lighthouse for Sokotra has been discussed at the Board of Trade by representatives of the various lines of steamships interested and other bodies, and its erection at the eastern end of the island was recommended.

The streets and buildings committee of the Scarborough Corporation have passed plans for the erection, in the grounds of the property locally known as the Castle by the Sea, situated near the old castle, of a revolving tower of the same description as that recently erected at Great Yarmouth. The structure is stationary, but it is surrounded by a platform which ascends vertically at a speed of 30ft. per minute. Two hundred and ten persons can be accommodated on the platform at one time, and the height—120ft.—will carry the spectators to a higher altitude than the Castle-hill plateau, which is 300ft. above the sea-level. The car on the platform, and in which the passengers are accommodated, revolves at the same time that the platform is ascending. The tower will be erected at the highest point in the gardens, and will be constructed of iron in lattice-work form. The platforms, of which there will be 11, will be balanced by weights. The house in the grounds will be transformed into a café and refreshment-rooms.

LEGAL INTELLIGENCE.

Failure of a Borough Engineer.—A statement of the affairs of Richard Swarbrick Dugdale, civil engineer and borough engineer to the Huddersfield Corporation, has been issued by Mr. J. A. Binns, the Official Receiver. The gross liabilities are put down at £1,506; the total assets are £100 for furniture, from which £49 has to be deducted for preferential claims, leaving a deficiency of £1,370. The debtor states that his failure has been brought about by the cost of maintaining and educating a large family, interest paid on borrowed money, and expenses connected with his own illness. The Official Receiver further states that the debtor was appointed borough surveyor in 1879, having been deputy surveyor of Salford for two years previously. He owed £300 on coming to Huddersfield. His salary at Huddersfie'd up to 1890 was £500 a year, and from that date was £600 per year, while during the last 12 years he has received £315 in premiums from articled pupils. He has a family of seven children, and his expenses in connection with his family have been in excess of his income ever since he came to Huddersfield. The Official Receiver adds that a scheme of arrangement may probably be submitted to the meeting of creditors for consideration.

In Re John Ashworth, of Davyhulme.—A meeting of the creditors of Mr. John Ashworth, residing at Mazeena Cottage, Davyhulme, and formerly carrying on business as a land agent and builder at King-street and John Dalton-street, Manchester, was held on Tuesday before Mr. Potter, Deputy Official Receiver. The bankrupt's statement of affairs showed liabilities expected to rank £1,991 3s. 6d., and assets £696 1s. 6d., leaving a deficiency of £1,295 2s. The bankrupt commenced business 12 years ago, with £100 capital, and attributed his failure to depreciation in the value of house property. He attended the meeting, and, being questioned by creditors, stated that he had not kept proper account books, but merely memoranda. Mr. Townley Trotter, accountant, was appointed trustee, with a committee of inspection.

Poor Mortar.—At Southampton Police-court on Friday, Stephen Goulding, Park-road, Freemantle, builder, was summoned for using mortar which was not of the proper consistency in accordance with the by-laws of the corporation as to new streets and buildings. The town clerk (Mr. G. B. Nalder) prosecuted, and Mr. Page defended. Mr. J. L. Foot, building inspector, in the employ of the Southampton Corporation, said he took samples of mortar from buildings in course of erection at Richmond-road, Freemantle, by defendant. The samples were handed to the borough analyst. In reply to Mr. Page, witness said mortar deteriorated by being kept after mixing. The mortar was not fit for building purposes, owing to the uncleanliness of the sand. The borough analyst (Mr. J. A. Brierley) said the sample submitted to him was not mortar as he understood it from experience. The parts of lime and sand were one to five in this case—and it should not be more than one to three. In reply to Mr. Page, witness said the sample produced to him was a mixture of clayey sand and lime, and was not mortar. Mr. Page said the sum and substance of defendant's offence appeared to be that there was a small proportion of clay in the material. Edward Banks, a bricklayer's labourer, in the employ of the defendant, said he mixed the mortar of which the inspector took a sample. He made it two of sand, one of road grit, and one of lime. The defendant was fined £2 and costs, or a month's imprisonment.

Solicitor's Authority as Agent.—Before his Honour Judge Granger, at Helston, on Saturday, Odger Eva, builder and surveyor and borough surveyor of Helston, brought an action remitted from the High Court against A. C. Cuffe Adams, of Bath, for £66 15s., balance of account for work done at Rinsey Farm and Cottages, Breage. Counsel explained that the work was ordered by Charles Frederick Dale, then practising as a solicitor in Helston, the brother-in-law of the defendant, and general agent of the defendant. A specification was forwarded to Mr. Adams, and £130 was agreed to for the work. The total amount of work ordered by Mr. Dale was £249, and the balance now was £66. The plaintiff said he understood Mr. Dale was agent for Mr. Cuffe Adams, the owner of Rinsey. Mr. Dale told him he had sent the specifications to Mr. Cuffe Adams, and he thought it rather stiff. The £140 was, therefore, cut down to £130. He was paid on Mr. Dale's private cheques, but it did not declare on what particular account it was paid on. The whole of the work was carried out, and there were extras. Mr. Dale kept on delaying the settlement, but never complained of the work. Mr. Boase, for defendant.—Until Mr. Dale had left the country you did not make any application to Mr. Cuffe Adams for the money?—Plaintiff: I don't know that he has left the country at all. He has left Helston; and I hear he has left Cornwall. Mr. Boase, for the defence, suggested that Mr. Eva never intended to look to Mr. Adams for payment until he found Mr. Dale

had left the country, but that Mr. Dale was the plaintiff's solicitor, and there was an account between them. Mr. Dale was in no sense a general agent of the defendant. The Judge said it was perfectly clear the defendant had had the misfortune to be let in by Mr. Charles Dale for a very considerable amount, but that had nothing whatever to do with the question he had to decide. The facts were that Mr. Dale suggested this purchase, and was the solicitor employed to carry out the sale. Undoubtedly Mr. Dale was defendant's agent for the management of the property. He was not an agent *quâ* solicitor, but an agent as many solicitors were in Cornwall, having authority to manage the property. In this particular instance he got the contract from the plaintiff for £140, and that was brought to the knowledge of the defendant. Although the extras seemed a large amount, he could not see that when Mr. Eva presumed that Mr. Dale was the agent for the property he had any right to object to do the extras. As regards the question as to whether the contract was properly done, and whether the extras were reasonable, there must be another inquiry, but as to whether there was a sufficient agency, he must decide for the plaintiff. He would leave the other question to be decided by an arbitrator. The parties agreed on Mr. Arthur Carkeek, of Redruth, as arbitrator, and his Honour said he should not decide the question of costs until after the arbitrator's report.

Paving Apportionments.—Mr. D'Eyncourt gave his decision at the North London Police-court, on Wednesday, in a case affecting the owners of property at Springfield, Clapton. The Hackney Vestry had scheduled this road for the purpose of making it up, and had apportioned the estimated cost (about £2,500) amongst the owners of the 33 houses. There were 11 old houses and 22 new ones. The contention of the vestry was that this was a new street within the meaning of the Act, and Mr. Young, who appeared for the defendants, said it was an old and private road, and pointed out that there was a gate and posts at the top. It was further argued for the defence that there was precedent for separating the road in question, and applying the magisterial powers to the new portion only. The leases of the old houses had almost all run out, one having only 2½ years to run, his apportionment reaching £300. —Mr. D'Eyncourt said he had viewed the locality, and considered all the cases submitted to him, as well as some others on the point. He had come to the conclusion that, notwithstanding the gate and posts, it came within the category of a "new street," and the vestry were justified by their action. With regard to separating the road, he thought this also could not be entertained. If it was a very lengthy road, with a quarter of a mile between the houses, it would be unreasonable to call upon the residents to pay for paving the whole; but in this case the houses were fairly continuous, and there was a cross road at either end of the comparatively short road. He gave his decision in favour of the vestry, with £10 costs.

CHIPS.

The partnership hitherto subsisting between R. C. Green and H. T. D. Hedley, of Sunderland, architects and surveyors, under the style of Middlemiss, Green, and Hedley, has been dissolved.

In the ancient village of Newburn-on-Tyne, workmen are at present employed in the carrying out of the sewerage scheme, and pipes are being laid over an area of eight miles of roads, extending to Throckley on the west, and Walbottle on the east. Mr. J. W. Robson, of Newcastle, has been intrusted with the contract; Mr. Gregory is the clerk of works, and Mr. T. Jennings the foreman.

Sydney Coussens, an inspector of works on the South-Eastern Railway, descended a shaft at a new arch being constructed on the line over Queen's-road, Hastings, on Wednesday, and falling off a stage pitched on his head on to a concrete bed below. He was killed almost instantly. Deceased, who was 35 years of age and married, belonged to London.

Her Majesty's Treasury have intimated that they are prepared to make a free grant of the sum of £5,000 towards the construction of the Fraserburgh and St. Combs light railway, under section 5 of the Light Railways Act. It is made a condition of the grant that not less than a like sum be expended by the promoters on works, exclusive of the value of land to be granted by landowners. The cost of construction, exclusive of land, is estimated at £12,000.

On Wednesday week a new organ, presented to Berkswell Church by Mr. J. Feeney, was dedicated by the Bishop of Worcester. The organ has been erected by Messrs. Willis and Sons, of Camden Town, London. It occupies a portion of the space beneath the tower at the west end of the quaint old church. It is inclosed in an oak case, and the front pipes are of polished zinc. The organ consists of two manuals, namely, great and swell organs from double C to G.

Our Office Table.

Mr. F. C. Penrose, F.R.S., writes, in Saturday's *Times*:—"In your edition of the 14th inst. a correspondent from Athens gave a very alarmist account of the Parthenon. That the Parthenon urgently requires some considerable repairs I quite agree. The examination of the temple with a view to these repairs was the object of an express journey which it was my duty to make, having been invited by the Greek Government, in concert with two other architects—a Frenchman and a German—for the purpose of advising them on this very point; and in the spring of last year I was engaged at Athens for about a month on that duty. If, as I trust, the Greek Archæological Society — notwithstanding the recent, and, I fear I must add, the still continuing, calamities of the country—are able to complete the repairs which they had undertaken to carry out, I believe the future conservation of the building may confidently be left to a future generation."

The twenty-seventh autumn exhibition at the Walker Art Gallery, Liverpool, which opens on Monday next, promises to be an unusually attractive one, and will include several of the most prominent pictures shown at the Royal Academy this season. Military subjects are strongly represented, and quite a number of large canvases depicting stirring incidents on the battlefield are to be found on the walls. Chief among these is the famous picture, "The Roll Call," by Lady Butler, which has been lent by the Queen. This work, painted so far back as 1874, has been assigned the place of honour in the Grosvenor Room. Occupying a prominent place in the same room is the recently-painted portrait of Earl Derby, by Mr. W. Q. Orchardson, R.A. From the Academy exhibition have also been secured the portrait of Mrs. Meyer and her daughters, by Mr. John S. Sargent, and "Pilchards," by Mr. C. Napier Hemy. Sir E. J. Poynter is represented by a small work; Sir E. Burne-Jones by the "Depths of the Sea"; Mr. G. H. Boughton by the "Vision at the Well," which is one of the principal pictures in the Grosvenor Room; Mr. David Murray, A.R.A., by "Hampstead Heath"; and Mr. Colin Hunter, A.R.A., by a fine Scotch scene. Other prominent works are by Messrs. Luke Fildes, J. McAlister, J. W. Waterhouse, A. Hacker, J. Lavery, Walter Langley, and Byam Shaw.

The fourth annual exhibition of the Society of Scottish Artists was opened at the R.S.A. galleries in Edinburgh on Saturday, and comprises 387 oil pictures, water-colours, and pastels, and but eleven pieces of sculpture. The loan works include "Don Quixote" by Corot, Gaston la Touche's "Return to the Port," a sunset scene by Cecil Lawson, and Raeburn's portrait of Mrs. Janet Sempill. Among the works by members are the portrait of the Marquis of Huntly, president of the society, by Mr. Coutts Mitchie, landscapes by Marshall Brown, Joseph Farquharson, R. Noble, and Mason Hunter; seascapes by J. Campbell Noble, and R. Burns, and portraits by Martin Hardie, W. S. MacGedge, and John Bowie.

By the Poor Law Act, 1897, an omnibus measure carried through by the Local Government Board, and which received the Royal assent on the last day of the late Session, the power of the Metropolitan Asylums Board as to borrowing money for land and buildings under the Act of 1867 are extended to "any land or buildings which may in the opinion of the Local Government Board be required for the purposes of the Act." The Asylums Board can now, therefore, buy a site, and build central administrative offices —a power they did not previously possess. Immediately on the passing of the Act the Local Government Board forwarded to the Asylums Board their formal sanction of the purchase from the City Corporation of the site on the Thames Embankment at the corner of John Carpenter-street. The land was sold by the City Lands Committee of the Corporation, subject to the necessary Parliamentary powers and the consent of the Local Government Board being secured. Both conditions having now been fulfilled, the purchase will forthwith be completed in accordance with the agreement. The land is about a third of an acre in extent, having a frontage of 93ft. to the Embankment. The price is £53,000, and the estimated cost of the buildings to be erected £30,000.

The members of the English Arboricultural Society, who held last week their annual session in Lynn, closed it on Friday evening after a most successful meeting. The society was founded at Hexham in 1880 with about a half-dozen subscribers. The number has yearly increased, and it has now upon its roll something like 420, with headquarters at Haydon Bridge, Northumberland. Its object is to promote the cultivation of trees and shrubs. Mr. F. W. Beadon is president, and Mr. John Davidson secretary and treasurer. On Wednesday in last week a journey was made to Rising Castle Hall, the seat of Sir Horace Farquhar, M.P., and thence to the Sandringham estate of the Prince of Wales, who provided the party with luncheon in the club-room at Wolferton. Upon leaving Sandringham a drive was taken to Houghton, the property of the Marquis of Cholmondeley, where the party was interested in the magnificent avenues of beeches and in several remarkably fine specimens of cedars of Lebanon. Lord de Grey and Wilton provided tea for them. The annual dinner was held at night at the Globe Hotel, Lynn, the president occupying the chair, and amongst his supporters was the ex-mayor of the borough, Mr. E. Dunn, who cordially welcomed the members of the society to the town. On Thursday, the excursionists went to Holkham-park by the kindness of the Earl of Leicester, K.G., Lord Lieutenant of Norfolk. The last day of the session (Friday) — another showery day—was devoted to Melton Constable, the seat of Lord Hastings. Several places have been suggested for next year's meeting, and Balmoral appears to be the most favoured.

The attendance of members and associates at the meeting of the British Association does not appear to have been so great as was expected; but there was quite a large representation of American men of science, and they contributed several valuable papers. The attendance on the opening day is given by the secretaries at 1,200. Prof. Roberts-Austen's discourse on the metals of Canada naturally attracted a very large audience, and his experiments with the electric furnaces were highly appreciated. Much time has been spent in excursions. The sums to be granted for various reports and researches amount to £1,200. The members of the Mechanical Section, besides many others, paid a visit to Niagara, some to inspect the power-stations there, some as geologists under the guidance of Dr. Gilbert, of the U.S. Survey, who probably knows every inch of the district around the Falls, the Rapids, and the Gorge.

The will of the late Mr. C. J. Phipps, F.S.A., of 26, Mecklenburgh-square, W.C., who died in July last, was proved by the executors, Mr. R. Eugene Sharp, and his wife, Mrs. Honnor Phipps, on Aug. 14. By his will Mr. Phipps leaves the whole of his property to his wife for life, and in the event of her remarriage or decease, to his four children; and in the event of the decease of any of them, then such portion as would come to their individual share to go to their children, if any. The value of the personalty is sworn at £8,858 net.

The wills have just been proved of the brothers Sir William Lawrence and Sir James Clarke Lawrence, formerly of the firm of William Lawrence and Sons, builders, of Pitfield-street, Hoxton, and Lambeth, who both served the City as alderman, sheriff, and Lord Mayor, and were for many years members of Parliament, and who died last spring at advanced ages within five weeks of one another. Sir William Lawrence left personal estate of the net or actual value of £117,113 12s. 10d., and his younger brother, Sir James Clarke Lawrence, left personal estate of the gross value of £152,098 2s. 11d. and of the net value of £30,389 15s. 1d. In both cases, the surviving brother, Mr. Edwin Lawrence, M.P., is appointed residuary legatee.

At an adjourned special meeting of the Belfast Corporation on Wednesday week, the question of additional asylum accommodation was again under discussion. The Board of Control of Irish Lunatic Asylums urge that a building should at once be erected at Purdysburn for 360 chronic patients, at an estimated cost of £60,000. The resolution originally submitted on the subject was withdrawn in favour of a resolution, which was unanimously adopted, to the effect that the Board of Control be informed that before any other steps are taken in the matter of the erection of the proposed asylum accommodation at Purdysburn, the Council was of opinion that quantities

should be taken out and tenders obtained for the alternative proposals of a complete asylum, as proposed by their architect, and the section now proposed to be erected, in order that the Board of Control and the Council might be in a position to determine which it would be more desirable and economical to proceed with.

The International Mathematical Congress, which closed at Zurich last week, decided that the next congress should be held in Paris in 1900. It was also resolved to appoint an international commission of five members, who are to report on mathematical progress and literature in their respective centres, and to promote the establishment of mathematical departments in university and other libraries. Resolutions were also passed in favour of the adoption of a simpler terminology and the institution of a central correspondence bureau, in order to maintain closer relations between teachers and students of the higher mathematics in different countries.

A newly-discovered process for treating marble or other similar stones in order to give them any coloured shade, veins, or spots, says the *Chicago Tribune*, consists in leaving these stones in one or more baths composed of a solution of alcohol and one or more colours of aniline or other colouring materials. The colouring materials are fixed by leaving the coloured stones in a bath of oil or any other fat substance, or by applying upon the stones layers of the same stuff. The absorption of the organic colouring materials and of the fat substances by the stone may be accelerated by heating or boiling the bath which contains the stuff to be treated.

Amongst the grants made for the U.S. Geological Survey are, for topographical surveys, 175,000dol.; for geological surveys and researches, 100,000dol.; for investigation of coal and gold in Alaska, 5,000dol.; palæontology, 10,000dol.; chemistry, 7,000dol.; gauging streams and water-supply, 50,000dol.; mineral resources, 20,000dol. These amounts are exclusive of any expenses of printing, &c.

The students attending Professor Gourlay's Architecture and Building Construction Classes at the Glasgow and West of Scotland Technical College have been very successful in this year's examinations. All the students presented in architecture and architectural design passed, two of them taking an excellent, five a first class, and five a second-class certificate. In honours building construction, four students were admitted to the practical examination in design, held in London, and all passed, James M. Alexander, John M. Arthur, and James S. Boyd taking first classes with bronze medals, while John Smith passed second class. In advanced building construction, 66 students were presented, of whom 18 passed first class and 47 second class; while in the elementary stage 71 were presented, and none failed; 64 take "pass," and seven "fair." In masonry, Archibald Scott took second place in the United Kingdom in the ordinary grade, thereby obtaining the bronze medal of the City and Guilds of London Institute with £1. One other student took a first class in this grade, and two a second class. In the honours grade of masonry three students passed. In carpentry and joinery ten students took first classes, and five second classes in the ordinary grade. In the National competition, the awards for architectural designs executed entirely in the classrooms, and for measured drawings of old work executed under the superintendence of the professor and his assistants, were the highest yet received by students of this college. They consist of one silver medal, which was won by James M'Kissack; two bronze medals to James Mather and Wm. S. Moyes; two national book prizes to Wm. S. Moyes and Joseph E. Potts; and two prizes for sets of works awarded to Wm. M'Clelland and Gordon L. Wright.

Marble deposits are known to exist in several districts in New South Wales, but they have not received the attention their importance deserves. Fine samples of red-brown to almost black can be obtained near Bathurst, and a beautiful grey from near Mudgee. A nicely-marked brown is obtainable in the neighbourhood of Molong, and a pure white from near Newbridge, said to be equal to the second-class marble from the famous Carrara quarries. A deposit near Rylstone is of a black colour, with white streaks and gold markings. Immense deposits of green serpentine also exist in the vicinity of Lucknow, N.S.W., which are well worth attention.

Trade News.

WAGES MOVEMENTS.

Dunfermline.—A strike of Dunfermline joiners began on Monday. A meeting was held in the forenoon, at which it was reported that two employers—one of them having the largest carpenter business in the city—had granted the advance of a penny per hour asked. It was unanimously resolved that those who had not received the advance should remain idle.

Edinburgh and Leith.—The men engaged in the building trade at Edinburgh and Leith, who came out on strike three weeks ago for a reduction of hours, returned to work on Monday, the masters having conceded an eight-hour day. The Edinburgh master lathers have also agreed to increase the wages of their men from 8½d. to 9d. per hour, commencing on September 6.

Lurgan.—The members of the Amalgamated Society of Joiners of this town have applied to the masters for an increase of 4s. per week. The employers offered an increase of 2s. 6d. per week, with a promise that they would give a further increase of 1s. 6d. next spring if work was any way good. The men refused to accept these terms, and came out on strike.

Midland Brickmakers' Wages Settlement.—A settlement of the Oldbury brickmakers' strike was arrived at on Monday at a conference between the employers and representatives of the men. The result of the scale of wages drawn up and agreed upon by both parties is to grant some of the men a small increase, whilst others are to work at the old rates, and in some instances the men complain that they have actually suffered a reduction under the new tariff. The female workers are pleased with the arrangement, as the basis agreed upon, so far as they are concerned, is much more satisfactory than their old system, and their wages will be increased, in some cases considerably. The union officials consider the matter closed by the agreement signed by both parties, and if any of the men choose to continue the strike they will do so on their own responsibility.

Penrhyn Quarry Dispute.—The terms of settlement of the Penrhyn Quarry dispute, which had been signed by Mr. Young, on behalf of Lord Penrhyn, and by Messrs. W. H. Williams, Robert Davies, and Henry Jones, "on behalf of the men for their confirmation," were laid before a mass meeting of the Bethesda quarrymen on Saturday night, and, after a long discussion, accepted *en bloc*. The terms of settlement provide:—1. That, in the first instance, grievances shall be submitted by the person or persons to the local manager. If not satisfied with his decision, the grievance may be submitted to the chief manager, either personally or by deputation appointed in such manner as the workmen may deem advisable. If the men are dissatisfied with the result of submitting their grievances under the preceding clause, they are now empowered to submit them again to the chief manager by a deputation consisting of six *employés* selected from the whole body of the workmen, and not from the classes or crews particularly aggrieved as under the first clause; and in all cases of importance an appeal may be made to Lord Penrhyn, either by individuals or by deputation. 2. Monthly bargains are to be given to suitable Rybelwya without delay. 3. The letting of contracts is to be left in the hands of the management, who are to engage all persons employed thereon, and to see that each receives his just rate of wages. Quarrymen are to be paid an average wage of 5s. 6d. per day, "bad rock men" 4s. 7d. per day, and labourers 3s. 7d. per day, as long as trade permits. 4. All the late *employés* are to be readmitted in a body as far as practicable, and the remainder as work can be arranged for them, time being allowed for those now working at a distance. The management have refused to grant the payment of wages fortnightly, as desired by the men.—About 2,400 late *employés* made individual application for employment on Wednesday, and it is anticipated that bargain letting will start next week.

The Amalgamated Society of Carpenters and the Engineers' Strike.—The members of the 780 branches of the Amalgamated Society of Carpenters and Joiners are being asked to vote on the question whether they will levy themselves 3d. per week in support of the engineers and allied trades now seeking to establish the eight hours working day, and continue the same until a settlement in London is effected? If two-thirds of the branches adopt it, the levy will be commenced at once. The Sheffield and other branches have already replied in the affirmative, and it is believed the great majority, if not all, of the branches are in favour of supporting the engineers.

Additions are being made to the lunatic asylum at Omagh at a cost of about £5,000. Mr. Joseph Colhoun, of Londonderry, is the contractor.

CHIPS.

Mr. H. H. Law, one of the Local Government Board's inspectors, held an inquiry at the board schools at Alverthorpe, near Wakefield, on Friday, with reference to an application made by the Wakefield Rural District Council for sanction to borrow £4,000 for extending and improving the sewage works at Alverthorpe, and for £1,100 for works of surface-water drainage. Mr. Massie, engineer to the rural council, explained the proposals, which were opposed by the corporation of Wakefield.

The Light Railway Commissioners have intimated that they will recommend the Board of Trade to make an order authorising the construction of a light railway from Peakirk, in Northamptonshire, via Crowland, to Postland, in Lincolnshire. The length of the proposed line is eight miles, and is intended for the benefit of the Crowland district, which has no railway within nearly four miles. The promoters hope to have the line constructed within twelve months, the necessary capital having been obtained. The new line will form a junction at Peakirk with the Great Northern Railway, on the Spalding and Peterborough line, and at March with the Great Eastern Railway on the Spalding and March line.

The Rev. G. E. Aspinall, chairman of the Halifax Board of Guardians, will perform the ceremony of laying the foundation stone of the new workhouse infirmary, at Skircoat, in about six weeks. The stone will consist of a huge granite block, suitably inscribed. The cost of the infirmary is estimated at £130,000.

A new infants' school which has been erected at Hasbury, near Hales Owen, was opened by Viscount Cobham on Monday. The school, which contains a large room, two classrooms, and a cloakroom, is capable of accommodating about 260 children. It has been erected at a cost of £1,000, all of which has been subscribed. Messrs. Roberts and Sons, of Cradley, were the builders, and Mr. Meredith was the architect.

Mr. G. W. Willocks, Local Government Board inspector, held an inquiry on Tuesday week, at the Dovey Valley Hotel, Cemmes-road, Machynlleth, into an application by the Machynlleth Rural District Council for sanction to borrow £500 for the erection of a bridge over the river Dovey at Cemmes-road, and also for the construction of new roads and approaches leading thereto. Mr. D. Evans, the clerk to the council, explained that the total cost of the proposed bridge would be £1,281 8s., of which the county council would provide £592 10s. The necessity for a bridge had been long felt, there being only two bridges for carriages in the district. There was a distance of about nine miles between the two bridges, and the proposed new bridge would be situated about midway between them. Evidence was also given by Mr. G. A. Hutchins, county surveyor, and Mr. R. Williams, surveyor to the rural district council.

Alderman Holden, of Walsall, who last year started a permanent town's collection of pictures with the gift of a Welsh landscape, has just acquired "The Bride of Lammermoor," by H. Gillard Glendone, for presentation to the same borough. It depicts the meeting of Lucy Ashton and the Master of Ravenswood as described in the opening lines of Chapter xxxii. of Sir Walter Scott's novel. It was exhibited in the Royal Academy in 1885, the year in which it was painted.

In view of the development of the Chat Moss estate, which was purchased by the sanitary department of the Manchester Corporation more than a year ago, a wharf is being constructed on the banks of the Ship Canal at Hulme's Bridge. The corporation purpose utilising the old bed of the river Irwell between Hulme's Bridge and Lower Irlam for the purposes of a canal lay-by.

The town clerk of Manchester presented a report to the rivers committee on Monday on the position of the corporation with reference to the disposal of sewage. The committee resolved to defer discussion on the subject for a few days, the city surveyor in the mean time to report as to the best possible point near Randle's sluices at which to place the effluent outfall, so that opposition on the part of the Mersey and Irwell Joint Committee may be avoided.

Mr. George William Tomlinson, J.P., of Huddersfield, who died on Saturday at the age of 60, had for more than 21 years been the hon. secretary of the Yorkshire Topographical and Archæological Society, and had also held many public offices in the town.

The Ramsgate Corporation intend to make application to borrow £20,500 for gaswork purposes.

Mr. John Belcher, F.R.I.B.A., of Hanover-square, London, has been appointed by the town council of Cambridge to prepare a design for new buildings for the front of the Guildhall. Application is to be made to the Local Government Board for power to borrow £5,000 and costs, in addition to such other sum as may be found necessary for the erection of the new buildings.

CHIPS.

The town council of Llanelly intend to carry out the reconstruction of the sea embankment at a cost of £3,818.

The death is announced from Paris at the age of 85 of the well-known painter, M. Lecoq de Boisbaudran, of late years the director of the Ecole de Dessin des Arts Decoratifs.

The new Roman Catholic Church of St. Mary's-on-the-Hill, Carnmoney, the erection of which has just been completed, was on Sunday solemnly dedicated by the Most Rev. Dr. Henry, Bishop of Down and Connor. The building has cost £3,000.

The Chancellor of the Diocese of London has ordered the removal of an organ which had been placed by the churchwardens in the south transept of Ashford parish church, Middlesex, on the ground that it had been erected without a faculty having been previously obtained. It was stated that the organ would conceal a memorial window and deprive the parishioners of forty sittings.

Probate of the will of Mr. Richard Christopher Rapier, of Brinkburn, Upper Tooting, and of Ransomes and Rapier, Limited, 32, Victoria-street, and Waterside Works, Ipswich, engineer, who died at The Lees, Folkestone, on the 25th May last, aged 60 years, leaving personal estate of the value of £52,989 3s. 9d. has been granted.

Mr. J. W. Willis-Bund, chairman of the Worcestershire County Council, held an inquiry on Friday at the workhouse, Selly Oak, into an application of the Northfield Parish Council for consent to purchase a piece of land on the Weoley Park estate, Selly Oak, for the purposes of a recreation ground for Selly Oak and Bournbrook, and also to borrow a loan of £3,200 for the purchase of the land and works connected with it.

Lord Midleton, the Lord Lieutenant of Surrey, has received an intimation from an anonymous donor to the fund for establishing a convalescent home for women of the county in commemoration of the Queen's reign, that he is prepared to build the institution at his own cost, provided that an annual income of £800 is assured. Mr. Maurice Beddington gave a site for the home near Ramsgate a short time ago, consisting of four acres, of the value of £4,000. The fund now exceeds £9,000.

At the last meeting of the Northwich Urban Council instructions given to Mr. Bancroft for the sinking of trial holes, &c., preparatory to submitting a comprehensive scheme for the sewerage of the district, were confirmed. A scheme, estimated to cost £37,000, has been under consideration. This was for one part of the town only, and as complaints have been frequently made that the lower parts of the district have been flooded owing to the sewerage arrangements, it is expected that a scheme embracing practically the whole of the urban district will be adopted. The council decided to engage Mr. J. Cawley, surveyor, to supervise the making of a number of private streets, his remuneration to be 2½ per cent. on the total outlay.

The Opera House at Londonderry has been redecorated by Messrs. J. Shaw and Co., of Belfast, the works to the ceiling, proscenium, and front of boxes being carried out by Mr. James E. Reid, of London.

The new line from Wootton Bassett to Patchway, known as the South Wales and Bristol Direct Railway, is about to be commenced. This will be 32 miles in length, and will shorten the distance between South Wales and London by 22 miles, and between Bristol and London by two miles. The contract has been let by the directors of the Great Western Railway Co. to Sir W. Pearson and Co., of London, and the work has to be completed within three years. One effect of this railway will be to open up districts in Gloucestershire which have hitherto been unprovided with railway accommodation.

The plans of the scheme of Messrs. Stevenson and Burstall, of London, for the reconstruction of the sewerage system of Douglas, Isle of Man, at a cost approaching £50,000, have now been fully approved of by the town council of that watering-place.

The master builders of Aberdeen left that city on Friday on their annual excursion, the Trossachs and Loch Lomond being the places selected as the scene of the outing. The party, to the number of 20, travelled in a special saloon attached to the 5.25 Caledonian train. Staying overnight in Stirling, they started on Saturday morning on their trip through the beautiful country between Perthshire and Dumbartonshire. The return journey was made by Balloch and Glasgow, Aberdeen being reached at 10.5 the same evening.

Colonel W. Langton Coke has held an inquiry in reference to an application by the East Ham Urban District Council to borrow £1,400 for the purchase of land for the purposes of sewage disposal, and £1,050 for the fire brigade purposes and for the construction of an underground sanitary convenience.

The partnership hitherto subsisting between E. E. Homer and W. H. Ridler, architects, of Bucklersbury, E.C., under the style of Homer and Ridler, has been dissolved.

The subject of a proposed subway under the Strand from the Temple to the Law Courts has been again submitted to the Strand Board of Works by the Temple authorities. The Works Committee of the Strand Board have issued a report recommending that the application be granted upon condition that the subway be open only during such hours as may be necessary to accommodate the business of the Royal Courts of Justice, and that the public have the right to use it at such times as it may be open. The subject will be fully considered at the meeting of the Board after the vacation.

Colonel Albert J. Hepper, R.E., held a Local Government Board inquiry at Nuneaton, on Friday, respecting the application of the Nuneaton and Chilvers Coton Urban District Council for sanction to borrow £1,500 for the erection of a public library.

The new organ in Bangor Cathedral is fast approaching completion, and will be opened next month.

Lady Augusta Mostyn opened a bazaar at Deganwy, Llandudno, on Friday, and announced her intention of erecting a new church at an outlay of £2,000 on a site given by her son, Lord Mostyn.

A peal of eight bells has just been placed in the tower, added in 1887, to St. Michael's Church, East Teignmouth. The bells have been cast by Messrs. Llewellyn and James, Bristol, and Mr. Harry Stokes, of Woodbury, Devon, has hung them. A new oak floor, frame, and fittings have been furnished. A set of eight chimes has been added to the clock by Messrs. John Smith and Sons, of Derby, who made the clock in 1889. The dedication service took place last week.

A strike of masons and bricklayers has broken out at Buda-Pesth, as their demand for higher wages has been refused. Some ten thousand have struck, and about an equal number of assistant workers are thrown out. There have already been several conflicts between the strikers and the police.

The Right Rev. C. O. L. Riley, D.D., Bishop of Perth, West Australia, conducted a dedication service at the parish church, Morecambe, on Friday, when the new chancel, organ chamber, and vestries were formally consecrated, and the new east window was unveiled. The east end of the church has been entirely rebuilt. The cost of the alterations has been £1,105.

A branch of Messrs. Barclay and Co.'s bank was opened for business on Monday, at the corner of Market-street and Grainger-street, Newcastle. The premises, which were recently destroyed by fire, have been reconstructed from plans by Mr. J. C. Cackett, F.R.I.B.A., of Newcastle. All the bank fittings are of Spanish mahogany, teak being employed for the external woodwork. This rests upon a base and sur-base of red and grey granite. Messrs. Sopwith, of Northumberland-street, Newcastle, carried out the teak and mahogany work for the architect, and Messrs. Emley did the granite work, while the structural work was executed by Mr. Maughan, of Westgate-road, in the same city.

The formal opening of the new premises of the St. George's Co-operative Society at the junction of George's-road and Gladstone-street, Glasgow, took place on Saturday. A cost of something like £25,000 has been incurred in acquiring and altering the large block of buildings to suit the wants of the society.

A receiving order has been granted in the case of Edward Vigers, Elgin-avenue, Notting-hill, W., and Palace-chambers, Bridge-street, Westminster, S.W., late Parliament-street, S.W., architect and surveyor.

The Roman Catholic bishop of Southwark laid the foundation-stone of a Catholic Church at Redhill on Tuesday afternoon. It is to take the place of the old church, which had become much dilapidated.

Mr. E. Onslow Ford, A.R.A., has been commissioned to execute a statue of the Duke of Norfolk, in commemoration of his public services whilst Mayor of Sheffield.

The offer made a little time back by the David Lewis Trustees to purchase Rupert-lane Barracks, Liverpool, has now been accepted by the authorities. As soon as arrangements have been made to complete the purchase, and the land is transferred to the Lewis Trust, steps will be taken by the trustees to have the unsightly old barracks pulled down, and the site laid out as a public recreation ground and a pleasure garden.

The Board of Trade has granted a license for three years from the present month for the working of the Highgate Hill Steep-Grade Cable Tramway. The cars, after remaining idle for four years, were re-started a few months ago, the tramway, after being repaired, being worked under a provisional license from the Board of Trade.

At a special meeting of Dundee Town Council on Monday a resolution in favour of the municipalisation of the tramways was carried by a large majority.

The school board for Halifax adopted on Monday plans by Mr. J. F. Walsh, of that town, for extensive additions to their school in Ackroyd-place.

Excavations that are being carried out near the Casino, at Baden-by-Zurich, have brought to light many relics of the time when this district was the great *entrepôt* of the Roman army in Transalpine Switzerland. The site of an old Roman military hospital has been found. A still more valuable "find" has been made in the shape of a villa, which must have belonged to some wealthy Roman. A well-modelled statuette in bronze, representing a faun, and a three-branch candlestick are among the objects discovered.

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DIRECTORS OR BUILDERS.

MEN who can organise and direct are now the successful men of business, and for a man to succeed in any vocation in these days it is no longer necessary that he should perform his own work, or to be a skilled expert. With one or two exceptions, the proposition holds true. The surgeon indeed must be an expert operator; the painter and sculptor has each to execute his own ideas in canvas or marble; but, notwithstanding these and a few other exceptions, the leading professional man is he who can direct and control others—the "whip-hand," to use an expression suitable to another occupation. So true is it, that we hear in every profession the complaint that the superficial and the incompetent get on, while the man who has come out of his school with flying colours or won academical honours finds it hard to get employment.

In these days, the man of action and the business man, one who can transact affairs with as little friction as possible and does not allow art to absorb too much attention, is he who succeeds. As far as qualifications go, readiness in facts and figures is of more consequence than learned research into the theories and principles of architecture, or even a facile pencil, much as the latter is valuable as an auxiliary of practical qualities. Mr. Bookful has never been able to supplant Mr. Pushington in the practical qualities of winning clients, managing committees, or arranging contracts, and we are afraid it must be confessed that the purely practical man wages an unequal conflict with the mere artist draughtsman. For some reason or other in the nature of things, the gifts of imagination and art expression have very seldom found a congenial soil in the mental discipline and habits of the student. Those experienced in architectural class teaching, and in schools of art, have to confess to finding a certain dislike to sustained study amongst artists and draughtsmen. They are bad readers, and worse thinkers. The exceptions make the rule. To set an architectural student on a problem of mathematics, or to give him the task of finding the strains in a girder or roof, is to expect him to do something of the most uncongenial kind. His soul revolts against figures. For analytical study the artist has little inclination. Art-designing is synthetic: it puts together, combines, and arranges;—on the contrary, scientific and mathematical studies require the very opposite process. The student has to analyse, take to pieces, and dissect, and form his conclusions. From data and experiment he has to discover certain laws and apply these step by step. Thus, in working out a formula for a girder or a roof, he has to determine certain loads, how they act, what strains they produce, and then to find certain sections or positions of members which will give the required strength. The process is absolutely the reverse of the way an architect would sketch out a structure. Suppose it is a vaulted building of masonry. He lays down his plan and sketches his elevation for the whole building before he thinks of proportioning his section or the size of his buttresses. The designer does not think of drawing a diagram of forces for his section, or showing where the resultant of the thrust of his vault and the weight of his masonry will come, till he has satisfied himself of the proportions of his building and its elevation externally.

Men of the Pushington stamp are equally averse to artistic studies. The bustling business man has no time nor inclination to ponder over nice proportions, delicate mouldings, or subtleties of form and colour, and if he can delegate all this kind of work to another—a "ghost" or a decorative artist—he is quite satisfied. To him "time is money," and the quicker he can turn out one job after another the better. Owing to these ineptitudes of the student and the business man, it comes to pass that their labours have to be pursued on different lines to those of the designer. They can be learned from books or cultivated in the office or committee-room. Not so the designer; he can only cultivate his art in the studio. But the business tact is an art also. The clever man of business is an artist of management; he knows how to organise and direct—a valuable qualification which should not be forgotten by the younger men in the profession who scoff at office work and management. The most successful men in the profession have been those who have brought to their genius as designers the discipline of business habits. It was by their dual qualifications as directors and designers that men like the late Sir Gilbert Scott and Mr. Street accomplished the prodigious amount of work that fell to their share—an amount unequalled by any architect of the Middle Ages. But how? Neither of them could have done so single-handed: they had their surveyors, quantity-takers, draughtsmen, clerks of works, and a staff of assistants; it was impossible for either of them to superintend all their works scattered up and down the country, or even to give them more than a hasty inspection. Modern facilities of education, railways, and other opportunities have made it practicable to bring together these various agents, under leaders of the profession, so that a successful architect can muster at his command an army of workers, and by dividing his forces undertake to carry out a score or more of big buildings, the designs for which have all been prepared at his London offices. This centralisation of skill and labour is very different to the system under which the great edifices of the Middle Ages were constructed.

Let us take the testimony of an authoritative writer. In his article "Construction," in the "Dictionnaire Raisonné de l'Architecture Française," Viollet-le-Duc describes the duties of the architect in the West: "It was incumbent upon the constructor to procure the materials, to find the means of transporting them, and to contend against the ignorance of unskilful labourers, and that he himself should make his own observations as to the quality of the lime, of the sand, of the stone, and to look after the storing of the timber. He not only had to be the architect, but the quarryman, the surveyor, the modeller, the superintendent, the carpenter, the lime-burner, the mason, and could be assisted only by his own intelligence and reason as an observer. To-day, when a lawyer or a business man has a house built without the assistance of an architect, it is easy for us to consider these first efforts as rude; but the genius which a builder of that period required and evinced in the erection of a hall, or a church, was certainly superior to that demanded from an architect of our time, whose operations may be carried on without any knowledge of the first elements of his art, a thing which too often occurs. . . In those days of barbaric ignorance, the most intelligent—those who had raised themselves by their own genius above the common workman—were alone capable of directing a structure, and the superintendence of buildings, necessarily limited among a restricted number of superior men, for that reason produced original works, in the execution of which the reasoning faculties were largely called upon where calculation is apparent, and the form bears that stamp of superiority which is the distinguishing mark of buildings ably planned, subservient to the needs and customs of the people."

Thus it was the *élite* of the craftsmen that supplied the material from which the old master builders arose. They were men who by natural ability and skill in their craft had raised themselves to a position above the workman. By a process of natural selection or "survival of the fittest" among them the few came to be architects. This is a rather different thing to asserting, as some have done, that the designing of buildings can be intrusted to everyone who can handle tools. Nothing is less true to fact. The old craftsman who became master-workman or "surveyor" was one who, had he lived in these days, would probably have won a name in the profession. In his time he won a leading position at building among his fellow-craftsmen. He united both the faculties to a certain degree. To a mason or an artist craftsman in some trade he united a certain amount of tact and common sense. Circumstances in those days favoured his promotion, because there was a natural competition amongst skilled men; but it is not so in these days. The mischief now is that the man may be an artist, and also one of skill, and yet cannot rise. Increase in numbers does not account for the fact; much more must be attributed to capital, favourable circumstances, individual qualities. With these a man possessed of very ordinary abilities gets on. A wide difference exists between preparing a design in an office and ordering it to be erected according to plans and specifications, and directing its progress personally step by step on the building itself. At a time when a man rose by degrees to be superintendent from the ranks of his own vocation, it would have been thought mad presumption for an outsider of the building crafts to dictate what should be done, and how a building ought to be designed. How great the change! The designing, controlling, directing is done from the outside by a class above the worker, the actual building by men who have no personal interest in the work. So the director-designing combination or agency of the present day has come about, and all is done by delegation. It has many advantages—economy of labour in the clerical work, speedier and more accurate draughtsmanship, special knowledge of buildings for varying uses, inception by men of a wider culture, more expert workmanship; but there is, on the contrary, no longer that close and direct relation between the construction as a matter of fact and utility and pleasing design. When the conceiver and the worker are separated, who can wonder if the building is a crude and coarse fulfilment of the artist's intention?

We said just now the analytic mind took things to pieces, while the man of synthetic tastes, the designer, delighted to combine and arrange and harmonise. These distinct habits exactly represent the scientific expert and the artist who look at things in different ways. Take, as an instance, the way an ordinary man of intelligence or a book-learned architect would regard an edifice. He would be more concerned with its dimensions, size, height, span, &c. If he was a man expert in construction he would be more interested in knowing the span and thickness of the vault than he would the arrangement of the ribs and the details of springers; he would work out the section showing diagram of forces; he would spend more time in examining and drawing to scale a timber or iron roof than he would in sketching its architectural details. For him facts are of more interest than effects or design or proportions.

The great want of connection in our buildings is one of the results of this mode of studying architecture—of the mode of analytical study. Our architectural and technical schools and courses, by sectional teaching, encourage this disjointed way of

studying design. For instance, they take materials, consider the properties, weights, and qualities of brick, stone, iron, and timber, but without making the student consider what all these properties mean in relation to design. If they make the novice an expert in answering questions on the crushing resistance, porosity, and working qualities of a particular stone, they think they have done all for him; but really they have only taught him the A B C of the subject. He knows as little as before as to how he should cut and convert or adapt the stone; how it should be applied; and of wood and iron and brick he only learns the physical qualities. Take, again, the subject of construction—the strength and stress of materials. The student is taught all the mechanical principles; but he is left entirely to his own resources when he has to design a vault, a buttress, or a timber or iron roof to suit a given building. He may have to draw to a scale a roof-truss showing its joints and connections; but all this may only make him an expert engineer or mechanical draughtsman. They are all so many separate and disconnected studies, and have no more to do with design or particular buildings than a knowledge of the rules of grammar can make a man a good prose writer, or a knowledge of descriptive anatomy can make a physician. These disjointed studies may enable a youth to get a high number of marks, but they will not enable him to design a cottage well. The results of this mode of teaching architecture is seen in our buildings. It makes technical graduates, but not designers.

A. designs a roof on mathematical principles though it is extremely ugly, while every detail has been studied carefully; it has no connection whatever with the rest of building. The corbels which carry the ribs on the wall are left to the fancy of the mason. B. has been very careful to make his stone pillars strong enough to bear the weight, and to design the details of his arcade according to the rules of a particular Gothic period, but they are either coarse or extremely weak. He has simply applied what he has been taught, and designed details that are only suited to a cathedral. C. designs a water tower from an engineer's point of view; but the tank of iron is atrociously united to the brick tower. These are only a few of the ways in which the modern scholastic ideal of architecture fails. The mason and carpenter period of the art was saved from these crudities and errors. But we have to look at things as they are. We cannot again hope to return to the age of a craftsmanship architecture; but we can do something to restore the connection which was severed in the 16th century. A few are striving to make architecture again what it was, the result of a combination of crafts, by making masons and carpenters directors of building, and educating the architect in trade schools. We doubt whether such a state is again practicable; but we can do much to make the architect better understood by the workman. His main position now must chiefly be that of a director, and his function that of arranging and combining. He need not trouble about details of trades, or be an expert in handling tools, but he can be taught to draw details that are reasonable and intelligible, and so to avoid the habit of designing out of his head in materials which he knows little about, and save trouble to those who have to torture them into shape. One writer says that ultimately the large crafts will reabsorb the architect. This is hardly probable under existing circumstances. What is more desirable is to secure him against further division and detachment from building.

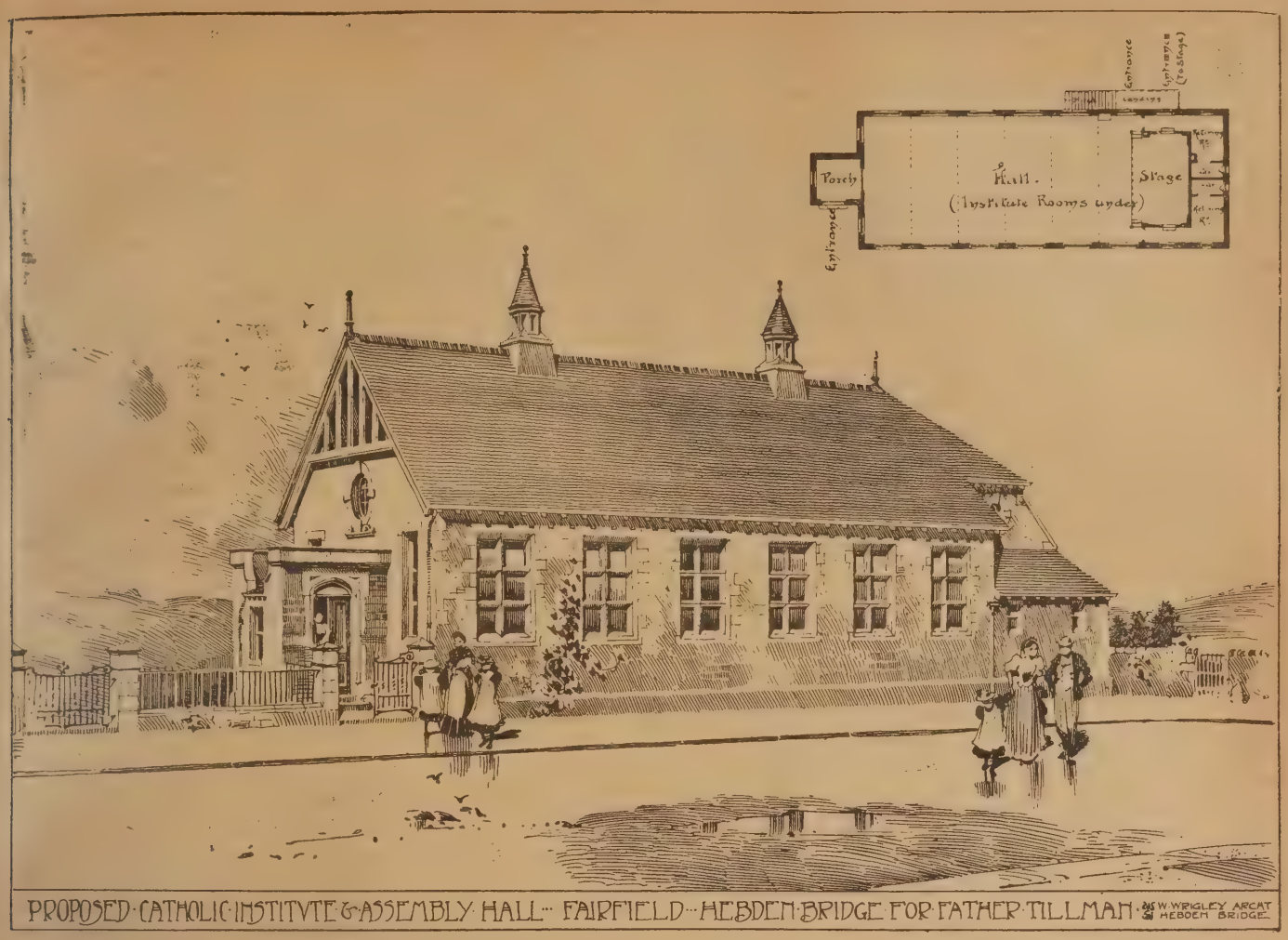
The retirement is announced of General Sir E. C. S. Williams, K.C.I.E., Government Director of Indian Railways at the India Office.

THE INTERNATIONAL CONGRESS OF ARCHITECTS ON ARCHITECTURAL EDUCATION.

THE International Architectural Congress of Architects has been holding its meetings at Brussels during the week. Organised by the Société Centrale d'Architecture of Belgium, a body of enlightened and independent views, there is no doubt the deliberations of the members of the congress will have their due weight. One of the most important questions on the programme we see is "Instruction in Architectural Art: Should it be Eclectic, or should it be Limited to the Principles of a School?" Here a challenge is thrown down to all who have theories to bring forward. For the real architect, who has a conscience and endeavours to discover a *raison d'être* for his position, which has been declared rather untenable, this subject will provoke interest. Of course, we know there are hundreds in the profession who care not a sou about the subject, who regard it as a question far above the needs of practical men, and to whom the discussion of architects' remuneration would be more to their taste, or the three last questions in the programme. To these men all educational subjects are distasteful.

As to what will be said on this first subject, we can form little opinion now; but there will no doubt be many champions for the theory that instruction in architecture should be eclectic, and not confined to one school. The modern architect has been brought up in the eclectic school: he likes to exercise his taste in selecting a "style," a bit from this building and a bit from that, or, as it has been nick-named, to follow the "bib-and-tucker" system of design; it is easy, and accommodates itself to various purposes;—the house or shop can be of Renaissance, the church or schools Gothic, the baths Alhambra-esque, and so on. To limit oneself to the principles of a school may do very well for a few; but not for the man who caters for popular suffrages. Of course, such a reason will not commend itself to the real artist, who regards architecture as building, or the result of the craftsmanship of the age to special ends; who says, in short, there is no such thing as a modern style, but that each designer or workman must impress his own meaning. In another article will be found some remarks bearing upon this topic. It would be well to remind the reader of the theories that now obtain. First, there are those who say that the study of architecture is a matter of learning different historic styles, and applying them as best they can with more or less modification, which class form the larger class of the profession. Second, those who say there is no such thing as architecture apart from building; that we can give the title of architecture only to buildings which can be dressed up in historic styles; third, those who have some theory of design, as, for instance that propounded by M. Leopold Eidlitz. The first theory is, of course, based on learning the styles, and may be called, therefore, the scholarship idea, which has existed in one form or another ever since the death of living architecture in the 16th century. All that we are at present is due to the scholastic view of art. Genuine architecture, the result of "experimental workmanship with tradition behind and reason in front," as Mr. Lethaby says, ceased entirely, and then it was an "essay in *vrai* architecture" in which scholars and amateurs dabbled, as well as architects. It is this "scholarship" theory of architecture that we have most to break away from: it is curbing invention—or rather suppressing it—and is likely to last so long as there are any old styles to borrow from. As to instructing students in architecture, the question is one of immense importance. On this system, the student must be a scholar in styles if he would succeed. He must look upon Classical antiquities and Mediæval traditions as the very groundwork of architecture, and regard them with as much importance as the scholar of language would Greek and Latin. But on rational grounds, such an academical course is not to be recommended. Viollet le Duc, Eidlitz, Fergusson, Veron, and others have all denounced a method of instruction founded on dead styles. The building, as a specialised product for a given end, an organic structure in which every requirement and condition finds its suitable expression, must be the basis of any intelligent study. The "architecture" of such a building must be developed from within outwards, it cannot be borrowed or imported; in a word, it must be the development and expression of function. The academical theory of educating the architect is, on philosophical grounds, a decided mistake; but the difficulty is in finding a substitute. The remarks of Mr. W. R. Lethaby in a paper read at the International Congress on Technical Education have a bearing on the question. The author traces the origin of the breakdown of architecture to the 16th century, when Roman law and art overthrew the guilds of craftsmen; and the substitution of the scholarship ideal. Before this time, the guilds of workmen were bound up with religious brotherhoods, and with the corporate life of the municipalities; but the revolution struck at them all, and in their place "a set of drawing masters, designers, commercial travellers in art" flocked from Italy, and "hung about the courts of France, Germany, and England." These "drawing master" designers were chiefly painters, and hence the architect became to be regarded as a "drawing master" of buildings rather than a graduate of the shops. These terms adequately describe the class of men who became the ancestors of the modern architect. The same writer refers to the disappearance of the body of workers which the earlier masters like Wren had to deal with, which body is fast decaying, and he refers to the value of the old guilds and the need of establishing schools in which the workman and the architect can be instructed. No one can seriously dispute the value of properly-constituted schools or guilds for craftsmen and architectural students. It is true, also, that professional and literary education is defective: it relies too much on conventional lines, rules, and formulæ, and is apt, as we are told, to "run to grammar," as the English system of teaching languages. The question "What should be the programme?" will not be answered till we bring the worker into association with the professional man. Then only can a series of questions or exercises be framed of value to the student of building.

Of the other papers to be read and discussed we can say little now. The second subject is the old question as to the value of a diploma—"Is an architectural diploma necessary?" After what we have said, we should say no student will value a diploma which is not a guarantee of architectural skill. The third subject, Restoration, is of more practical interest. It is briefly the right of an architect to correct the mistakes or alter the construction of the original builders; to finish unfinished parts of the building, like completing a tower of an old church. The right of an architect to interfere with another man's work is a delicate and moot point. Why not? The old architects had no such scruple in adding to, pulling down, and altering another's work. But there is a professional sense of etiquette in modern procedure which we cannot quite understand. The other two questions have reference to the ownership of designs—"What steps should be taken to insure architects' proprietorship of their designs?" The difficulty would be sometimes to say what was really original in a design. The last question, as to



the need of establishing a fund to protect architects, is one that may be profitably discussed in the interests of the profession. Such a fund would enable architects to claim their rights against exacting boards, and assist them to ventilate their grievances in competition awards.

ASSEMBLY HALL, ETC., HEBDEN BRIDGE.

THIS Hall is in course of erection adjoining the church and presbytery buildings recently erected. The walls are of random block insides, with local stone dressings. The plan shows the assembly hall only, under which there is a billiard-room, games rooms, baths, &c. The whole is being built at a total cost of about £900, exclusive of heating and furnishing. Mr. W. Wrigley, M.S.A., of Hebden Bridge, is the architect for the work.

MECHANICAL COMPRESSION OF GROUND FOR FOUNDATIONS.

FROM the time of Chatmoss and before, architects and engineers have had ever before them the constantly-recurring difficulty of being compelled to erect important and substantial structures upon ground to which nature has denied the powers of resistance demanded of it by man. There are but three principles by which this want of resistance can be overcome, although each is susceptible of a large number of diverse applications. The supports, or, generally speaking, the foundations of the intended fabric may be carried down to a depth at which they will ultimately reach hard ground. Again, the area of the base may be so increased as to reduce the weight per unit of surface to an amount which the site can carry with safety. Both of these methods are expensive, and the latter is open to the objection that it can very seldom be employed. As a rule, the value of land is so great in districts where high and massive buildings are erected, that the adequate area, or rather the minimum area which can be made to suffice for the purpose, is all that can be obtained. As an example corroborating our statement, witness the "giant buildings"—the "sky-scrapers" of the United States. There remains now the third principle to be considered, which consists in imparting a factitious resistance to the ground which it does not naturally possess. Several different processes and methods have been used to accomplish this desirable end. Our readers may probably recollect the description published in the columns of the BUILDING NEWS of the freezing process for consolidating loose and friable earth, and enabling it to stand a much greater unit pressure than when under its normal condition.

A new method, which may be termed the "Deluc" process, has been very recently introduced, and though it may be regarded as still passing through its probationary career, several structures built during the last year, upon foundations so obtained, have not evinced any signs of sagging, cracks, or other premonitory symptoms of incipient deformation. In a word, the *raison d'être* of the "Deluc" process is to be found in the fact that it effects a compression of the soil over as large a surface as is necessary, and to such a depth as may be required. The maximum depth at present attained is a little over 50ft., which was a work of considerable difficulty, and may be looked upon more as a successful trial of what the principle is capable of than as an example of what would often occur in actual practical work. In order to bring about the requisite degree of density or consolidation of the comparatively soft substratum, one or more rows of vertical holes, about 2ft. in diameter, are sunk at distances apart, varying from 5ft. to 7ft. from centre to centre, and subsequently filled up with almost any description of clean hard material, broken to convenient dimensions. Now comes the mechanical part of the operation, which consists in the method adopted for perforating the holes in the ground. For this purpose, a cast-iron ram, weighing about a ton and a half, of a prolonged conical form, and furnished with a steel point, is allowed to fall from a height of between 30ft. and 40ft., being hauled up after every blow by a sort of steam pile-driver running on rails along a platform. In moderately soft ground, the depth of penetration attained at each fall will average about 15in., which will be sufficient to perforate a hole 30ft. deep in half-a-dozen hours. Experiments have shown that when the operation is concluded, even in banks of freshly-made earth, the hole so made will hold water at a constant level, so firm have the adjacent layers become.

When this preliminary stage is reached, a lighter ram, weighing a trifle under a ton, and with a much blunter point than the former, is substituted for it. First, however, the hole is filled with the material already described in successive instalments of a height of 18in., each height being well rammed as the filling proceeds. A third ram, of a truncated shape, and about the same weight as its predecessor, is used to test the results of the process. If, after a certain number of blows, there is no further sensible penetration, it is assumed that the consolidation has been successfully accomplished. The tops of all these piles, as they might be called, are then covered over with a platform of concrete, and the foundation for the future building is complete. It frequently occurs that a moderate degree of resistance will be sufficient, and the present process will enable that amount to be obtained, without incurring the expensive contingency of carrying the foundations down to solid rock or hard ground. Whenever, therefore, it is a simple case of consolidating the ground for only some 6ft. or 7ft., the conically-shaped ram is not used. The lighter and blunter specimen can do all that is necessary, and also it alone is employed when the earth is of a very soft, almost of a semi-fluid, description. Were the heaviest and sharpest pointed ram used in this case, it would go down too far, and might disappear altogether. A much smaller fall is given under these circumstances. It should be stated that there is one kind of substratum which defies all the efforts of the "Deluc" process. It is clay. When the depth of this material does not exceed 3ft., the conical ram can tackle the job; but when it has a greater thickness, some other means must be taken to overcome the difficulty. That once effected, the ram can be brought into useful

play again. The first application of this process was made, as might be expected from the name of the designer, in France, where the natural resistance of the soil was between five and six tons to the square foot. It is worth remarking that this method of securing good and solid foundations on hard ground was used in preparing the site for the erection of the large building which is to house the whole of the administrative staff of the Great Parisian Exhibition in 1900 at the Quai d'Orsay, not far from the bridge of Alma. The question of the comparative cost of the "Deluc" process will not be quite solved just yet, although it is stated that, by dispensing with all expensive timber piling, it ought to prove more economical, and also what is equally of importance, save time and labour. T. C.

SANITARY ASSOCIATION OF SCOTLAND'S CONGRESS AT DUNDEE.

THE twenty-third annual congress of the Sanitary Association of Scotland was held in Dundee on Thursday and Friday in last week. At the inaugural meeting on the former day, the chair was occupied by Lord Provost M'Grady, Dundee, hon. president of the association, who, in an address of welcome, contrasted the present position of Dundee with that in 1847, more particularly as regarded the ravages of typhus fever. In the latter year, he stated, with a population less than half the present, there were 1,033 cases; in 1865-66, when the population was 110,000, there were 1,084 cases; while since 1876, when the important improvements scheme of 1871 came into effect, the number of cases had never reached 100 in any one year. In 1895-96 the cases numbered respectively four and five, while during the present year, up till the end of July, only one case had been reported.

In the council's report reference was made to the passing of the new Public Health (Scotland) Act, in regard to which it was stated that although its provisions were not so comprehensive and far-reaching in some respects as the memorandum of the Association urged, it would do much to bring about improved sanitary conditions, and would give greater facilities to those intrusted with public health administration. Regret was generally expressed at the death of Mr. J. C. Stobo, sanitary inspector, Rutherglen, treasurer of the Association. The constitution was altered to read, that old members must have their subscriptions paid by first of August of each year, and in case of new members, within two months of their admission to the Association, or in the discretion of the council their names may be removed from the roll. An important alteration on the constitution was to the effect that sixty be the percentage of marks necessary to obtain a pass in the diploma examination of the Association. Hitherto the percentage has been fifty. Rothesay was selected as next year's place of meeting.

A paper was subsequently read by the President, Mr. Gilbert Thomson, C.E., Glasgow, on "Recent Developments in Sewage Purification." He said, while it would appear as if the future progress in sewage purification would be largely dependent on bacteriological research, the new methods had not yet so completely proved their superiority as to drive the others out of the field. There were still many competing systems full of vitality, and his object was not to advocate one or another, but to show the main lines on which recent advances had been made. Proceeding, he described and compared the three chief methods of treatment of the present time —on land, by precipitation and by bacteriological methods; and said the fact that they had not yet reached a final settlement of the sewage question was proved by the circumstance that within the last few weeks, as they had seen by the newspaper reports, works on each of the three leading methods to which he had referred had been adopted or recommended. This was, of course, so far due to the differences in local conditions; but it also suggested the probability that meantime there was so little to choose between the best representatives of the various systems, that causes more or less accidental might be sufficient to turn the scale in favour of any of them. Meantime, it might be said that, while no system could be definitely pronounced the best, they had, at all events, at command various processes which might be trusted to produce, if properly worked, a satisfactory effluent. But sewage still remained, and probably would remain, an element of expense to any community, and to minimise that expense it was necessary that the system should be judiciously selected, the works skilfully planned, and, what was of the less importance, that the management should be careful and skilful. The public health aspect of sewage disposal was now fairly secure, and it might be hoped progress in the future would probably affect chiefly the financial aspect. Another aspect which was little considered when speaking of works in general, but which had an unpleasant habit of coming to the front very awkwardly, was the æsthetic one. Sewage works might be, and usually were, conducted so as to cause no actual nuisance; but if by still further improvement they could with some plausibility speak of the corporation aquarium, of the district committee's Jubilee ponds, an important, if perhaps indefinite, advance would have been made.

Bailie Dechan, Hawick, read a paper on "River Pollution," for the partial cessation of which injury to the public health of the country he said they were indebted to the Rivers Pollution Prevention Act, 1876. The present Act, however, was a weakling of a very pronounced type; but, like most things not understood, it was generally feared. The very fact that the consent of the Local Government Board was necessary before a sanitary authority could take proceedings had practically made the Act a dead letter. The Act was also the very essence of ambiguity, and the absence of definition made it almost hopeless for that progress which the altered conditions of our life demanded. It was very harassing and annoying indeed to local authorities, manufacturers, and others who might be responsible for allowing or causing pollution of a river, because these parties might incur considerable expense in their efforts to prevent pollution, which for the time being might be accepted as meeting the requirements of the case, and shortly afterwards be informed that the process adopted was, in the language of the Act, "neither the best nor only practicable and available means." Bailie Dechan contended that to obviate this feeling of uncertainty they were quite entitled to look to the recently-established Local Government Board for Scotland for instruction and guidance.

In the discussion which followed the reading of this paper, Mr. John Lindsay, interim Police Clerk, Glasgow, said the Rivers Pollution Act was of no use whatever, and remarked that it had failed absolutely and originally in the purposes for which it was intended. He thought the Association should set about getting an Act which really accomplished the primary purpose it was intended for. In the cases of river pollution brought under his notice he had found the Act to be absolutely of no avail, and even in the Public Health Act there was nothing to help them from a sanitary point of view. The only remedy he could get was to go to the Glasgow Police Act of 1866. It seemed to him a sad state of matters that for the prevention of the pollution of a river one had to go to a local Act of Parliament of thirty years ago to get remedies which in these days should be contained in a general and Imperial Act of Parliament.

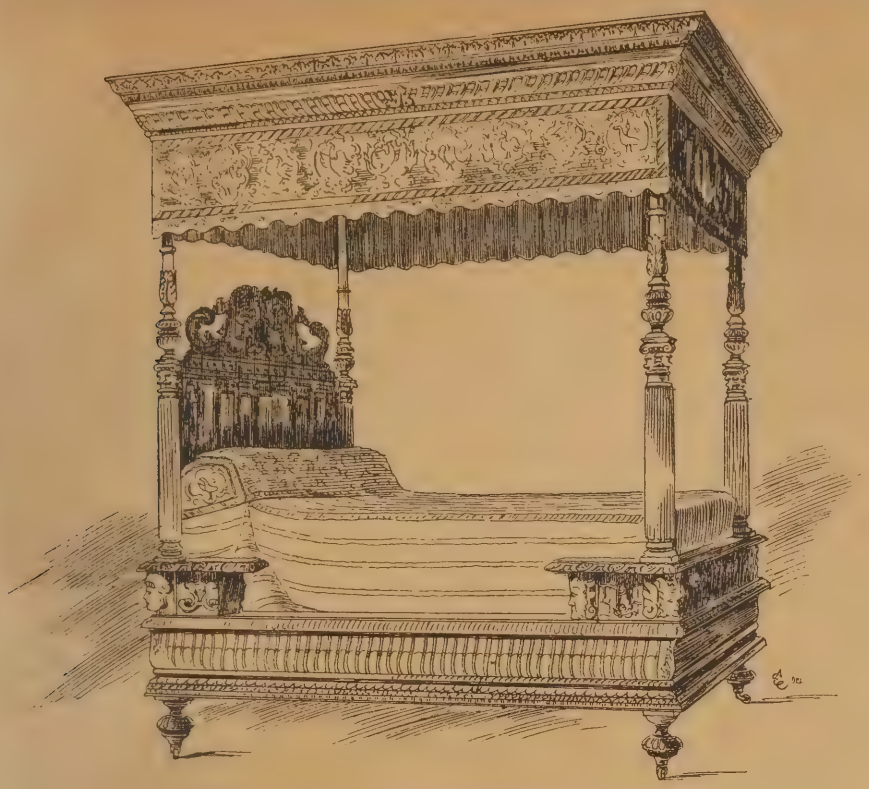
Councillor Elliot, the Sanitary Convener of the city, reader a paper on "Dundee, Old and New, judged from a Sanitary Standpoint," and, after discussion, the Congress joined in a drive from the Town-house to places of interest within the city of Dundee. In the evening the annual dinner of the Association was held in the Queen's Hotel.

On Friday, the conference was resumed in the Burgh Court-room, Dundee, the president, Mr. Gilbert Thomson, Glasgow, in the chair. Dr. Charles Templeman, the medical officer of health for Dundee, discussed the question of the prevention of disease by inoculative methods, in a paper which led to considerable discussion. Bailie John Tait, Kirkcaldy, read a paper entitled, "On the Trail of Typhoid," in which he dealt with two epidemics of enteric or typhoid fever which occurred in Kirkcaldy in 1896, and remarked that if a clause had been inserted in the Public Health Bill, making it imperative that those in charge of dairies should pass an examination, and receive a diploma of efficiency before being put in charge of a dairy, the Act would have been more effective. "Dairy Sanitation and Legislation" was the subject of a paper by Dr. T. G. Nasmyth, medical officer of health, Cupar-Fife; Mr. William Maclay, Glasgow, contributed a paper on "Protection Against Adulteration"; and Principal Dewar, Royal (Dick) Veterinary College, Edinburgh, read another on "The Inspection of Meat."

At the annual business meeting, the following office-bearers were elected for the ensuing year: Honorary president, Lord Provost Henry M'Grady, Dundee; president, Gilbert Thomson, M.A., C.E., Glasgow; vice-presidents: A. K. Chalmers, M.D., medical officer of health, Glasgow; William W. Kelso, sanitary inspector, Paisley. Secretary and treasurer, George Middleton, M.A., LL.B., writer, Glasgow. Council: chairmen of health committees, Councillor Elliot, Dundee; Bailie Pollard, Edinburgh; Bailie Dick, Glasgow. Medical officers: Dr. Munro, Renfrewshire; Dr. M'Vail, Dumbartonshire; Dr. Ross, Dumfriesshire. Sanitary inspectors: Peter Fyfe, Glasgow; Duncan Cumming, Perth; W. Dunlop Brown, Rothesay. Burgh engineers and surveyors: William Mackison, Dundee; Joseph Potts, C.E., Partick. Elected members: Dr. Glaister, Glasgow; Bailie Miller, Partick; D. M. Alexander, Glasgow; Councillor Paton, Paisley; Councillor William Maclay, Glasgow; ex-Bailie Crawford, Glasgow; Bailie M. Dechan, Hawick. President-elect, A. K. Chalmers, M.D., Glasgow. Board of examiners: Dr. M'Vail, Dumbartonshire; Dr. Chalmers, Glasgow; Mr. Gilbert Thompson, Glasgow; Mr. William W. Kelso, Paisley; Dr. Duncan, Glasgow; Dr. Glaister, Glasgow; Mr. Peter Fyfe, Glasgow; Mr. G. A. D. Mackay, Edinburgh; Dr. Bannerman, Hawick; Professor Hay, Aberdeen; Mr. George Mackay, Perth; Mr. David Dunbar, Dumbartonshire. Secretary to the board, George Middleton. Parliamentary Bills Committee, the whole Council.

THE ORDNANCE SURVEY.

A REPORT of the progress of the Ordnance Survey to March 31, 1897, signed by Colonel J. Farquharson, the Director-General, is published as a Blue-book. It states that, while all cultivated districts in England and Wales were surveyed before 1890 on the 1-2500 scale, with the exception of Lancashire and Yorkshire, the plans for all the cultivated districts of Lancashire and Yorkshire have since been published. The revision of the maps on the 1-2500 scale was sanctioned in 1886, but the actual work of revision was not begun until 1894. This is attributed to the necessity of resurveying those counties which had been originally surveyed on the 6in. scale. Some delay was also caused by the revisions which had been in progress in London, Plymouth, Glasgow, and the Tyneside towns, but the 1-2500 revision has now been taken up in Middlesex, Essex, Kent, Surrey, Sussex, Hampshire, Buckinghamshire, Hertfordshire, Northumberland, Nottingham, Cheshire, Derbyshire, Glamorganshire, Durham, and Westmoreland. The area revised during the year 1896-97 was 4,623 square miles. The rate of progress, it appears, has varied greatly, progress having been slow where great changes have taken place, as in the neighbourhood of London, and relatively rapid in the agricultural districts. Publication of the revised plans is proceeding, and 3,567 square miles have been published during the year. It is estimated that the arrears will be made up by 1910, and the intention is expressed that after that has been done no sheet shall represent a survey or revision more than 20 years old. Maps on the 6in. scale have been published for all England and Wales. The new series 1in. map is published in two forms —(1) outline and contours, this map being now completed, and combined maps published also for Brighton, Derby, Gloucester, and Cheltenham, Plymouth, Nottingham, Chatham, and Winchester; (2) hill features, the publication of which will, according to existing arrangements, be completed in 1902. The experiment is being made of having some sheets of this map engraved by the trade in order to accelerate the progress of the work. The revision of the 1in. map is being carried out independently of that of the larger scale maps, and it is intended that all sheets should be annually brought up to date as regards railways, canals, and important public works. During the revision certain alterations are being made in this map so as to bring it more into harmony with military requirements without injuring its utility for civil purposes. At the instance of the War Office, an experimental 1in. map in colours has been prepared, by transfer of zinc, of most of the district south of the Thames, and the publication has been sanctioned by the Treasury. The revision of the map issued on the



A FRENCH BED OF THE SIXTEENTH CENTURY.

scale of four miles to an inch is to follow immediately that of the 1in. map. The plans of all towns entitled to a large scale survey have been published, and the survey of London on the 5ft. scale has been revised and extended.

Details are also given in the report of the progress of work with regard to Scotland and Ireland and the Isle of Man. In the case of both Scotland and Wales the corrections of place-names which have been found necessary have been found to be comparatively few. Reference is made to the entire change that has been made in the system in force for the sale of the maps to the public. No comment is made on the degree of success resulting from this change, but the list of the total values of the maps sold each year show that, while from 1889 to 1893 the annual value varied between £13,000 and £13,700, increasing to £14,903 in 1894 and £15,497 in 1895, the amount reached £17,715 in 1896-97. Index maps are appended to the report showing the periods which have elapsed since the dates of the surveys of the various counties, and other particulars as to revision and publication.

FRENCH BED OF THE SIXTEENTH CENTURY.

THIS handsome couch of the four-poster type is a fine example of the refined work done in France towards the end of the 16th century. Most of the members of cornice and of the sides and end of bed are carved with varied enrichments. The four posts are also richly ornamented with fluted columns, terminated half-way up by caps of a Composite description. The bed is kept well off the floor by feet.

RESERVOIR DAM PROFILE.

THE value of curved dams on plan has received much attention from engineering experts. The Aqueduct Commissioners to the Quaker Bridge Dam, in their report on the design of the profile, speak favourably of the value of the curved form for a narrow deep gorge, as its arched action comes into play. They say: "If the radius is short, the cross-section of the dam may be produced below what is termed the gravity section, meaning thereby a cross-section or profile of such proportions that it is able, by the force of gravity alone, to resist the forces tending to overturn it, or to slide it on its base at any point." Even if of long radius, the curved form is said to prove an advantage to masonry construction. The curved form is also more pleasing to the eye than the straight, and satisfies the mind as to the stability, and should be preferred. The conclusions led the experts to recommend the adoption of a certain profile in a curved plan with radius of about 1,200ft. Mr. C. F. Courtney, in his work on "Masonry Dams," noticed last week, lays down the following conditions as to stability:—"(1) No part of the masonry must be in tension; (2) no part of the structure must be under more than a certain pressure from the superincumbent weight; (3) it must by friction alone resist any tendency to slide on its base; (4) it must by its own weight alone be able to resist all tendency to overturn by water pressure, or the pressure of uneven winds, &c; (5) there must be such a width given to the top as to counteract the effects of expansion and contraction." Prof. Rankine points out that theoretically if the limits of pressure fall outside the centre-third of the profile the structure is exposed to tension; the line of pressure therefore falls within the centre-third, for if the requirement as to tension be fulfilled, conditions 2 to 4 are complied with. By aid of the graphic process a number of trial profiles can be drawn, till one be found that will give the required lines. Those who are engaged in sections of this kind will find the formula given by Mr. Courtney for ascertaining the theoretical profile of service. It is fully worked out in figures, and the author says it meets rigidly the requirements of stability. The detailed calculations of a masonry dam, 100ft. high, is given in tabular form. The formula gives a profile of polygonal outline which is quite accurate enough for practical purposes.

ELECTRIC LIGHTING NOTES FOR ARCHITECTS.—I.

By AN ASSOC. INST. ELECT. ENGS.

INTRODUCTION AND SCOPE.

THE lighting of buildings by means of electricity has developed to such an extent that it is now important that architects, clerks of works, and all who deal with specifications of buildings, should have some acquaintance with the fundamental principles of this system of lighting; and, believing that those who neglect this branch of building design will have cause for regret, this series of papers has been prepared to give students and others a general idea of the principles involved, and, by explaining everyday terms, and the various systems and devices adopted in practice, to provide an introduction to this branch of electrical engineering, so that advantage may be taken of the standard textbooks and journals dealing specifically with electric lighting problems. And, whilst it is not expected that architects should become electrical engineers, it is not too much to hope that they may possess such a knowledge of electric lighting which will enable them to work intelligently with the electrical engineer when circumstances demand joint responsibility. At the same time there are many cases, especially with private installations, when much preliminary work may be undertaken by the architect, whilst in all cases an acquaintance with the principles of electric lighting cannot but be of use to him.

To make the series complete it will be necessary to deal first with some elementary facts relating to electrical energy, and to introduce and explain such terms, units, and laws as must of necessity frequently occur in these articles. And here it may be observed that, when we explain electrical phenomena by means of comparisons with other better known phenomena, the analogy given must be limited to the statement made, and must in no case be taken to apply to other electrical phenomena.

Our subject naturally divides itself into three parts: (1) electrical energy and its production, (2) its distribution, and (3) electric lamps and light. The generation of electricity, important as it may be to the electrical engineer, is, to some extent, outside the province of the architect; consequently, it will receive only passing notice, due prominence being rather given to distributing arrangements of a permanent character, so that efficiency, durability, and security may be attained.

However interesting it might be, we must pass over the consideration of the purely physical phenomena connected with our subject, and consequently can only say a few words about electricity *per se*. To be concise, we may say that electricity is one of the mysterious forces of nature, and, like heat and light, it may be defined as a form of energy; and, although it is convenient and usual to compare the transference of electricity along a conductor to the flow of a fluid in a pipe, there is nothing materialistic in its nature, and the comparison is purely and simply arbitrary; as a matter of fact, its innate nature is beyond our present knowledge. We know how to produce it, and also how to use it; and we shall assume that it is common knowledge that certain effects are always produced, and always accompany the transference of electricity from one point to another. In electric lighting, for instance, the heating effect of an electric current is utilised to produce light, and, in fact, speaking generally, the existence of a current of electricity can only be recognised by the effects its produces. It is also remarkable that these effects may be concentrated to any degree and wherever they may be required, and it is in consequence of this that electrical energy is of immense practical value.

We shall also assume that everyone knows that electricity may be produced in a variety of ways, i.e., by friction, by chemical and by mechanical means, and that in each case the substance electrified is capable of doing work; in other words, electrification is accompanied by the production of energy. Electricity, produced by means of batteries (chemical means), is suitable for experimental and signalling purposes, whilst for commercial undertakings on a large scale, electricity is produced by mechanical means, and we have for lighting purposes to depend upon the dynamo as a generator of electricity; presently, we shall have to deal in a very brief manner with different types of these generators and generating stations. Before, however, we can make much progress with our subject proper, it is very important that we should have a thorough grasp of those factors which comprise an electric circuit; the first of these—*current* and its unit, the *ampère*—will now be considered.

CURRENTS OF ELECTRICITY—THE COULOMB—THE AMPERE.

Commercially, we are concerned mainly with electricity in motion, and, in ordinary parlance, we speak as if electricity were passing or flowing along a conductor, just as water flows along a pipe, and it is from this arbitrary notion that we get the idea of currents of electricity; and, when we remember that the word current means simply rate of flow, we shall understand that the term current of electricity means rate of flow of electricity. And, just as we can measure the rate of flow of water, so we can measure currents of electricity, and in definite units, too, great care

having been taken to arrange a comprehensive system of electrical units. The system of units was legalised by the Board of Trade in 1894, and the student cannot pay too much attention to the study of electrical units and standards. The unit quantity of water is the gallon, cubic inch, or cubic foot, whilst the unit quantity of electricity is termed the *coulomb*. The unit rate of flow of water is the gallon per second, cubic inch, or cubic foot per second, as the case may be; similarly, the unit of an electric current or unit rate of flow of electricity is the coulomb-per-second, or *ampère* as it is called.

These units are defined by the Board of Trade as follows:—The coulomb or unit quantity of electricity is that definite quantity which, when passed through a solution of nitrate of silver in water, deposits 0·001118 of a gramme of silver. The ampère is the name of unit current, and is that unvarying electric current which, when passed through a solution of nitrate of silver in water, deposits silver at the rate of 0·001118 of a gramme per second.

We thus see that a current of electricity of an ampère's strength does a definite amount of work per second, this unit conveying the idea of *rate* of transfer; as an example, we may mention that many glow-lamps (120 volts.) give 16 candle-power of light when supplied with electricity at the rate of half a coulomb per second—that is, with half an ampère. Currents may be measured in a variety of ways, the commercial instruments for measuring ampères being termed ampère-meters or ammeters. These we shall consider when dealing with equipments; for very small currents a secondary unit, one-thousandth part of the ampère, and called the *milliampère*, is used in practice.

CONDUCTION OF ELECTRICITY — ELECTRICAL RESISTANCE AND ITS UNIT, THE OHM.

The idea of electricity being in motion implies some conducting channel, and the whole path traversed by electricity is said to form an electric circuit. As we have already inferred, some metal in the form of wire is generally the medium by means of which electricity is transferred from one point to another, and it is an advantage when an electric circuit consists of a material, or materials, which allow electricity to pass easily. Materials that do this are called conductors, and since conductors vary greatly in their conducting powers, it is very important to know the degree in which conductors differ in this respect. This statement implies obstruction to a greater or less extent to the passage of electricity, and it is because of this obstruction that the magnitude of currents to a certain extent is limited. This property of conductors, obstructing and limiting the quantity of electricity passing through a circuit is analogous to friction, and is termed electrical resistance. Resistance, then, may be defined as the obstruction which electricity encounters when traversing a conductor. A good conductor offers little resistance, whilst a bad conductor offers so much resistance that it is often used to confine the electricity along a definite channel; it is then termed an insulator. All substances, however, conduct electricity more or less, and, whilst there is no substance which offers no resistance, there is no material known which obstructs the passage of electricity absolutely, nor is there any clear dividing line between conductors and insulators.

Since the magnitude of a current of electricity is limited under certain conditions by this obstruction offered by conductors, it is obvious that the resistance of conductors plays a most important part in the distribution of electricity for commercial purposes, and in practice we often require to compare and measure the resistance of conductors with great accuracy; consequently, a standard is required, and a suitable conductor of convenient form, given dimensions, and definite physical condition, has been chosen, the electrical resistance of which is the unit of electrical resistance known as the *ohm*. The Board of Trade specifies that the ohm, the unit of resistance, shall be that resistance offered to an unvarying electrical current by a column of pure mercury, 106·3 centimètres long, and of a constant cross-sectional area of one square millimètre at the temperature of melting ice. Very often a symbol —the small Greek letter omega, ω—is used as an abbreviation for the term ohm. Thus, 10^{ω} means 10 ohms.

The factors which individually and independently affect the resistance of a conductor are the dimensions, the material, the temperature, and physical condition generally.

Now, just as a long pipe offers more resistance to the flow of water in a pipe than a shorter one of the same diameter, so the resistance of a conductor to the passage of electricity is directly proportional to the length. Increased length gives increased resistance. The resistance also varies inversely as the area of the cross-section of the conductor. Doubling the area of a conductor allows twice the number of ampères to pass, other things remaining the same; in other words, the resistance is halved. Algebraically—

$$R \propto l \text{ (resistance varies as the length)}$$

$$R \propto \frac{1}{A} \text{ (resistance varies inversely as the area)}$$

Combining these expressions, we get—

$$R \propto \frac{l}{A} \quad \ldots\ldots\ldots\ldots \quad (1)$$

where R = resistance in ohms, l = the length in centimètres, and A = area of cross-section in square centimètres.

Again, with a pipe of given dimensions the quantity of water flowing through it, under given conditions also depends upon the material and the nature of the inside surface of the pipe, and in a similar way electrical resistance varies with different materials and their physical conditions; in other words, resistance is a physical property of the conductor itself. And, since this physical property, electrical resistance, varies with different materials, the resistance of a mass of known volume of the various materials in a definite form is accurately determined. To do this a centimètre cube—a cube each side of which is one centimètre long—is interposed in an electric circuit, and the resistance offered to the passage of electricity between two opposite faces of the cube at a temperature of 0° C. is found in terms of the ohm. This resistance when exactly determined is of the nature of a constant, and is known as the specific resistance or resistivity of the material. As the specific resistances are very small quantities, it is more convenient to express the resistivity of a material in microhms (millionths of an ohm). Thus the resistivity of a sample of nearly pure copper was found to be 0·000001561 of an ohm, or 1·561 microhms.

Usually the Greek letter σ (Sigma) is used to denote the specific resistance or resistivity of a substance; so that—

$$R \propto \sigma \quad \ldots\ldots\ldots\ldots \quad (2)$$

And, combining this with the expression given in equation (1), we obtain the relationship between the resistance, dimensions, and material of a conductor—*i.e.*,

$$R = \frac{\sigma \cdot l}{A} = \frac{\sigma \cdot l}{\pi r^2} = \frac{4 \sigma \cdot l}{\pi d^2} \quad \ldots\ldots\ldots \quad (3)$$

which enables us to calculate very readily the resistance of a conductor; r and d are the radius and diameter respectively.

Again, the resistance of a conductor also depends upon the purity of the material, the degree of hardness or softness, &c. Also, when the material of a conductor is an alloy, its resistance is always higher than that of the individual metals forming the alloy. It will not be out of place here to point out that the magnitude of the current itself does not exert any influence upon the resistance of the conductor through which the electricity is passing, except in so far as it changes the physical state of the wire—as, for instance, by raising the temperature of the wire. The effects of these changes will be considered in detail later on.

It will no doubt appear strange that, whilst high conducting power is considered the essential property of a conductor, a unit of the negative or converse property has been chosen for purposes of reference, instead of a unit denoting the facility with which a material permits the flow of electricity. For some problems, however, such a unit is desirable, and is often used in calculations. Now, the property which a substance has for conducting electricity is termed "conductance." Conductance is the converse of resistance, and is measured in terms of a unit which is the reciprocal of the ohm, the unit of resistance. This unit is termed the *mho*, an inversion of the word "ohm"—that is, *mho* is *ohm* written backwards. The mho is the conductance of a column of mercury 106·3 centimètres long and 1 square millimetre in sectional area at 0° C, and it is evident that a conductor of R ohms resistance will have a conducting power of $\frac{1}{R}$ mhos. Conductance, then, is determined by dividing unity by the resistance in ohms. On account of its high conducting power, copper is used almost universally for conducting cables.

As is well known, electricity for lighting purposes has often to be carried considerable distances, and consequently whilst conductors should have little resistance that they may form an easy path for the electricity passing, it is at the same time essential that means should exist for confining the electricity in a definite path; otherwise it will be found that it is the nature of electricity to take shorter paths so as to complete the circuit in a way not to be desired. Nature fortunately provides us with a plentiful supply of both conductors and insulators, giving us a large variety of materials which differ widely in their conducting powers, so that by making a judicious selection from these materials we are enabled to use conductors permitting electricity to flow easily, and at the same time to inclose the conductors with insulating materials or insulators, giving us unlimited control over the current and the path, so as to prevent leakage, waste, and danger.

Insulating materials are those which have high resistances, such as dry air, glass, porcelain, stoneware, slate, mica, ebonite, shellac, paraffin, resin, and bituminous compounds, oil, india-rubber, guttapercha, paper, cotton, silk, and wood. The specific resistances of these substances are so high that we express insulation resistances in terms of a secondary unit, one million times the size of the ohm, which is termed the megohm. One megohm equals 1,000,000 ohms. The symbol for megohm is the capital Greek letter Omega, Ω. Thus 100 Ω means 100 megohms. The insulation resistance, for instance, of a thoroughly well-insulated cable used in electric-light circuit varies from 200,000,000 to 5,000,000,000 ohms per mile —that is, from 200 to 5,000 megohms per mile.

The megohm-mile is a unit of resistance denoting the average insulation resistance of one mile of insulated cable. Insulation resistance decreases with length of cable and increases with thickness of covering. It varies considerably with atmospheric changes, and changes in temperature, decreasing greatly with increase of temperature and addition of moisture. In the proper place we shall deal with different types of cables and methods of insulating the same, and shall give directions for using the right kind for the various purposes for which they may be required.

(*To be continued.*)

CONSTRUCTION OF ARCHES IN CONCRETE.—XI.

WE shall now pass on to review the experiments and tests carried out upon arches constructed of different materials, but having the same span and other details in common, so far as the circumstances and conditions of each case would permit. These tests are particularly interesting and valuable, insomuch as the length of the span of each description of arch was 76ft., a dimension which raises them far beyond the amateur or toy phase, and places them in the rank of practical working structures, and thoroughly fit to do their duty as road or railway bridges. One great desideratum when subjecting the arched type of construction to actual tests, and those of a severe character, was fortunately secured—that is, a firm and solid stratum to build the points of support upon. The examples selected for the experiments we are about to describe were five in number, and were constructed respectively of stone, brick, ordinary well-rammed concrete, Monier cement on the compound system, and of steel. The loads were composed of old rails, piled up in gradually successive layers or tiers, commencing at one point of support, and carried up to the crown of the arch only, so that they were distributed uniformly over one half of the span. It is obvious that this condition could only obtain in practice when the rolling load was advancing across the arch; but, as this arrangement tries its powers of endurance and resistance to the maximum limit, it constitutes a very suitable and appropriate standard according to which to dispose the loading. It should be kept in view that in the arch, as well as in every other similar constructive design, it is not the absolute amounts of the dead and moving or live loads, regarded separately, which chiefly affect the resulting stresses, but the proportion which exists between them; in other words, the greater the disproportion or discrepancy between their respective amounts the more disadvantageously do they affect the structure when the greater

FIG. 2

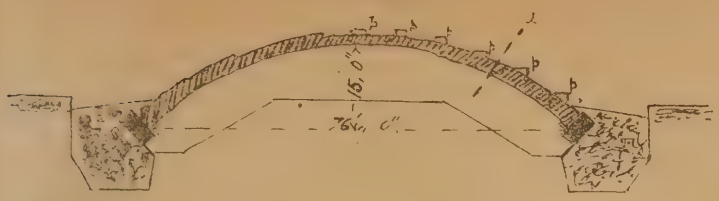


FIG. 1.

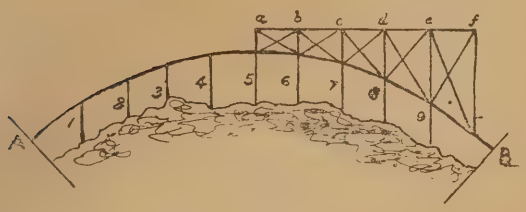
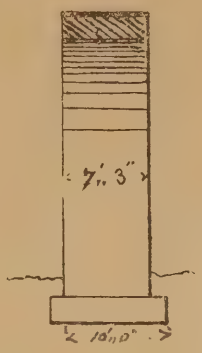


FIG. 3.



loading is on the live side. When a bridge reaches a very large span its dead or insistent weight becomes of such magnitude that the rolling or live load may be practically neglected. It would, in fact, produce no more effect upon the bridge than would a bluebottle fly walking across a 3in. plank.

A reference to Fig. 1 will show the manner in which the arches were supported and the platform erected upon which the numerous tiers of rails were accumulated. Underneath the arch, which is represented in skeleton elevation in Fig. 1 by the curved line A B, five masonry pillars were built, corresponding to the odd number s1, 3, 5. . 9 in the elevation. Each pillar was 3ft. 4in. by 7ft. 6in., and carried all the temporary scaffolding and centring. In order that the uniform distribution of the load should be completely guaranteed, a platform *a b—f* was built on the top of the arch. The platform was supported by six steel pillars upon small pedestals, raised about 1ft. above the level of the arch, and strongly braced together by diagonal struts and ties; the total weight of the platform and pillars amounted to 15 tons. In proportioning the dimensions of the steel pillars it was estimated that a load of two tons per square foot would not exert a correspondingly greater stress upon them than six tons per square inch—a very fair margin for good mild steel.

Of all the arches tested of the span of 76ft. that constructed of brick proved to be the weakest and the strongest, but we must not anticipate. We shall commence with the weakest, an elevation of which is given in Fig. 2, and a transverse section through the crown in Fig. 3. The principal dimensions, which will answer for all the bridges to a certain extent, are span = 76ft. rise = 15ft. radius of intrados = 55ft. The width of the arched rib was 7ft. 3in., the depth at the crown 2ft., and at the springings 3ft. 6in. Machine-made bricks were used throughout, and when subjected to separate preliminary tests evinced a very remarkable degree of strength and excellence. The arch was turned in Portland cement mortar, mixed in the proportions, by volume, of one part of cement to two and a half parts of clean, hard, sharp sand. About one-third of an inch was allowed for the joints, and, without entering into further details, it may be stated, once for all, that no precautions were neglected to insure the best materials and first-class workmanship. The arches of bricks and of stone were erected parallel to one another at a distance of 27ft. apart, from centre to centre; both were allowed to remain *in statu quo* upon the centring for six weeks subsequent to their building before the experiments were commenced. As it was especially important to detect and register the incipient signs of the smallest cracks when the centres were "struck," the faces of the arches were coated with a thin layer of fat lime. It was not until a load amounting to 43 tons was placed, uniformly distributed over one-half of the arch, that cracks began to come into evidence. They first appeared at a distance of about 5ft. from the springing of the loaded half of the arch, were of quite insignificant dimensions, and, what is somewhat singular, had their origin in the extrados of the arch. When the load was increased to 57 tons, which is equal to 0·25 tons per square foot on the half span, the number of the fissures increased, and spread themselves over the whole width of it. At this stage of the trial the load was removed, and the result that followed deserves to be noted. It was observed that the fissures completely closed up, but, at the same time, the arch did not return to its normal contours, thus clearly demonstrating that it had undergone, however slight, permanent deformation, the maximum deflection amounting to $\frac{1}{4}$in. Upon reloading the half-arch as before, the following facts were recorded:—Not only was there a large increase in the previous deformation, but the old cracks reopened, accompanied by others, which continued to augment, both in number and magnitude, until the point of failure was attained; which occurred when the total load was raised to 1·7 tons per running foot. Contrary to what generally occurs in similar experiments, the rupture was not of a violent, nor of an exceptionally sudden character, but took place in a very gentle and gradual manner. At the time of failure the maximum deformations or deviations from the original position of the axis of the arch amounted to 1·2in. measured in a vertical direction, and to 0·82in. when measured in a horizontal sense—that is, the maximum deflection under the breaking-load is given by the former dimension, and the greatest lateral displacement by the latter. It would appear that the failure of this example was due, not so much to any weakness in the resisting powers of the bricks, as to that of the mortar. The fissures, which extended along the whole width of the arch, were found to follow very closely the line of the joints, which tends to indicate that they were more or less separated by the tensile stresses acting upon them. On the other hand, the bricks yielded only at one point, situated at a distance of nine or ten joints from the springing of the unloaded half of the arch. The actual point of final breaking occurred at the section, *x y*, in Fig. 2.

Similar experiments were conducted upon an arch of stone of the same dimensions, and built with the same description of mortar as the example of brick just described. The stones were dressed only on the intrados, so as to obtain a firm bedding on the lagging boards of the centring and upon the heading joints, the other faces being left rough. It will be seen as we proceed that the stone arch manifested a far greater degree of solidity or resistance to deformation than that built of brick, for whereas, when the centres were struck, the greatest deflection in the former amounted to only $\frac{1}{50}$th of an inch instead of $\frac{1}{4}$in. as in the latter case. Similarly to the arch of brick, the stone in the other example showed only one weak point, placed about 22ft. from the abutment on the loaded half of the structure. The influence which the character of the masonry exercised upon the strength of the joints deserves mention, and the attention also of those engaged in the building of stonework and brickwork. As the test progressed it was noted that the mortar adhered far more firmly and tenaciously to the rough faces of the stones than it did to the dressed faces. It has long been known that roughly hammer-dressed stones, such as those used in rubble masonry, whether coursed or uncoursed, or even rude random work, made a better bond than the cut stones in ashlar work, although, for the sake of uniformity and appearance, the latter must be employed for large and important public edifices. One circumstance probably tended to this disintegration of the joints in the mortar. The stone employed was of a very hard description, and consequently endowed with but a very limited degree of porosity, and thus, probably, especially owing to the little time allowed, was not able to absorb or become intimately associated with the mortar. In a few cases a sudden shock quite spoiled the joint, although previously the stones appeared to be set as closely as possible.

So soon as the aggregate of the loads reached two tons per foot run, equal to about a quarter of a ton per square foot, the stone arch began to show signs of distress, and the accompanying deflections were 0·4in. and 0·3in. in the vertical and horizontal directions respectively. No new cracks were developed during a period of repose permitted the structure for three or four days; but, directly the loads were again increased, fresh fissures occurred on both faces of the arch, and extended throughout the whole breadth, as also happened with the brick specimen. These fissures, as was universally noticed, were accompanied by correspondingly-increased deformations which manifested themselves slowly, and, as it were, with gravity and dignity. While putting on a last charge of rails the arch gave way; the total breaking weight amounted to 74 tons, which is equal to 0·33 tons per square foot. With the exception of the cleft taking place near the springing of the unloaded half of the arch, all the others occurred parallel to the extrados, and were not in evidence until the point of failure had been very nearly determined. The difference to be remarked in the behaviour of the two arches under test is, that the one of brick suffered rupture from the action of compressive forces, and that of stone from those of an opposite nature. The experiments conducted with the arch of concrete next claim our attention.

UNIVERSITY COLLEGE, LONDON.

THE following prizes and certificates have been awarded in the courses of architectural lectures and architectural and constructional drawing and quantity surveying at University College, as the result of the work and examination of the Session 1896-1897:—

ARCHITECTURE.—Professor T. Roger Smith, F.R.I.B.A.

FINE ART.—Donaldson Medal: M. H. West, of Maidenhead. Prize, G. G. Lean, of Isleworth. Third Class, E. Martineau, of Hastings.

CONSTRUCTION.—Donaldson Medal: C. F. Dawson, of Barking. Prize, F. J. Freeman, of Blackheath. Second Class, H. S. R. Boyajian, of Kharput; G. G. Lean, of Isleworth. Third Class, E. Martineau, of Hastings; W. P. D. Stebbing, of London.

CLASSES MAINTAINED BY THE CARPENTERS' COMPANY: ARCHITECTURAL DRAWING.—1st Prize, J. Porter, of London; 2nd Prize, P. H. Pape, of London. Certificate, 3*, E. Desch, of London.

CONSTRUCTION DRAWING.—1st Prize, A. E. Stump, of London; 2nd Prize, W. Smalley, of London. Second Class, A. S. Kilby, of London; A. Pethybridge, of London; A. Thwaite, of London.

QUANTITY SURVEYING.—ELEMENTARY CLASS: Prize, W. B. Payne, of London. ADVANCED CLASS: Prize, H. C. Simmons, of London. Second Class, T. A. Burr, of London; W. Smalley, of London. Third Class, H. B. Ward, of London.

HEALTH RESORTS AND MEDICAL GEOGRAPHY.

A VERY instructive paper on Medical Geography is given in the *Lancet* of July 31, by Alfred Haviland, M.R.C.S. He shows by means of coloured maps that the high-mortality groups which "in every case skirt the lower courses of fully-formed rivers that seasonally flood their riparial districts, instances of which occur on the east and south coasts from the Tweed to the Devonshire rivers, between which extremes will stand out the blue colouring of high mortality along the rivers Tyne, Swale, Humber, Welland, Trent, Ouse, Yare, the East Anglian rivers, Thames, and the south coast rivers. The Thames basin has long been known as one of the great cancer fields of England and Wales." Mr. Haviland shows that cancer affects the river-valley systems, which, when sheltered, harbour the *materies morbi* of rheumatism. In the Isle of Man the author found the water-logged valley between Douglas and Peel subject to the prevalence of cancer, whereas in the elevated localities, such as Manghold, Lonan, and Malew, characterised by a large area of limestone, there has been the lowest death-rates from malignant diseases. Mr. Haviland's remarks mainly refer to the disease distribution in the Isle of Man; but, of course, the

same conditions will be found to operate in England and all other places. This geographical distribution of phthisis and cancer, heart-disease and dropsy in females is a most important study as an aid to clinical medicine, and it has an interest also for all who are in the habit of seeking changes for health, and to the building community. The architect should know the facts, and we think Mr. Haviland's coloured maps will be of service. The author points out that in the centres of the mountain masses valley-room for the erection of cottages where protection would be afforded to the lung-tainted visitor, who would find the purest elevated climate and protection from wind. Instead of building hospitals for phthisical patients, cottages should be so constructed as to revolve on a turntable, and be adjusted to meet the varying sun and wind changes. The Isle of Man possesses extreme climatic conditions, owing to its physical configuration. For those who want a health change, a knowledge of where to go to avoid increasing the hereditary taint of disease is of the utmost importance from a medical point of view.

UTILISATION OF A "MOSS" ESTATE.

THE Cleansing Committee and the Parks Committee of the Manchester Corporation made a visit of inspection on Monday to the Carrington Moss estate. The Carrington Moss estate is, says the *Manchester Guardian*, about ten miles from Manchester, to the north-west of Sale. It was purchased by the Cleansing Committee in 1886, in order that the Corporation might be enabled to dispose of the refuse and other matter from the southern portion of the city. Of this, many thousands of tons are collected annually, and one of the great difficulties that then lay before the City Council was how to dispose of it to the greatest advantage to the community. When the estate was bought from the trustees of Earl Stamford, it consisted for the greatest part of wild, boggy moss land. There were 600 acres of wild moss, wholly unreclaimed, 209 acres of cultivated moss, 282 acres of cultivated land, and nine acres of roads, altogether 1,100 acres. The purchase cost of the estate to the city was £38,000. The committee in whose charge the land was placed at once began to use means to bring the whole of it under cultivation, utilising the refuse and nightsoil collected for a top-dressing to the moss. They laid out a sum of about £80,000 for light railways, of which some twelve miles have been laid, for roads, which have also been cut and metalled for a similar length, and for drainage, rolling stock for the railway, buildings, and other necessary works. The development of the estate has been so successfully carried out that an estimate prepared by the city surveyor, Mr. T. de Courcy Meade, places the value of the property at some £12,000 higher than its cost to the city. The whole moss, in fact, has been developed into highly cultivated farm and garden land. Refuse is conveyed daily in barges along the Ship Canal to a wharf which lies near the border of the reclaimed moss. From the barges the refuse is lifted into tanks, and taken to convenient points for redistribution over the ground. Of the whole estate the Cleansing Committee farm about 400 acres, a considerable portion of which is under tillage, and the remainder is laid down to grass. A homestead has been built for the farm bailiff, Mr. J. M'Connell, and cottages have also been provided for the use of the workmen on the farm. The other land is let off for farming, and the tenants are supplied with manure by the committee. Since 1890 more than 425,000 tons of collected matter have been distributed over the various parts of the moss by the use of the light railways. Now that the whole of the property has been brought under cultivation it will be necessary to reduce the quantity of surface matter spread on the land, as the power of absorption by the soil has, necessarily, been diminished. In future, the occupiers of the land will be furnished with 20 tons of manurial matter per acre annually, and the surplus will be conveyed to the Chat Moss estate, which has been recently purchased. At the outset the bog land was thoroughly drained, and the percolation of water that is continually in progress is so great that, notwithstanding the constant additions of top dressing in soil, there is always a well-defined sinking of the land. The surface soil is shallow, but scarcely anything could be better adapted to the cultivation of root crops. The yield of roots this year will be particularly heavy. Oats have also been grown in abundance. These are sold by the committee, at the ordinary market value, to the other committees for use in the Corporation stables, and so much of the hay as is not used for dairy purposes is, of course, dealt with similarly. A considerable profit has, for some years been made on the working of the farm. The land taken by farmers is used as dairy and vegetable farms, and many tons of produce are annually sent into the Smithfield market. Not far from the Corporation homestead the Cleansing Committee have placed about seventy acres of the reclaimed moss in the charge of the Parks Committee. This change was made a few years ago on the proposal of Mr. Needham, who suggested that shrubs and the smaller kinds of trees might there be grown for use in the parks and the city squares. Five acres were at first laid out, and it was then seen that much more land might with advantage be utilised. Additions to the plantation have, therefore, been made from year to year, and another plot of land will in a few weeks be added to this new Manchester arboretum. The golden elders that are placed during summer in the city squares are grown on what a few years ago was unreclaimed moss. There are acres of rhododendrons awaiting transplantation, besides poplars and other trees, which flourish in a peaty soil. Forest trees, whose roots strike deep, will not develop in the subsoil, but the birch and also the privet flourish well, and flowers grow in abundance.

THE DISTRICT COUNCILS (WATER SUPPLY FACILITIES) ACT.

A BILL known as the District Councils (Water Supply Facilities) Bill, which was drafted by Mr. J. A. Davenport, M.S.A., the engineer and surveyor of the Nantwich Rural Sanitary Authority, was promoted in Parliament last session by Col. Cotton Jodrell, Sir Jno. T. Brunner, Mr. Henry Tollemache, and other Cheshire members, who were successful in passing it through all its stages, and it now occupies a place on the Statute Book as 60 and 61 Vic., ch. 44. Mr. Davenport and the Nantwich authority have for years, says the *Chester Chronicle*, shown a high sense of their responsibilities to the ratepayers, especially in regard to the all-important matter of a water supply, and as a result of a meeting between Mr. Davenport and the agents of some of the larger estates in his district, a voluntary arrangement was effected under which tenants were to submit to a penny water rate, to pay a minimum of 10s. for each house supplied with water, while the owners were to make good the difference between income and expenditure for 30 years, when their contributions ceased, the amounts borrowed having in the mean time been cleared off. The arrangement worked splendidly, but under it the sanitary authority incurred certain risks. There was no power to compel a landowner to join in the agreement, and holders of settled estates found a difficulty in charging them for purposes of water supply. Nor was there responsibility, legal or otherwise, to compel their successors to recognise the agreement. Smaller properties are constantly changing hands, and their owners are naturally chary about accepting responsibilities that might affect the selling value of their lands and tenements. The Bill which has now become an Act was promoted to meet this difficulty. Col. Cotton Jodrell, Sir John Brunner, and Mr. Tollemache introduced the Bill, which after its second reading was made a Government measure, and the rest was plain sailing. To those gentlemen, and especially to Mr. Davenport—all of whom were accorded a special vote of thanks at last Saturday's meeting of the Nantwich Rural Council—the public in rural districts, from the cottager to the landowner, will feel grateful for their having been the means of passing into law an arrangement beneficent in its purposes and far-reaching in its scope. The following memorandum, issued by Government, will give an idea of the provisions of this useful measure:—

"The object of this Bill is to give facilities to district councils to make arrangements with landowners to charge their estates for the purpose of assisting in the provision of a supply of pure water thereto. At present limited owners and their powers come under the Reservoirs Act, 1877, by which they have power to carry out the supply by going to land improvement companies, spending their own money, or borrowing it, the sanction of the board having to be obtained thereto. This Bill provides that all owners, limited or otherwise, may make arrangements with rural district councils, with the concurrence of the Board of Agriculture. The advantage of the Bill is that in rural parishes it often occurs that a long extension of water-main cannot be supplied without the assistance of the owner, as the rate for carrying out the work would be too heavy a burden for the (townships or) parishes concerned. The bill gives power to all owners to charge their estates, or provide the money for this purpose. Under this Bill, also, where a long extension of main is contemplated, all owners, large or small, can combine to supply the need, whereas, under the Reservoirs Act, each individual owner can only act for his own estate. In the case of 'partial action'—that is, where only part of a parish or township had to be supplied—the non-receiver of the water would object to the special rate. The Bill does away with this difficulty. The cases where local sewerage works have been opposed by other ratepayers may be cited in support of the above. As an example of the effect of the Bill in a union where its principles have already been applied (by mutual arrangement, and by the zeal of the surveyor), about 120 miles of main have been constructed, supplying some 3,000 houses, which could not otherwise have been so treated, and applications for the water are still coming in from owners and occupiers all round. The bill is permissive."

WROUGHT-IRON AND STEEL IN CONSTRUCTIONAL WORK.—XXIX.

BEFORE giving illustrations of the methods of jointing the members of structures, a single article may be appropriated with advantage to the estimation of the strength of beams or girders, confining the remarks thereon to common sections having solid webs only. The proportioning of large braced girders, bridges, roofs, &c., is too extensive to be included in the scope of these articles.

The function of a beam or girder is to resist a bending moment acting upon it, which bending moment is composed of two factors, load and leverage. In a simple cantilever, such as a joist projecting from a wall and loaded at the end, the greatest bending moment will be $W \times L$; where W = weight applied at the end, and L = the projection or distance of weight from wall. If the load is distributed over the length of the cantilever, the formula becomes $\frac{W \times L}{2}$, because the centre of gravity of the weight is half-way along the cantilever. If a beam is supported at both ends and loaded in the centre, the greatest bending moment is $\frac{W \times L}{4}$, where L = the span or distance between supports. If the load be distributed, the formula becomes $\frac{W \times L}{8}$.

By fixing the ends of a girder its carrying capacity is increased; but, at the same time, the point of greatest bending moment is affected. In the case of the cantilever the greatest bending moment occurs at its junction with the wall or support; in the case of the beam simply supported at the ends, the greatest bending moment occurs at the centre. When a beam is properly fixed at both ends and loaded in the centre the formula is $\frac{W \times L}{8}$, but the greatest bending moment occurs both in the centre and also at the ends. This affects the formation of the girder, insomuch that in the simple supported case the bending moment dies away towards the supports, and so the section may be gradually lightened by either omitting flange plates, or by curving the girder so as to decrease its depth. But in the case of a beam having fixed ends and being loaded centrally, the same section must be maintained at the ends as in the centre; for a girder with a uniformly distributed load and ends fixed, the greatest bending moment is $\frac{W \times L}{12}$ and it occurs at the ends.

To these bending moments must always be added the bending moment due to the weight of the girder itself. This, of course, must be arrived at approximately; generally one is acquainted with former similar work which will form a good basis for other calculations. It is, therefore, useful to note sections and exact weights when obtainable; such notes frequently save time, and give one better and more certain information than a rapidly estimated weight.

There are two methods in general use for calculating the correct section of a girder; these methods are identical in principle, differing only in precision of result. The first method simply consists in dividing the bending moment by the effective depth of the girder. This gives at once the load upon the tension and compression flanges, from which it is easy to arrange a plate and angle section to suit. The effective depth of a girder is properly the distance between the

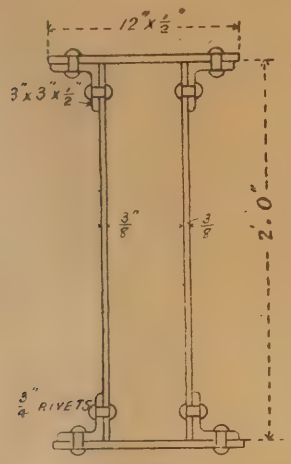


Fig. 183.

centres of gravity of the flanges, and is usually taken at the depth of the web-plate in plate girders having one or two flange-plates. Care must be taken when calculating the area of the tension flange to allow for the presence of rivet-holes; these may be ignored when considering the area of the compression flange, because the shanks of the rivets transmit the compressive stresses. At first sight this would appear to point to a difference of area in the two flanges. This difference, however, is lessened by the relative strength of wrought iron in tension and compression. The tensile strength of wrought iron is about 22 tons per square inch; its compressive strength is only 18 tons per square inch. When this is taken into account the difference in the flange areas will not be much. There are, however, practical reasons for using the same plate and angle sections in both flanges. As a broad principle, it is wise to aim at simplicity and uniformity in constructional work, because it involves less labour and less liability to error, while the additional weight sometimes entailed is seldom of any moment. An example of this method of calculation may be useful.

Given a case of a girder which has to sustain a bending moment of, say, 1,200 inch-tons, including that due to its own weight. The depth of a girder is generally about from $\frac{1}{12}$th to $\frac{1}{20}$th of the span, and is understood to mean the depth of the web-plate. We will assume a depth of 2ft. in this case, the load upon the flanges will then be—

$$\frac{\text{bending moment}}{\text{depth of girder}} = \frac{1200}{24} = 50 \text{ tons.}$$

Note that the depth of the girder is figured in inches, because the bending moment is given in terms of inches—i.e., in inch-tons; if it were given in foot-tons, it would be necessary to put the depth of the girder in feet.

Putting the safe load on the material—wrought iron—at five tons per square inch in tension, we shall require an area of $\frac{50}{5}$ = 10sq.in. in the tension flange. This area must be provided by the angles and flange-plate, minus the two rivets connecting them together. It is usual to ignore the web-plates when calculating the strength of a girder by this method. Obviously this flange area may be made up in many different proportions of plates and angles: we may use a narrow and thick flange with a single web-plate, or a wide and thin flange and two webs, thus forming a box girder. The length of the girder and the duty it has to perform govern to some extent its width; if it is a long girder and subject to live loads or vibrations, it will be wise to adopt a box section with wide flanges, say of half the depth of the girder. Using (Fig. 183) two angles, each 3in. by 3in. by ½in., and a flange plate 12in. by ½in., we get an area of: Two angles, 3in. by 3in. by ½in., minus one ¾in. rivet-hole each = 4·75sq.in.; one plate 12in. by ½in., minus two ¾in. rivet-holes = 5·25sq.in.; total flange area = 10·00sq.in., which will meet the case for the tension flange. Trying these sections over for the compression flange, and ignoring the presence of rivet-holes, we get: Two angles 3in. by 3in. by ½in. = 5·5sq.in.; one plate 12in. by ½in. = 6·0sq.in.; total area = 11·5sq.in. Dividing this area into the load upon the flange, we get a stress of $\frac{50 \text{ tons}}{11\cdot5\text{sq.in.}}$ = 4·35 tons per square inch, which will not be too high in relation to the tension stress of 5 tons per square inch.

In these figures no account has been taken of the web plates, but they should have sufficient area to resist safely the maximum shearing action on the girder. The ultimate shearing strength of wrought iron may be put at 18 tons per square inch, the same as the compressive strength; generally, however, it will be found that girder webs have to be made in excess of the calculated thickness for practical reasons, such as allowance for corrosion and resistance to buckling.

Passing now to the second method of estimating the strength of a girder section:—In the first method the flange area was massed together, and multiplied by one leverage. In this second method every fibre, both of flange and web, acting at its respective distance from the centre of gravity of the section, is taken into account. This involves the calculation of the moment of inertia of the section which, as stated in Article XIX., is an easy matter when dealing with simple sections, but becomes more difficult as sections become complicated. Reprinting for convenience the rule given in Article XIX., we will work out the moment of inertia of a girder section and estimate its strength therefrom. To find the moment of inertia of any cross-section made up of a number of simple figures. Rule:—Find the moment of inertia of each of the simple figures about an axis traversing its centre of gravity parallel to the neutral axis of the complete figure, then multiply the area of each of the simple figures by the square of the distance between its centre of gravity and the neutral axis of the whole figure. Add all the results together for the moment of inertia of the whole figure.

Taking the girder section given for the illustration of the first method of calculation, Fig. 183, the first thing to do is to arrange its elements in a minimum number of simple figures parallel to the neutral axis of the complete section, as in Fig. 184.

It will be noticed that two assumptions have been made—the one that the neutral axis passes through the centre of gravity of the section; the

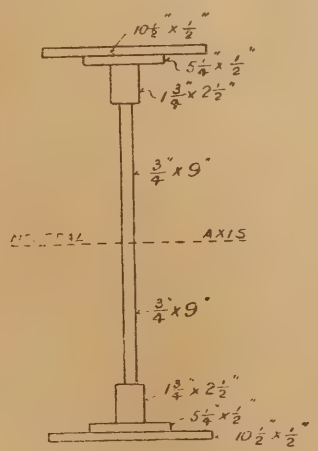


Fig. 184.

other that the rivet-holes are omitted in the compression flange as well as the tension flange. The first assumption, if not strictly correct, is sufficiently near for all practical purposes when dealing with wrought iron or steel. The second is adopted simply for convenience, and is also accurate enough for all ordinary work. By effecting these slight alterations we are able to halve the calculations necessary for finding the moment of inertia. If I is reckoned out for one-half of the section, the operation of multiplying by 2 gives I for the whole section. Taking one-half, then, and putting the necessary letters and figures to it, the dimensions and relations illustrated in Fig. 185 are obtained. By the rule previously stated, we require first the moment of inertia of each of these sections about an axis traversing its centre of gravity parallel to the neutral axis of the whole section. Then—

$$\text{I for A} = \frac{10\cdot5\text{in.} \times \cdot5^3\text{in.}}{12} = \cdot11$$

$$\text{I for B} = \frac{5\cdot25\text{in.} \times \cdot5^3\text{in.}}{12} = \cdot05$$

$$\text{I for C} = \frac{1\cdot75\text{in.} \times 2\cdot5^3\text{in.}}{12} = 2\cdot28$$

$$\text{I for D} = \frac{\cdot75\text{in.} \times 9^3\text{in.}}{12} = 45\cdot56$$

Then multiply the area of each of the simple figures by the square of the distance between its

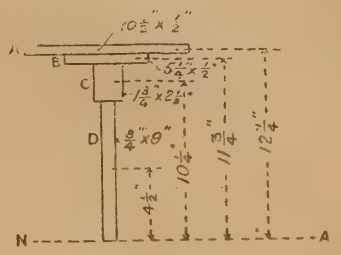


Fig. 185.

centre of gravity and the neutral axis of the whole figure thus—

Area of A × distance² = 10·5in. × ·5in. × 12·25²in. = 787·50
Area of B × distance² = 5·25in. × ·5in. × 11·75²in. = 362·22
Area of C × distance² = 1·75in. × 2·5in. × 10·25²in. = 459·37
Area of D × distance² = ·75in. × 9in. × 4·5²in. = 136·69

Adding the results for the moment of inertia of the whole figures, we obtain—

I for A = ·11
I for B = ·05
I for C = 2·28
I for D = 45·56
Area × d^2 A = 787·50
Area × d^2 B = 362·22
Area × d^2 C = 459·37
Area × d^2 D = 136·69

Total I = 1793·78 × 2 halves = 3587·56.

To use this value for estimating the strength of the section, it is necessary to divide it by the distance of the extreme edge of the section from the neutral axis. By so doing a new value is obtained, which is termed the modulus of the section, which is usually represented by the letter Z. This modulus, divided into the bending moment, gives the stress on the material at the extreme edge of the section. The modulus in the present case is $\frac{3,587}{12\cdot5}$ = 287. Dividing this value into the bending moment, we have $\frac{1,200}{287}$ = 4·18 tons per square inch on the outside fibres of the flange-plates. The difference between this stress of 4·18 tons and the stress of 5 tons per square inch, which was calculated by the first method, is due to the fact that the second method takes the web-plates into account, and as they are taken rather heavy in this case, the difference in stress is more apparent. This second method is, of course, more accurate than the first; but it involves more calculation, which means loss of time, while increasing the liability to error when estimates have to be worked out quickly. Calculating the moment of inertia for any section whatever can generally be accomplished by this method, and the example is given as supplementary to Article XIX., on Columns, as well as for the requirements of the present article.

J. H.

A MAMMOTH CATALOGUE.

Messrs. Young and Marten, of the Caledonian Works, Stratford, are preparing a complete general catalogue for issue presently, which rivals the Directory in size, and probably equals it in usefulness, while the style in which it is being produced entitles it to rank as a *volume de luxe*. It consists of ten volumes, each containing about 450 pages. The paper is of sumptuous quality, and the illustrations unexceptionable.

A more complete compendium of the various requirements of the building trades it would be

impossible to desire. It comprises every class of plumbers' goods, sanitary appliances, builders' ironmongery, metals, oils, colours, artists' materials, joinery and timber, glass of all kinds, lime, cement, slates, tiles, bricks and pottery, felts, laths—indeed, so far as we have tested the comprehensive indexes, there is not an article needed in the smallest shop, or the colossal works of the great contractor, that cannot be selected and priced by its aid.

Customers of the firm know, without our assurance, that this convenient comprehensiveness has always been seconded by high quality, and with the aid supplied by such a catalogue as this, and the immense resources of a firm like Messrs. Young and Marten at his disposal, a builder need never be at a moment's loss.

CHIPS.

The urban district council of Holyhead have obtained the assent of the ratepayers to a proposal to purchase the undertaking of the local waterworks company.

The Sudbury Schools for the Harrow United District School Board are being warmed and ventilated by means of Shorland's patent Manchester grates, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

The urban district council of Kettering have unanimously decided to promote a Bill next session for the purchase from a company of the local waterworks undertaking.

Under the direction of H.M. Board of Works, the life-sized bronze statue of King James II., disguised as a Roman soldier, now in the gardens at the rear of Whitehall-place is now being moved a few yards, into a position where the public will have the opportunity of seeing it more easily. It is being re-erected in the garden of Gwydyr House, and, instead of looking towards the river, his Majesty will face westward, looking on Whitehall and the Treasury buildings.

An examination of master and operative plumbers applying for registration under the National Registration of Plumbers was held on Saturday by the Worshipful Company of Plumbers at the Borough Polytechnic Institute. Five succeeded in passing the examination in practical workmanship.

The memorial stones of new Wesleyan schools at Lowerhouse, Burnley, were laid on Saturday. The schools are being erected at a cost of £2,500, and will provide accommodation for between 500 and 600.

The foundation-stone of new offices and board-rooms for Bucklow Union was laid at Knutsford on Friday. The erection of the buildings, which are estimated to cost £4,500, forms part of an extensive scheme, contemplated for some years, of rearranging the workhouse. Friday's proceedings included the relaying of the original foundation-stone of the workhouse hospital, laid by Lady de Tabley in 1881, and displaced by the extension of the administrative block.

The Port Talbot Railway, which is 17 miles in length, and is expected to be an important adjunct to the Port Talbot docks, now in course of construction, was opened on Tuesday. The cost of the line has been £120,000. The Port Talbot docks are to be completed in the autumn of next year.

On Saturday afternoon Sir Humphrey de Trafford laid the foundation-stone of the new Roman Catholic church for Eccles. The site fronts Liverpool-road, and is adjacent to the present mission schools. The cost of the church and presbytery—the latter of which is being built on a portion of the site of the old Eccles racecourse—will be about £8,000.

The magistrates of Manchester have granted provisionally a full license in connection with the hotel which the Midland Railway Company proposes to erect near the Central Station. The hotel will be bounded by Peter-street, Lower Mosley-street, Windmill-street, and Mount-street. The hotel will be built under the provisions of a clause in the Act obtained by the Midland Company last session. It will contain 300 bedrooms, and a large concert-hall will be one of the special features of the building.

Pluscarden Priory, near Elgin, has just been purchased by the Marquis of Bute from the Duke of Fife. It is expected that the marquis will have the priory restored, and that the work will shortly be proceeded with.

New buildings are being added to the sanatorium at Brighton, for the town council. They comprise a new administrative building, one scarlet-fever block, a block containing six small wards for patients requiring special isolation and for paying patients, a porter's lodge, and a discharge building. The contractors are Messrs. Peters and Son, whose tender was accepted nearly a year since at £19,775.

OBITUARY.

Mr. Daniel Birkett, F.R.I.B.A., of 45, Lowther-street, Carlisle, who died recently at Roehampton at the age of sixty, was a son of the late John Birkett, of Broomhills, near Carlisle, and was articled to the late John Dobson, of Newcastle, the architect of Holme Eden, near Carlisle, Beaufront, near Hexham, the Central Station at Newcastle, and other notable works. Mr. Birkett was the architect of the Cumberland Union Bank, Carlisle; he won the premium given by the corporation of that city for the best design for private residences on the Aglionby lands; and from his designs were erected the buildings on the east side of Portland-square, Carlisle, and the business premises of Messrs. Hope and Bendle in in the same city. He was the architect of many schools erected in the neighbourhood of Carlisle, and those of Denton Holme and Kendal-street in that city. He joined the Royal Institute of British Architects as an Associate in 1864, becoming a Fellow six years later. Some ten years ago he retired from the active pursuit of his profession, and resided for the most part at Silloth.

Mr. George Tait, retired builder, of Hawick, N.B., died at his residence, 76, High-street, in that borough, on Tuesday week, aged four score years and four. Deceased's father was originally a mason, and afterwards a master builder, and in 1836 took his two sons—George and John—into partnership with him, and under the designation of George Tait and Sons the business was continued till the year 1856, when the old man died. John (since deceased) having about 1853 emigrated to Australia, the business was continued for upwards of 30 years by Mr. George Tait. Having a thorough knowledge of the town, deceased was for years much engaged with the arbitration of old marches in the cases of houses and garden dykes, while as a valuator his services were also much in requisition. During their long business career, father and son erected a very large number of the buildings of the town and neighbourhood, including many mills and large residences, East Bank U.P., Wilton Parish, Orrock U.P., and St. Andrew's Free churches. At one time Mr. Tait took a considerable interest in public affairs, and was more than once returned to the old town council. He was also a useful member of the parochial board. Some years ago Mr. Tait retired from business, and was succeeded by Mr. Adam Scott. Mr. Tait, who was a widower for 46 years, is survived by a daughter.

It is proposed to restore the parish church of Dean Prior, near Buckfastleigh, South Devon, the parish of which Robert Herrick, the poet of the "Hesperides," "Cherry Ripe," "Gather ye Roses," and other familiar verses, was vicar. The sum of £1,000 is required for restoring and reseating the Perpendicular church, whose characteristically Devonian tower is covered, quite needlessly, with grey plaster. It is intended to remove this, and to make the stone work visible once more.

At a special meeting of the Warminster Town Council, held on Monday, the report of the sewage disposal committee on the plans and estimate for the scheme of sewerage and sewage disposal was adopted, and the clerk was instructed to apply to the Local Government Board for sanction to a loan of £5,000 for carrying out the work. The scheme is to dispose of the sewage by means of the septic tank system at Smallbrook, and to run the effluent off the present sewage farm; to complete the drainage of the Common, and to dispose on the land the sewage of this part of the town.

Steady progress is being made by Mr. Thompson's staff of workmen with the work of restoring the west front of Peterborough Cathedral, attention now being given to the north-west tower. During the last week about 8ft. of the south-east pinnacle was replaced with new Clipstone stone. The north gable of the west front is now nearly out of the contractors' hands, the pointing having been finished, and it awaits re-enthronement of the various figures within their niches. The small columns of Alwalton marble, which had perished, have been replaced in the same material, a bed of it having been successfully struck on Mr. Fitzwilliam's land at Alwalton.

The well-known Elephant and Castle tavern at the junction of Walworth and Kennington Park roads, Newington Causeway, and facing four other main thoroughfares, is about to be rebuilt, several adjacent properties being taken in. The building will be increased in height, and crowned with a domical roof, and more bar and billiard-room accommodation will be provided. Mr. John Farrer is the architect.

COMPETITIONS.

Huddersfield: Castle Hill Tower.—One of the schemes originated at Huddersfield for the celebration of the Diamond Jubilee was the erection of a tower on Castle Hill, and so well has the idea met with public approval that about £1,530 has been already subscribed for its accomplishment. Recently designs were invited, and of these 32 sets were forthcoming from various parts of the country. The designs were duly placed on public exhibition, and a committee of the subscribers was appointed to adjudicate upon the plans, for which one premium of £20 was offered. The work of selection was concluded on Tuesday. In the first instance six sets of designs were selected from the mass, and these were eventually reduced to three, which had the following positions in the competition allotted to them:—1. Mr. Isaac Jones, 6, Deerbrooke-road, Herne Hill, S.E.; 2, Messrs. John and A. C. Haigh, York-place, Huddersfield; and 3, Mr. Walter R. Watson, 689, Great Western-road, Hill Head, Glasgow. The next step to be taken will be to forward the selected design to Sir J. W. Ramsden, Bart., the lord of the manor, who has given the site for the tower, and then to ask Mr. Jones to send in the specifications, upon which tenders for the completion of the work may be invited. Mr. Jones's design provides for a high, square, feudal tower, with a projecting window at the base, giving light to the caretaker's house and the various offices connected therewith. The architect had evidently studied the requirements of the scheme on the spot, and had sent in a sketch of the tower as erected on the site likely to be chosen. Messrs. Haigh, the second competitors, had also fixed upon for their design a massive square tower, having a circular turret from base to summit at each angle of the square. The competitor placed third, who had signed his design "Clutha," had produced a sketch showing a square tower surmounted by a lantern. Given suitable weather, it is expected that no great lapse of time will ensue before the Castle Hill, which forms such a striking figure in the landscape, will be rendered further notable by the erection of the Jubilee tower.

New York.—The second competition for the New York Public Library is to be confined to twelve architects, or firms of architects, six of whom, Messrs. J. H. Freedlander; Haydel and Shepard; Hornbostel, Wood, and Palmer; Howard and Cauldwell; W. Wheeler Smith, with Walker and Morris; and Whitney Warren, have been selected from among the twelve who received awards in the preliminary competition; while six others, Messrs. Carrère and Hastings; Cyrus L. W. Eidlitz; Charles C. Haight; McKim, Mead, and White; Peabody and Stearns; and George B. Post, have been added to them by invitation. Three of the members of the jury of seven which is to consider the designs submitted in the second competition are to be practising architects, chosen by the competitors themselves. Three others are to be chosen by the Trustees of the Library out of their own number; and the seventh member is to be the Director of the Library. The jury of seven is to choose, by majority vote, three designs, sending them, with indications as to their order of merit, to the Trustees, who are to select one of them, and send it to the city authorities, with the recommendation that its author be appointed architect of the building.

"Owen Jones" Prize.—This competition was instituted in 1878 by the council of the Society of Arts, as trustees of the sum of £400 presented to them by the Owen Jones Memorial Committee, being the balance of subscriptions to that fund, upon condition of their expending the interest thereof in prizes to "Students of the School of Art who, in annual competition, produce the best designs for household furniture, carpets, wallpapers and hangings, damasks, chintzes, &c., regulated by the principles laid down by Owen Jones." The prizes are awarded on the results of of the annual competition of the Science and Art Department. Six prizes were offered for competition in the present year, each prize consisting of a bound copy of Owen Jones's "Principles of Design" and a bronze medal. The following is a list of the successful candidates:—William F. Blagg, School of Art, Chelsea, design for a wallpaper; Helena R. Dow, School of Art, Glasgow, design for a wallpaper and frieze; Robert Paterson, School of Art, Glasgow, design for a carpet; Herbert D. Richter, School of Art, Bath, design for wallpaper; Bertha Smith, School of

Art, Bloomsbury, design for wallpaper and frieze; John Wadsworth, School of Art, Macclesfield, design for carpet. The next award will be made in 1898, when six prizes will be offered for competition.

CHIPS.

The Earl of Carlisle opened on Saturday at Carlisle the first exhibition in connection with the newly-formed Cumberland and Westmoreland Society of Arts and Crafts, and gave an address upon the work of such associations.

The Duke of Devonshire laid on Monday, with masonic ritual, the corner-stone of the new Victoria Nurses' Home in connection with the Bradford Royal Infirmary. The building, which was illustrated by us by plan and perspective on the 20th ult., is being erected from designs by Messrs. Milnes and France, of Bradford, at a cost of £10,000.

The members of the East Riding Antiquarian Society paid a visit on Friday to Rillington, Thorpe Bassett, and Wintringham, three East Riding villages at the foot of the Wolds, near Malton, for the purpose of inspecting the churches there.

An Austrian Scientific Expedition, consisting of the Vienna Professors Bendorf and Niemann, and Military Captain Schindler, left Vienna on Monday morning to continue excavations at Ephesus.

The Earl of Derby will attend the formal opening on Thursday week, the 16th inst., by the Countess of Derby of the Victoria Jubilee Technical School at Preston.

The indefatigable vicar of Croyland writes stating that he has nearly finished the new east end of the abbey church, and on Sunday last administered therein the Holy Communion at 8 a.m. for the first time. The three sections of the building still needing immediate repair are the underpinning of the north wall, and rebuilding a buttress, the porch, and the roof, for which a further sum of £800 is still required. He is also endeavouring to raise £400 for an organ.

On Wednesday in last week Col. A. G. Durnford, R.E., one of the inspectors of the Local Government Board, held a public inquiry at the Council Chamber, Tonbridge, relative to an application made by the urban district council for permission to raise a loan of £9,600 for the purchase of Tonbridge Castle and grounds.

A light railway from Chichester to Selsey was opened on Friday by the Mayoress of Chichester. The new line, which is seven and a half miles long, extends from the south side of Chichester Station to the Manor House, Selsey, about 200 yards from the church. It has been laid at a small cost, the paid-up capital of the company being only £12,000, with an issue of £7,000 in debentures. It is hoped that the result will be to develop Selsey as a watering-place.

The sales at the Mart, Tokenhouse-yard, last week were small and disappointing, the aggregate realisation, as registered at the Estate Exchange, being £15,600, as against £21,133 recorded for the corresponding week of last year.

At Walton-on-the Naze on Tuesday, the first pile of the pier extension works, the completion of which will enable the London steamboats to call there, was driven by Mrs. Round, wife of Mr. James Round, M.P. It is proposed to extend the pier from its present length of 600ft. to 2,500ft., to construct along it an electric tramway, and to build a pavilion at the sea extremity. It is intended to complete the work in time for next summer's boat service.

Colonel A. J. Hepper, D.S.O., R.E., has held an inquiry at Swadlincote with regard to the proposal of the urban district council to borrow £5,000 for works in connection with the sewerage and sewage disposal scheme.

At Sherrard-road, Manor Park, on Tuesday afternoon, a timber stack belonging to Mr. Birch, a local builder, was fired by lightning and destroyed.

On Saturday afternoon the foundation-stones were laid of new Sunday-schools in connection with the Primitive Methodist church in Westfield-street, St. Helen's. The new schools occupy the site of the old chapel in Kirkland-street. The schools, which will accommodate between 600 and 700 scholars, are being built by Mr. Jos. Ellison, Mr. Wilson, Runcorn, being the architect.

A message was received at Bangor on Monday, announcing the arrest, at Antwerp, of Robert Hughes, of Bangor, the secretary of the Bangor and Arfon Permanent Mutual Building Society, and of Lloyd's Association, and a member of the Carnarvonshire County Council and the Bangor City Council. He left the town some time ago, and it was afterwards ascertained that there were defalcations in connection with the society's funds amounting to £1,886. A warrant was then issued for his arrest. A month is expected to elapse before he is brought to Bangor, owing to extradition difficulties.

Building Intelligence.

Birmingham.—By permission of the governors, architect (Mr. W. Henman, F.R.I.B.A.), and builders (Messrs. Barnsley and Sons), a numerous party of members and friends of the Clerks of Works and Builders' Foremen Association paid a visit to the New General Hospital on Saturday afternoon. The party was conducted over the building by Mr. Parsons (the clerk of works) and Mr. Randall (the foreman). In their progress through the building they met Mr. J. C. Holder, whom they welcomed with great cordiality. Mr. Holder thanked them for their expressions of goodwill, and said that what he and his colleagues had done on behalf of the city had been a labour of love. He described the aims of the administration in the planning of the building, and expressed the opinion that on its completion Birmingham would possess the best-equipped and the finest hospital in the kingdom. At a subsequent period, while the party were in the chapel, the president (Mr. Patchett) expressed the hope that at least one of the windows would be reserved for a stained-glass memorial to Mr. Holder. The suggestion met with the approval of the company, and over £10 was subscribed towards a fund for that purpose by the visitors.

Chichester.—Attention is being directed to the condition of this cathedral, and the urgent necessity for extensive restoration. An appeal is being made by the Duke of Richmond and Gordon, the Bishop of Chichester (Dr. Ernest Wilberforce), and the Dean (Dr. Randall). The executive committee for the restoration of the cathedral propose, in the first place, to set on foot the rebuilding of the north-west tower, which has been pronounced to be necessary for the safety and preservation of the fabric originally supported by the tower before it fell. Mr. J. L. Pearson, R.A., who has been appointed architect to execute this part of the work, has already prepared plans, and a builder is prepared to carry out the work for £6,250. It is proposed to build so much of the tower as can be completed with the funds already subscribed, and to carry on the work to completion as subscriptions come in. The committee hope to be able to undertake, as funds are supplied, the repair of the south transept, the renewing and repairing the dilapidated pavement of the nave and aisles, the re-erection of the nine pinnacles on the buttresses, and the restoration of the ancient library for the chapel of St. John.

Cheltenham.—The scheme initiated by the corporation to erect a kursaal and municipal offices, at a cost of £48,000, on the site of the existing winter-garden building, has met with an unexpected check. The application for a loan has been refused by the Local Government Board, whose inspectors recently held an inquiry into the matter. The grounds of objection are that the Local Government Board consider that some of the details of the scheme are open to objection, and that the estimates are likely to be exceeded; while at the same time they question whether the site is the most suitable for municipal offices, and whether offices could not be provided at less cost on another site. They also raise an objection to the demolition of the existing buildings, and recommend the council to give consideration to those points in any further scheme they may have before them.

Edinburgh.—At the Castle several unobtrusive old buildings erected a century ago are being removed to make room for a military hospital. The new building will have architectural features of a Scottish character, which the old buildings did not possess. The ground plan covers an area of 160ft. by 120ft. The block, which will face Princes-street, will be three stories in height, and towards Castle-terrace there will be an annexe of the same height, the wall of a promenade, and the gable of the south block, which will only be of two stories. On the east side will be the kitchen and entrance gateway. The whole of the buildings will be of stone. To Princes-street a prominent architectural feature of the building is a range of dormer windows deeply set in the wall-head, and rising considerably over it. The wall-head between shows a corbelled cornice with embrasures, and round the dormers is carried an ornamental stringcourse. The windows of the lower stories are square-headed, with jambs of dressed stones. Between the building and its annexe, which faces Castle-terrace, the façade is broken by a large recess. The gable of the south block has bold crowsteps, and the windows show varied features. On the ground floor of the Princes-street block will be a ward with fourteen beds. There will be a lobby with entrance from a courtyard, round which the buildings will be grouped. This will lead to a waiting-room, which in turn will communicate with the surgery. The other accommodation at this level is set apart as pack and linen stores. A stone staircase, which is shown in the elevation as a projection, will give access to the floors above. On the first floor there will be a sixteen-bed ward, a day-room, and three small wards, with the usual rooms for orderlies. The floor above in its internal arrangements corresponds to a large extent with that just described. There will be a sixteen-bed ward, and one of three other small wards will be set apart for officers. In it there will be two beds. From this block a corridor runs southwards, at the end of which a new kitchen establishment for the hospital is to be constructed. The kitchen will only be one story in height, and will be lighted from the top as well as the sides. In the south block, on the ground floor, is a ward of five beds for special infectious cases, with separate entrance and sanitary arrangements, so as to isolate it from the rest of the building. There will be rooms for the orderlies and stores on the ground level, and in the floor above will be the quarters for the warrant officer, who has charge of the discipline of the establishment under the medical officer, the orderlies, and the steward. The beds in the wards are placed two between each window, so that there will be abundance of light for the patients. The wards will be heated by hot-water pipes and by special stoves, and the vitiated air will be extracted by means of flues. Between the two blocks on the west side a raised promenade will be constructed overlooking Castle-terrace, on which the patients may take the air. It is approached from the courtyard by a double flight of steps, and between the pillars carrying it there will be seats placed for the patients. The hospital buildings on the Castle side are inclosed by a wall, and for entrance the old Queen Anne pillars will be used. They are to be taken down, and put up in another position from what they now occupy. The courtyard has been formed by removing the old magazine building, which was 74ft. by 41ft., and part of the space thus secured will be laid out as an ornamental ground. The cost of the hospital will be about £18,000. The plans were designed in the War Office, and have been adapted locally by District-surveyor T. Ivor Moore, R.E. The specifications were prepared locally under Colonel W. H. Patten, commanding the Royal Engineers in Scotland, and the district surveyor. The contractor has a year to complete the buildings.

Felixstowe.—A new hotel, to be known as the Balmoral, is about to be built on the brow of the cliffs at Felixstowe. The plans, prepared by Mr. T. W. Cotman, M.S.A., of Ipswich, show an entrance hall 47ft. by 25ft., dining-room 54ft. by 28ft., with a bay window 18ft. by 12ft.; and an extra dining-room 28ft. by 17ft. 6in.; smoking-room 28ft. by 24ft., with a bay corresponding to that of the dining-room; billiard-room 45ft. by 28ft. (two tables); drawing-room 30ft. by 24ft.; sitting-rooms, each 28ft. by 15ft.; and there will be 120 bedrooms all told. In the centre of the building will be a winter garden 55ft. by 30ft. Verandahs and balconies will run along the front.

Fenton, Staffs.—The formal opening of the new schools erected by the Stoke-on-Trent United District School Board in Queen-street, Fenton, took place on Monday week. The school block stands upon a site 6,000sq.yds. in extent, and is planned on the central-hall system. The entrances are so arranged as to obviate as much as possible the objection to the system—viz., cross currents from entrances in central hall. The internal walls are plastered in the upper portion and have tile dadoes on the lower portion in very light tints. The exterior is of red brick with stone dressings, and tile roofs, with a tower over one entrance for water-supply tanks and bell. The ventilation is on Boyle's system. Accommodation is provided for 600, half boys and half girls. The central hall is 81ft. by 38ft. There are six classrooms, each 25ft. square, two classrooms 25ft. by 22ft., and two classrooms 34½ft. by 22ft.; two teachers' and two book and store rooms, four cloak-rooms and entrances. The flooring is of pitch-pine blocks, and the heating is by low-pressure steam. The furniture is principally in oak. The lighting is by gas on the Stott-Thorpe system. The contractor for the

general work is Mr. John Bagnall, of Fenton; block flooring by the Wood Block Flooring Company, of Victoria-street, London; tile dadoes by Messrs. Minton, Hollins, and Co., of Stoke-on-Trent; painting by Mr. E. Peake, Fenton; ventilation, Messrs. Boyle; heating by Messrs. R. Dawson and Co. (Limited), of Stalybridge, near Manchester; and the furnishing by the Bennett Company, of Glasgow. The work has been carried out from the plans and under the supervision of the board's architects, Messrs. R. Scrivener and Sons, of Hanley.

Ipswich.—The old workhouse buildings at Stoke being so ill-arranged, cramped, and insanitary as not to be worth rebuilding, a new workhouse is in course of erection at the other side of Ipswich on a site facing Rashmere Heath and the Woodbridge-road, at a cost of £28,000. The buildings consist of a series of semi-detached blocks, including an administrative block in the centre, comprising dining-hall (with open-timber roof), kitchen, sculleries, board-room, master's residence, laundry, and stores. Connected with this block by a corridor is the infirmary, and in an isolated block near the main turnpike road are the vagrant wards. Near by are the main buildings, comprising day-rooms and dormitories, and other detached blocks are arranged as workshops, boiler-house and mortuary. The building materials are local red bricks for external walls, the inside walls being of Peterborough bricks, and the roofs are covered with Bangor slates. The flooring of corridors and sanitary annexes is of terazzo, that of the general building of granolithic stone in some portions and ordinary deal in others. The joint architects are Messrs. Salter and Adams, of London, and Mr. W. L. Newcombe, of Newcastle-on-Tyne, and the contractors are Messrs. Grimwood and Sons, of Ipswich.

Leeds.—The foundation-stones of a new Hebrew place of worship, to be called the Central Synagogue, in Templar-street, Leeds, were laid on Sunday. The site is on the south side of Templar-street, and, when completed, the building will have a frontage of 80ft. to that street. The premises will include a synagogue 60ft. long by 48ft. wide, with galleries on three sides, providing accommodation for 800 people, robing-rooms, vestry, a schoolroom with accommodation for about 250 people, and other necessary accommodation. The building will be of brick with stone facings, and will have two entrances from Templar-street. The architect is Mr. Alfred Bentley, of Leeds; and the builder is Mr. Fred. Puffitt, of Hunslet.

Madderty, N.B. — The ancient barn-like parish church was reopened on Monday after transformation, both externally and internally. A new entrance upon the north side, with porch facing west, has taken the place of two openings now built up, and the old square-sashed windows have been superseded by stone mullioned and arch-headed openings of two and three lights; while new windows have been pierced in the north and east walls, and a little rose window has been introduced in the west gable. The gallery has been taken away, and the church enlarged by utilising the space formerly occupied by the old lobby and staircases. The pulpit, with new carved panels, is placed in the north-east corner on a raised and tiled platform, on which also the choir is to be accommodated. Three stained-glass windows have been put in, while all the other windows have been filled in with cathedral tinted glass. One new three-light window represents the Crucifixion, St. Mary, and St. John the Evangelist, and having at the right and left lower corners respectively the obverse and reverse of the ancient Inchaffray seal. The glasswork of the windows has been executed by Messrs. Ballantyne and Gardiner, Edinburgh.

Motherwell.—The plans of a new model lodging-house, to be erected by the Lanarkshire Model Lodging-House Company in Orbiston-street and Meadow-road, Motherwell, were lodged in the Dean of Guild Court of that borough on Tuesday. The design is Free Classic, with a frontage showing two circular turrets at the angles, and an arched decorated doorway in the centre. Accommodation is provided for 316 lodgers, with four special rooms for warders, and a manager's house, from which there is a private entrance to the different parts of the building. The dining-room is 55ft. by 34ft.; recreation-room, 65ft. by 34ft.; and the kitchen, 35ft. by 20ft. The estimated cost is £6,500. The building, which is to be erected from plans by Mr. Alexander Cullen, architect, Hamilton and Motherwell, is to be called the Victoria Home.

New York.—Following the example set in London by Lord Rowton, Mr. D. O. Mills, of New York, proposes to provide in that city decent and comfortable hotel accommodation at a price within the means of people who have heretofore been obliged to find shelter at lodging-houses; and the first of the hotels built for this purpose is, says the *American Architect*, now nearing completion. The structure, of which Mr. Ernest Flagg is the architect, is situated on Bleecker-street, extending from Thompson-street to Sullivan-street, a distance of 200ft. The three fronts are faced with Indiana limestone and white brick, and are ten stories high. The plan, in brief, consists of two square blocks, each with a large courtyard in the centre, room being left between the blocks for a connecting-hall, with stairway and elevators on each side. The stairways have outside windows, giving a current of fresh air across the hall. In each of the main blocks is a corridor passing entirely around it, with bedrooms on each side, some opening on the courtyard, and the others on the outside, but all having ample light; and the re-entering angles are occupied by ventilation shafts. The bedrooms are only 5ft. wide and 7ft. long, and it is expected that at 20 cents a night, which is the ordinary charge for a lodging-house bunk, the building will pay a reasonable interest on its cost. A restaurant, capable of accommodating 400 people, occupies a portion of the ground floor. Ventilation is provided by means of fans, which exhaust the air from the corridors; and as the partitions between the cubicles do not, except in certain instances, extend quite to the ceiling, a good current is kept up through them. To facilitate ventilation, also, the windows opening on the courtyard are fitted with wire screens in place of glass. As the courts have glass roofs, and the air in them is warmed by steam-coils, it is thought that no injurious draughts will follow from this arrangement. A second hotel, similarly arranged, is in process of erection near by.

Ryton-on-Tyne. — On Saturday afternoon, Mrs. Simpson, wife of Mr. John Bell Simpson, managing partner of the Stella Coal Company, laid the foundation-stone of a block of buildings to be known as "The Robert Simpson Memorial Homes for Aged Miners." The premises will comprise 10 homes for the company's aged miners. The Stella company have given the site of 800 square yards, and the contract price is £1,220. The estimated cost of the buildings, including the value of site, is £1,350. The site abuts on the main turnpike from Newcastle to Hexham, and is situated at Barmoor, about a mile west of the village of Ryton. The homes, which will have a south aspect, consist of eight one-story homes and two two-story homes, one of each of the latter being placed at the two ends of the block. Each of the eight homes will consist of two rooms; the two end homes will have three rooms each. There will be a pantry, a small scullery, and conveniences at the back of each cottage. The measurement of the kitchens of the one-story cottages is 13ft. by 13ft., and that of the bedrooms 13ft. by 10ft. The rooms are placed one on each side of the door. The two end cottages will have a kitchen 14ft. by 17ft. and two bedrooms upstairs of 11ft by 8ft. and 14ft. by 10ft. respectively. The block will be built of white bricks, with red brick dressings, and the roofs will be of Bridgwater red tiles. Each cottage will have a garden in front, facing the road. The homes have been designed by Mr. Jas. Archbold, engineer to the Stella Coal Company, and will be built by Mr. Peter Fellowes, Greenside.

Truro Cathedral.—The Truro Cathedral General Building Committee met on Thursday in last week to consider the question of the materials used in the foundation of the nave at present being laid. Several leading members of the committee who had frequently visited the works criticised freely the kind of stone used; but the clerk of the works (Mr. Caine) expressed his opinion that good stone had been employed by the contractor. Mr. Codd, the representative of the architect (Mr. J. L. Pearson, R.A.), had come down from London to inspect the foundations, and had subjected the concrete laid to some severe tests with satisfactory results. It was also stated that the materials used at present were the same that had formed the foundation of the part of the cathedral already erected, and had proved perfectly sound. The committee decided—(1) That specimens of the concrete already laid should be subjected to some scientific test under Mr. Pearson's supervision; (2) that for the rest of the foundations of the nave now in progress hard stone only should be employed for the concrete; (3) that for the present the work should proceed no further than just below the floor level.

CHIPS.

The Dean and Chapter have just erected in the crypt of Canterbury Cathedral a marble tablet, "To the beloved and honoured memory of William Archibald Scott-Robertson, M.A., hon. Canon of this Cathedral, as a mark of gratitude to one who ungrudgingly devoted to the service of the Cathedral his faithful labours and his abundant antiquarian knowledge."

At a meeting of Glasgow District Lunacy Board on Friday, a committee was granted powers to visit nurses' homes in Glasgow and district before deciding upon the design of the proposed nurses' home at Gareloch Asylum. The building, in which will be accommodated the whole nursing staff, it is estimated, will cost £7,000, exclusive of furnishing, and no asylum in Scotland has at present such a home in connection with it.

A new Masonic hall in St. Nicholas-street, Worcester, was opened with much ceremony on Tuesday. It contains an assembly-hall, provincial museum, large dining-room, and other adjuncts, and the ground-floor is arranged in lock-up shops.

Colonel Heffer, C.E., inspector of the Local Government Board, held an inquiry at Shuttington on Tuesday, in reference to an application to borrow £550 for laying water-mains in the village, to join those at Amington, in the Tamworth water area. Mr. H. J. Clarson, surveyor to the Tamworth Rural District Council, explained the scheme.

At Messrs. Hilton, Anderson, and Co.'s cement works at Halling, near Rochester, on Tuesday, a large kiln containing about 200 tons of boiling cement overturned, knocking down other kilns, and wrecking a shed. Three men, named Stevens, Atkins, and Chittenden, were seriously injured, and it is feared Stevens will not recover.

The principal business transacted by the Gloucester City Council at its meeting on Tuesday was the decision to borrow a sum not exceeding £50,000 for the provision of a public electric-light supply and refuse destructor. A committee of six was appointed, and after the meeting they set off on a tour of inspection of electric-light works at Newport, Reading, St. Pancras, Shoreditch, Leyton, Tunbridge Wells, Hampstead, Leicester, Oxford, and Cheltenham. Mr. Robert Hammond, of London, was appointed engineer to the scheme.

The interesting old timber church at Lower Peover, Cheshire, celebrated its 601st anniversary on Wake Sunday. Additional interest was given to the festival, as a new clock, with Cambridge chimes, has been placed in the tower. The vicar held a dedication service. The clock has been made by Messrs. J. Smith and Sons, Derby.

A special meeting of the Highland Railway shareholders was held on Wednesday. Sir G. Macpherson Grant, the chairman, explained that the meeting had been called to authorise the raising of new capital, under the Company's Act of 1895. There were several causes why additional capital was required. The Aviemore and Kyleakin lines still remained to be completed. The Aviemore line had now been opened as far as Daviot, within seven mile of Inverness, and pressure was being brought to bear on the contractors for the completion of the remaining portion as rapidly as possibly. The Kyleakin extension, by which the system would be placed in closer touch with Skye, was approaching completion. It was also necessary to build a pier at Skye, so that the steamboat or other ferry might be established. It was agreed to issue £200,000 preference stock and £100,000 debentures, as recommended by the directors.

An interesting ceremony took place within the City Chambers, Glasgow, on Tuesday, when the portrait, commissioned by the corporation, of Councillor Alexander Osborne, the "Father" of Glasgow Town Council (having been a member of that body since 1862), and a replica for Mrs. Osborne, were unveiled in the banqueting-hall. The portraits have been painted by Mr. James Guthrie, R.S.A.

Mr. John Sharman, formerly chief engineer of the London and North-Western Railway, was drowned while bathing at Morecambe on Tuesday afternoon.

At a sitting of the Glasgow Uninhabitable Houses Committee on Tuesday, 88 houses were ordered to be closed up. These include practically all the houses which were occupied in the Old Wynd and the larger part of Meuse-lane, two of the meanest streets of the city.

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ILLUSTRATIONS.

KNOCKDERRY CASTLE.—SELECTED DESIGN FOR NEW WESLEYAN COLLEGE, SCARBOROUGH.—HOGHTON TOWER, LANCASHIRE.—NEW CHURCH AT BENTLEY, NEAR DONCASTER.—INDUSTRIAL SCHOOL, HAGEN, WESTPHALIA.—KING EDWARD'S GRAMMAR SCHOOL, MORPETH.

Our Illustrations.

KNOCKDERRY CASTLE.

THE drawing shows the addition, which consists of a music-room with open roof, library, and bedroom accommodation. From the parapet which goes round the tower magnificent views of Loch Long and the mountain scenery are obtained. The castle rises from a rocky foundation, which is high above the level of the Loch. Mr. J. S. Templeton is the proprietor. Mr. W. Leiper, R.S.A., is the architect. The drawing was on view at the Royal Scottish Academy's Exhibition at Edinburgh a few months since.

NEW COLLEGE, SCARBOROUGH.

THIS design was selected in the recent competition at Scarborough. The college is to be built on Filey-road, overlooking the south bay. The materials to be used are red brick and Whitby stone, roofs to be covered with red tiles. The architects are Messrs. Hall, Cooper, and Davis.

HOGHTON TOWER, LANCASHIRE.

WE gave a view of this house, showing the dining-hall exterior in the inner court on August 20, when other illustrations appeared in connection with the Architectural Association Excursion in the neighbourhood of Lancaster. We then promised to publish the accompanying measured drawings lent us by Mr. W. A. Waddington, together with some details of the old tables in the dining hall: replete with figured dimensions, these details cannot fail to be of service. The sketch-view of the other side of the old mansion serves to further illustrate its quaintness and interesting character.

NEW CHURCH, BENTLEY, NEAR DONCASTER.

THIS church was opened in the autumn of last year. Its accommodation is for about 400. It consists of a nave 30ft. wide and 60ft. long, with arcades of five arches and aisles, which are passageways only and are but 3ft. wide, the nave and aisle being under one roof. The west end is a composition of three traceried windows of two lights each, separated by massive buttresses, and surmounted by a rose window. The side windows are deeply recessed under the arches of the nave arcades, which, continued north and south, form curtain arches over them. The nave roof is a massive tie-beam roof of pitch-pine, with arched and cusped trusses, purlins with cusped wind-braces, and very deeply carved cornice. The chancel is 36ft. long and 19ft. wide. Its roof is also of pitch pine, with arched principals and trussed common rafters. The bays over the sanctuary are boarded and divided into traceried panels. Vestries and an organ chamber are provided north of the chancel. The entrances are in the western bay of the nave north and south—on the north through a broad, low, and shallow porch, in the gable of which sits a figure of St. Peter; on the south side through the lower stage of the tower. The tower contains a clock and a peal of bells. The spire rises to a height of 120ft. The building is faced with stone externally; the roofs are covered with plain tiles. The nave is seated with open benches, which are of teak; the chancel stalls are somewhat elaborately treated, and are also of teak. The altar is of oak, with cusped panels; the altar rails are of wrought-iron scroll-work, and are gilt. The pulpit and font are of stone. The east window is filled with rich painted glass, arranged in two tiers of New Testament subjects, with a Majesty over in the centre light surrounded by angels, which fill in the tracery. The cost, including the boundary walls, which are of stone, was about £8,000. The architect is Mr. John Codd, A.R.I.B.A., and the drawing we here reproduce was hung in the Architectural room at the Royal Academy this summer.

INDUSTRIAL SCHOOL, HAGEN, WESTPHALIA.

THIS building, for the Industrial School, Hagen, Westphalia, is erected from the designs of Herr Felix Genzmer, architect. It is reproduced from *Architektonische Rundschau*.

KING EDWARD VI. GRAMMAR SCHOOL, MORPETH.

THE foundation-stone of the new science and art department of this school was laid on July 30. On the ground-floor will be the physical and chemical laboratories, lecture theatre, advanced, balance, and other rooms. On the first floor will be the elementary, life-rooms, model-room, masters' room, and room for manual instruction. The work is being carried out by Mr. T. W. Middlemiss, from the plans and under the superintendence of Messrs. Boolds and Hardy, architects, Morpeth.

A site for a new public free library and reading-room for the Blackley and Harpurhey districts of the city of Manchester has been secured on the borders of the David Lewis Recreation Ground and Blackley new park. The Parks Committee has signified its approval, and plans for the new building will be prepared at once. The library will be constructed to accommodate about 10,000 volumes.

The inauguration of the monumental fountain erected in Brussels to the memory of Jules Anspach, burgomaster of that city from 1863 to 1872, took place on Sunday. The monument consists of a sculptured pediment of white marble, with a bronze medallion and obelisk surmounted by a figure of St. Michael, the Patron Saint of Brussels. It stands in the centre of the new boulevards, and is a fitting tribute to the memory of a citizen who was instrumental in effecting a vast scheme of improvement both from a hygienic and architectural point of view.

Rapid progress is being made with the new wing of the Portsmouth Royal Sailors' Home, situate within a short distance of the main entrance to the dockyard. On the basement of the new building, a bowling alley, 80ft. in length, and a store for bicycles are in course of erection. Her Majesty and members of the Royal Family are warm supporters of the home, and the Empress Frederick, when at Portsmouth a few months since, inspected the new premises, which will be ready for opening in October. One hundred and fifty-nine additional sleeping cabins are to be provided, and, acting under the instructions of the committee, the architect (Mr. Vernon-Inkpen, of Southsea) has made provision for fixing hydrants, with folding hose and fire-bells, on each floor, in order that the staff of the home might, in the event of an outbreak, promptly cope with it.

Mr. William Forsyth, the surveyor of the District of Columbia, U.S.A., has resigned on account of ill-health and age, and Mr. Henry B. Looker, the assistant surveyor, has been appointed to succeed him. Mr. Forsyth is the oldest living employé of the District of Columbia, having served more than 40 years. He was born in Ireland, and was first engaged in railway building in Belgium. He made surveys for the borough of Brighton, and for many of the parks in London. Emigrating to the States in 1850, he was the next year appointed assistant surveyor of the county of Washington, and in 1857 he was made surveyor.

After a long discussion and a division, the Lancashire Asylums Board decided at their last meeting to authorise a committee to accept a tender for the proposed new county lunatic asylum at Winwith Hall, and to provide temporary accommodation during the erection of that building at one of the existing asylums. Mr. Thomas Beaman, of Chatham, was appointed as clerk of works at the new asylum at a salary of £4 a week.

LEGAL INTELLIGENCE.

RE J. ASHWORTH.—John Ashworth, who carried on business as a land agent and builder, at King-street, Manchester, came up for examination at the Manchester Bankruptcy Court on Monday. He said his liabilities were £1,991 and his assets £696, leaving a deficiency of £1,295. He attributed his failure to depreciation in the value of house property. His assets represented the value of equities in properties, and, in his opinion, they were worth that amount. He did not think they were paper assets. He had scheduled the properties at prices he thought they would fetch. He first knew of his insolvency at the end of last year. He had not applied for his discharge in a previous bankruptcy, and he did not know whether his creditors released him, or what dividend was paid. He could not say what his financial position was at any time during the last three years. He had not kept proper books of account. The examination was adjourned.

CHIPS.

The organ at Hebron Chapel, Bedminster, has been closed for some months past for repairs and enlargement, and Messrs. Johnson, organ builders, of Dighton-street, Bristol, have added several stops and introduced the pneumatic action throughout. The reopening took place on Wednesday.

The Local Government Board have deferred sanctioning the Romford Urban District Council's application for power to borrow £5,000 for street improvements until the Essex County Council have intimated how much they are prepared to contribute towards the improvement of the footways.

The General Purposes Committee of the Middlesbrough Corporation recommend that Victoria-square be laid out and inclosed at a cost of £1,300.

The picturesque "ruins" on the south side of Virginia Water have become unsafe, and with a view to preventing any accident several of the Corinthian columns have recently been dismantled. They were originally portions of a Roman temple near Tripoli, and were brought home in 1825 and arranged as they have since stood by Sir Jeffrey Wyattville.

A commencement has been made in the work of laying a system of pneumatic tubes for conveying letters to nearly all parts of the new city of New York. For many years a small pneumatic service has been maintained between the post office and the upper part of the city; but the new system, which includes three lines southward from 42nd-street, and two lines thence northward to 125th-street, will provide for the transmission of at least 70 per cent. of the postal matter which is now conveyed about the city in mail-waggons.

The Princess Henry of Battenberg, Governor of the Isle of Wight, laid, on Monday, the foundation-stone of a new wing to the Royal Isle of Wight Infirmary and County Hospital at Ryde, erected for the accommodation of ten children patients, and as a commemoration of the long reign of the Queen.

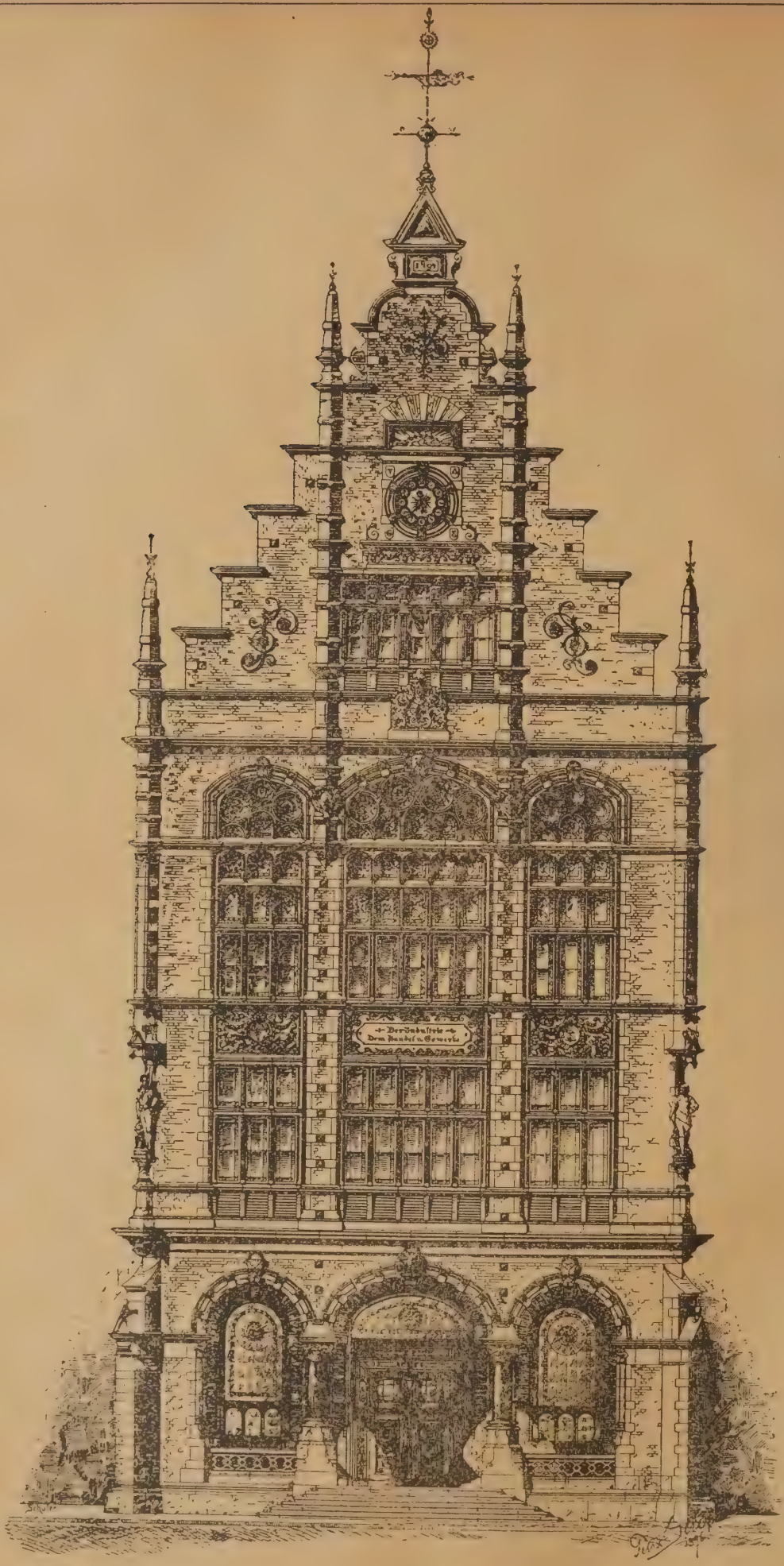
Bishop Wilkinson, of St. Andrew's, Dunkeld, and Dunblane, consecrated a new Episcopal church at Auchterarder on Saturday. The church, which is named after St. Kessog, is the gift of Rev. Edward Thomas Scott Reid.

The town council of Stamford have held a meeting in committee to discuss the deep drainage scheme prepared by Mr. James Mansergh, M.Inst.C.E. After a lengthy discussion, a motion in favour of the abandonment of the scheme was carried by an overwhelming majority, and the town clerk was instructed to write to the engineer for his bill of expenses.

The Marquis of Londonderry has received applications for shares in his projected company for the development of Seaham Harbour to the amount of more than double the probable capital. Mr. H. H. Wake, the engineer to the River Wear Commissioners, has completed his preliminary survey in connection with the scheme, which is said to embody a harbour of refuge.

Mme. Louise Marie Roederer, of Rheims, who died on Feb. 6, the widow of M. Charles E. Roederer, has bequeathed to the Rheims Cathedral her painting, "The Assumption," by C. L. Müller, and to the Church of St. Geneviève, of Rheims, her large painting representing St. Germain and St. Geneviève.

Mr. Hamo Thornycroft's statue of Oliver Cromwell, destined to be set up at Westminster, is very nearly completed. The *Athenæum* says that it is characteristic and expressive, and represents the Protector standing with one hand upon the sword at his side, holding a Bible in the other. His head is bare, and his felt hat—which, of course, is of the shape affected by the Puritans of his time—is under his arm, while, as if lost in thought, he looks moodily down at the ground at his feet. The likeness of the face, derived largely from the death-mask, is strikingly faithful.



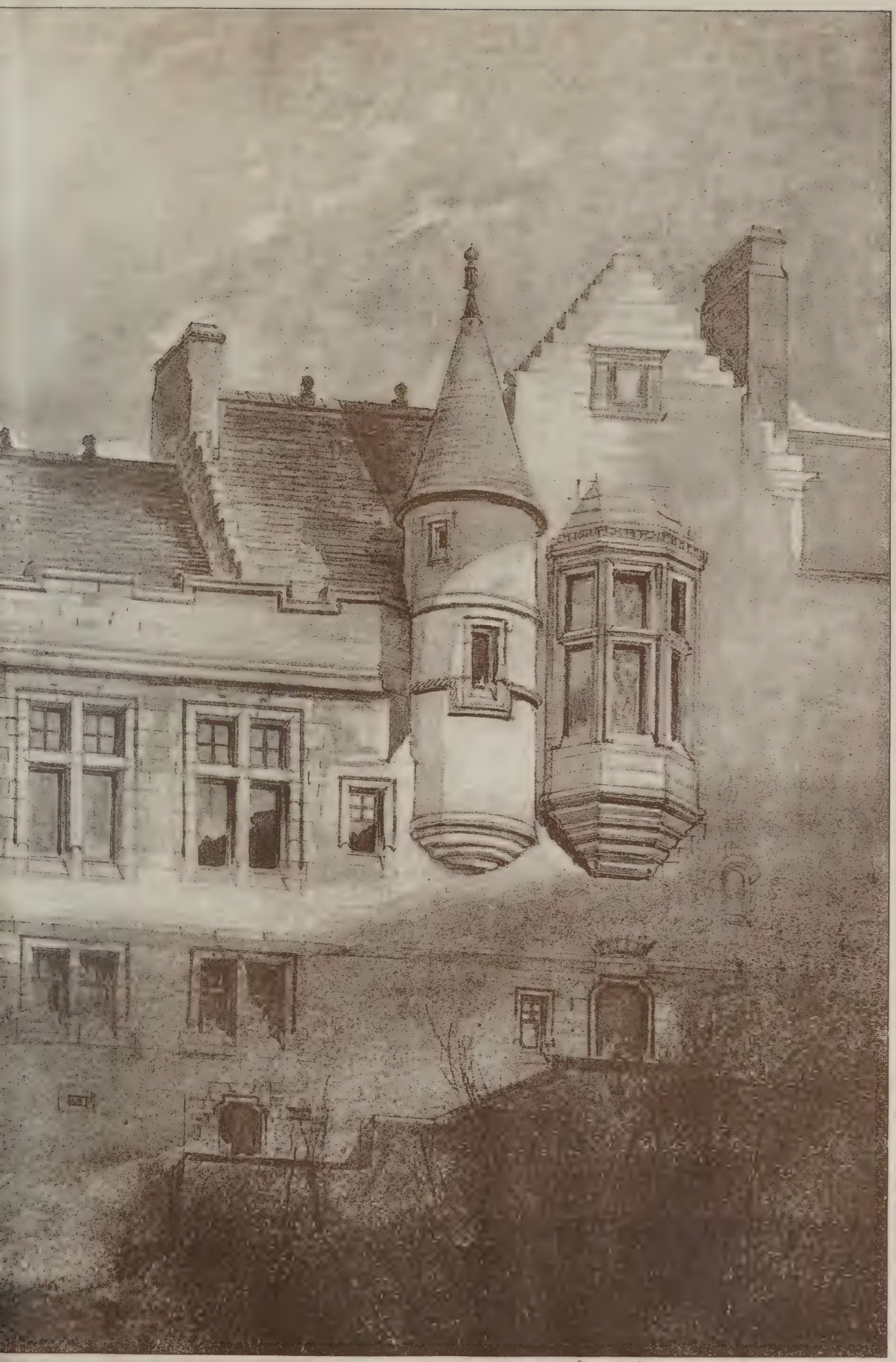
From Architektonische Rundschau.

INDUSTRIAL SCHOOL, HAGEN, WESTPHALIA, GERMANY.—Felix Genzmer, *Architect.*

Photo Lithographed & Printed by James Akerman, 6, Queen Square W.C.

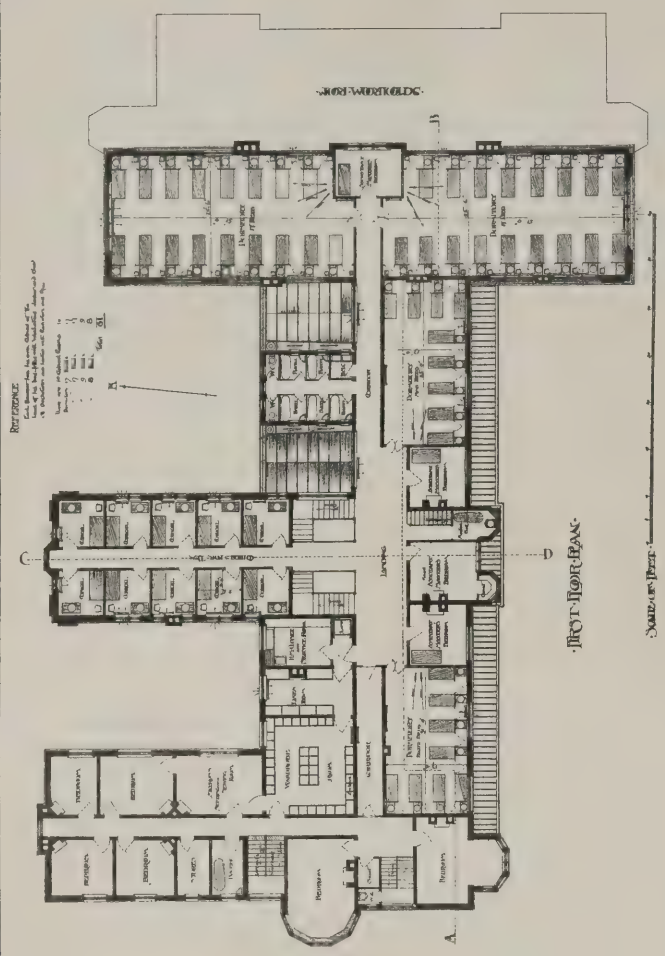
NEW · CHURCH · BENTLEY · NR DONCASTER · JOHN · CODD · ARIBA · ARCHT

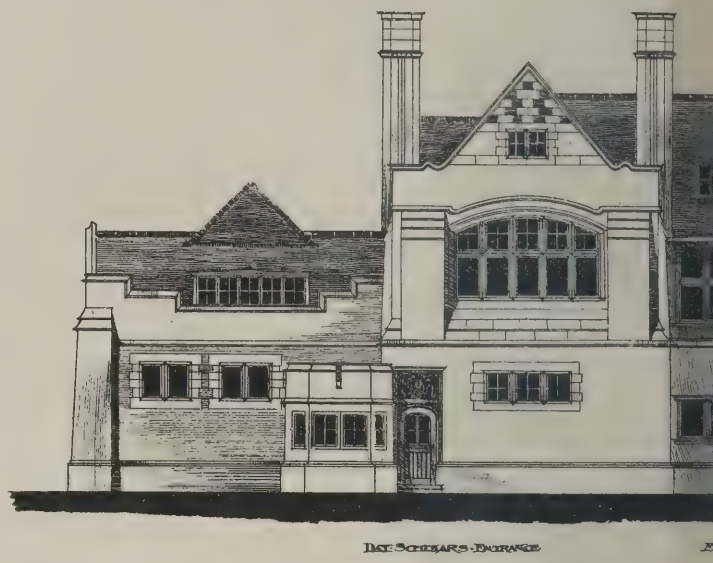
KNOCKDERRY - CAST



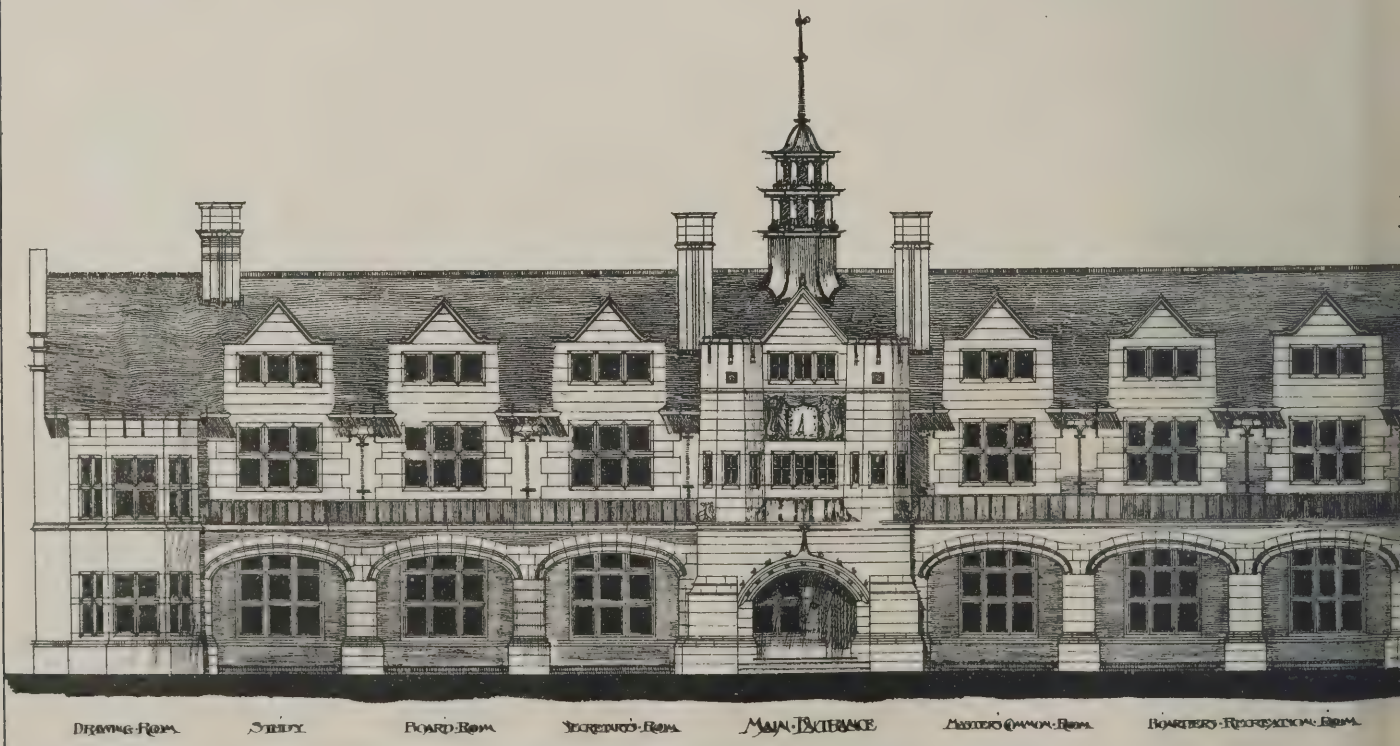
"PHOTO-TINT" by James Akerman 6 Queen Square London W.C

WM LEIPER · R.S.A · ARCHT





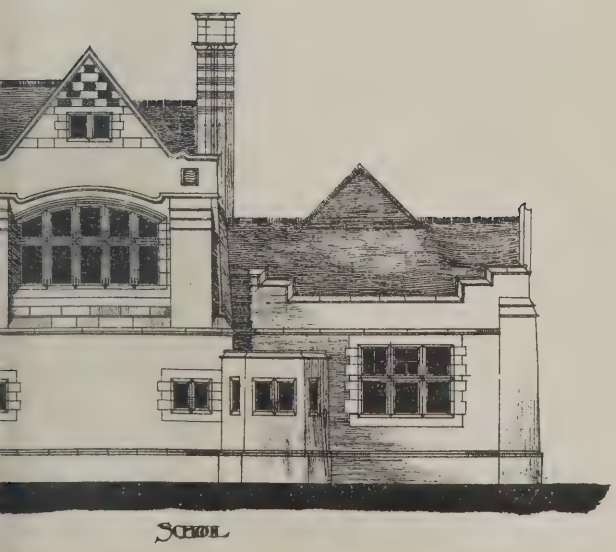
FIRST PREMIATED DESIGN BY MESSRS HALL COOPER &

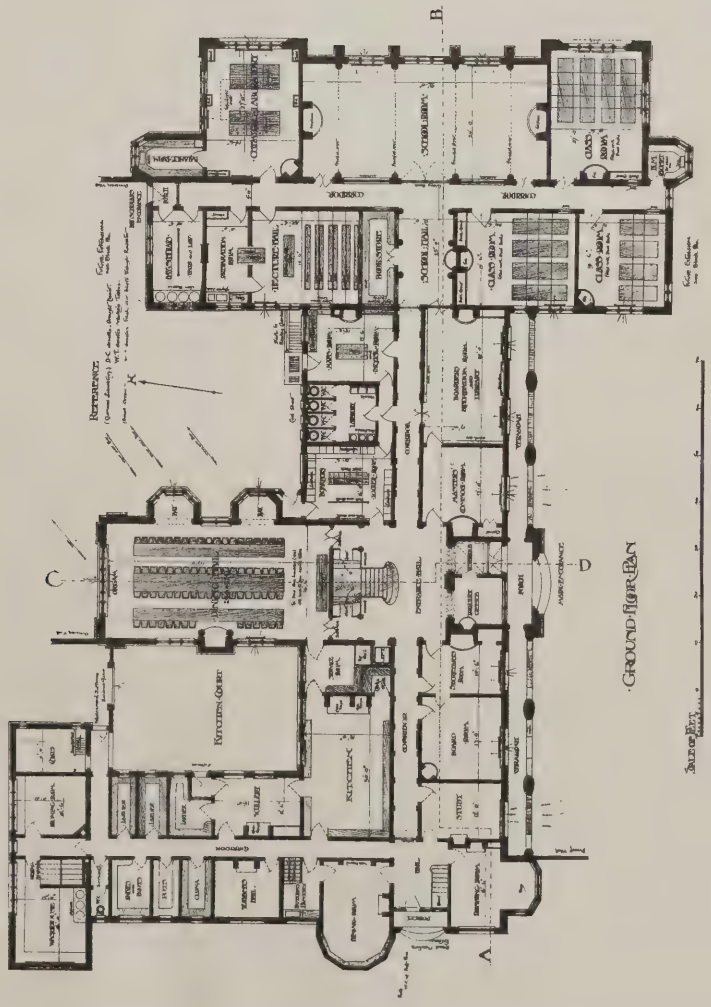


SOUTH ELEVATION TOWARDS QUAD

North Elevation looking towards Scarboro

Wesleyan College Scarboro





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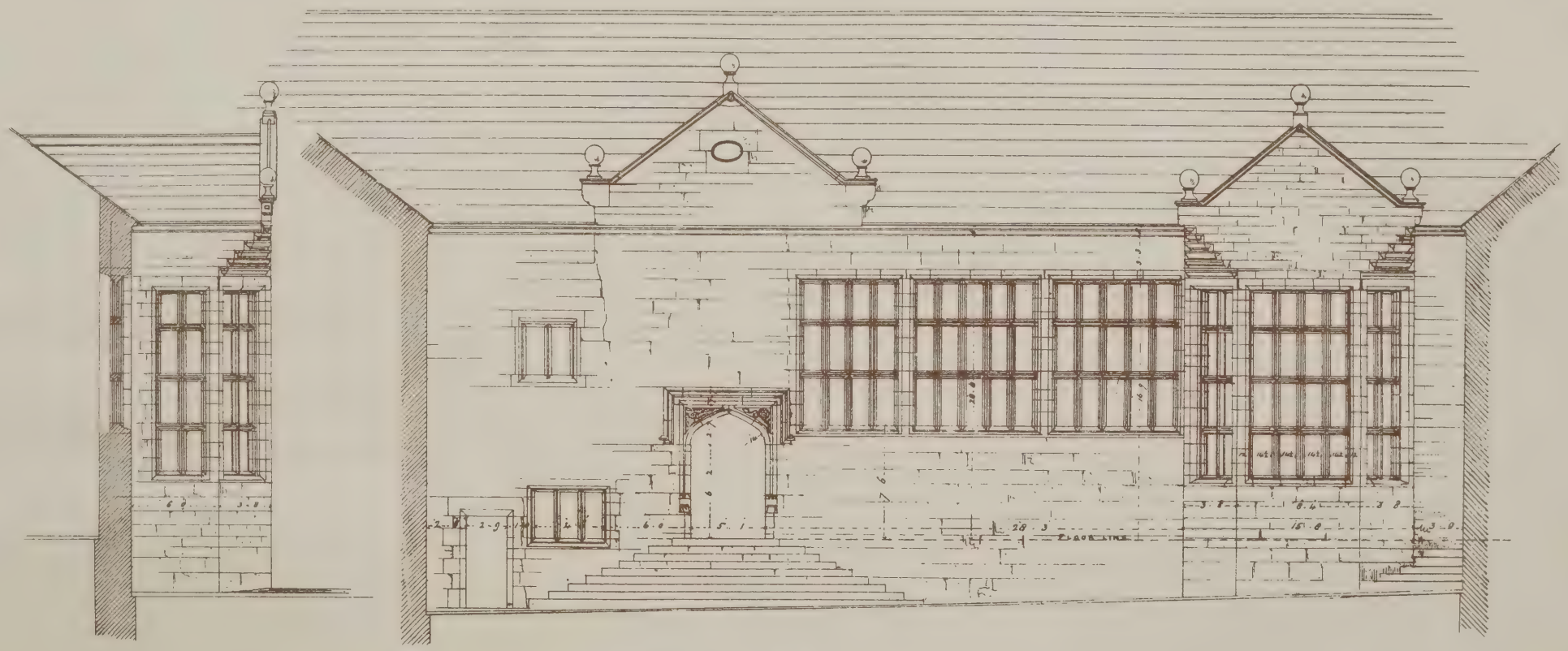
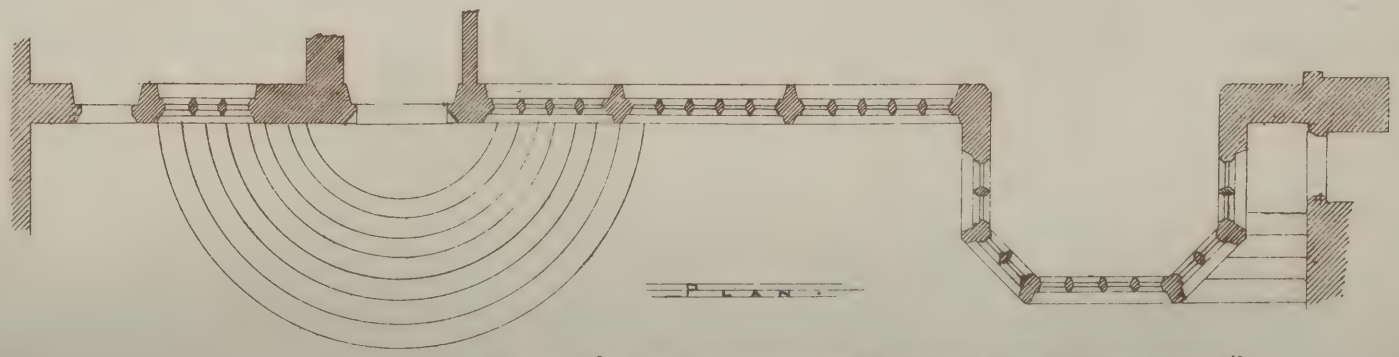




HOGHTON TOWER,

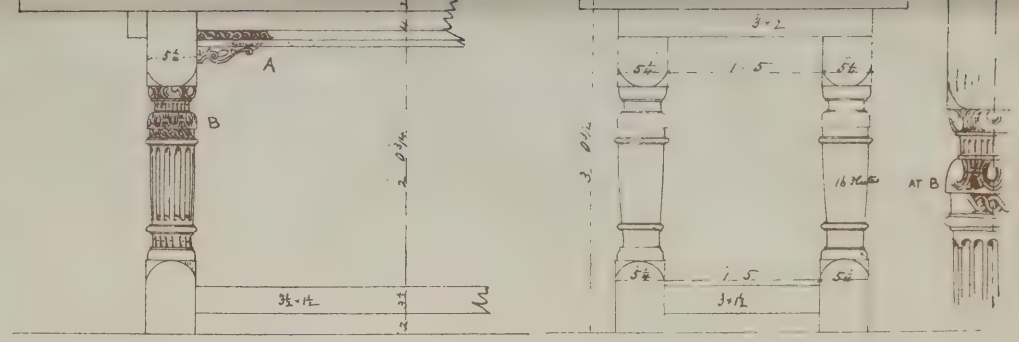
LANCASHIRE.

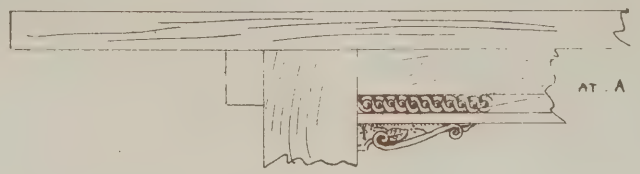
ELEVATION OF DINING-HALL.

PLAN.

SCALE OF FEET.

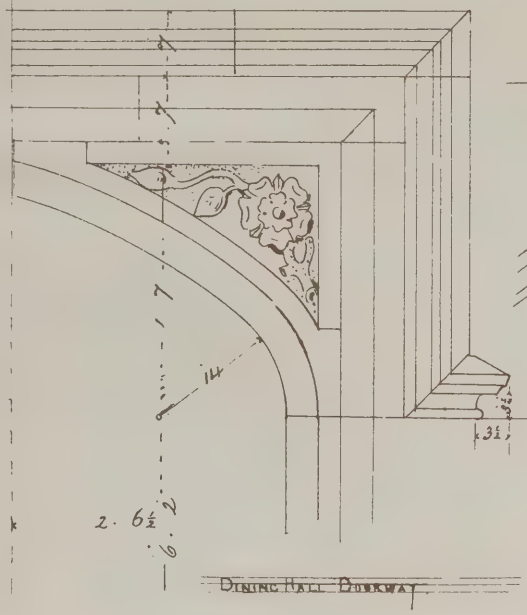
ARCHITECTURAL ASSOCIATION EXCURSION, 1897.



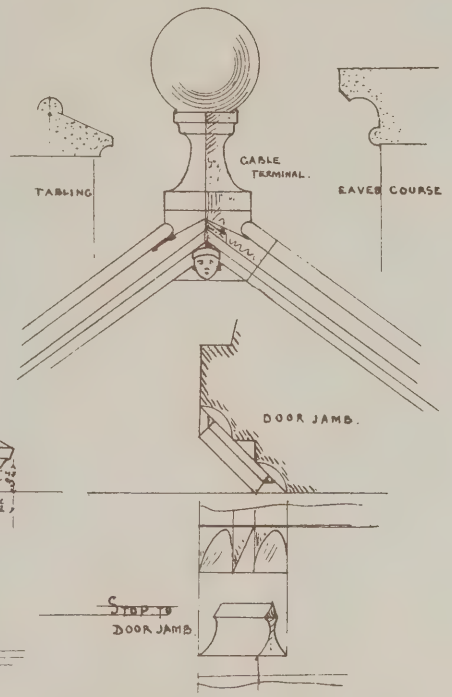


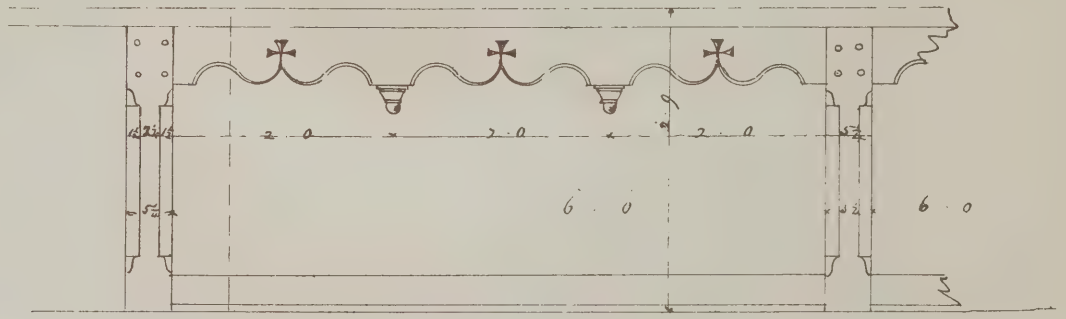
SECTION.

PORTION OF DINING HALL WINDOW.



DINING HALL DOORWAY.

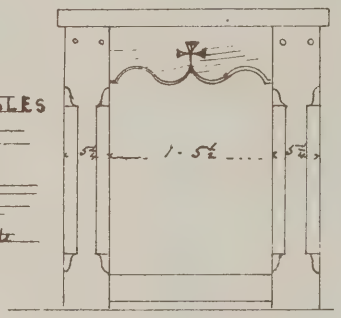


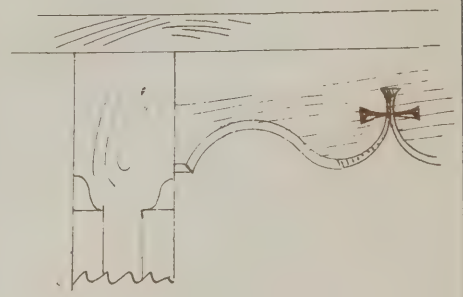


DETAILS OF TABLES IN DINING HALL.

No. 1. 17 is long 3. 0 wide & 3. 0 ¾ high

No. 2. 13. 3 long 2. 6 wide & 2. 9 high.





W. A. WADDINGTON. DELT.

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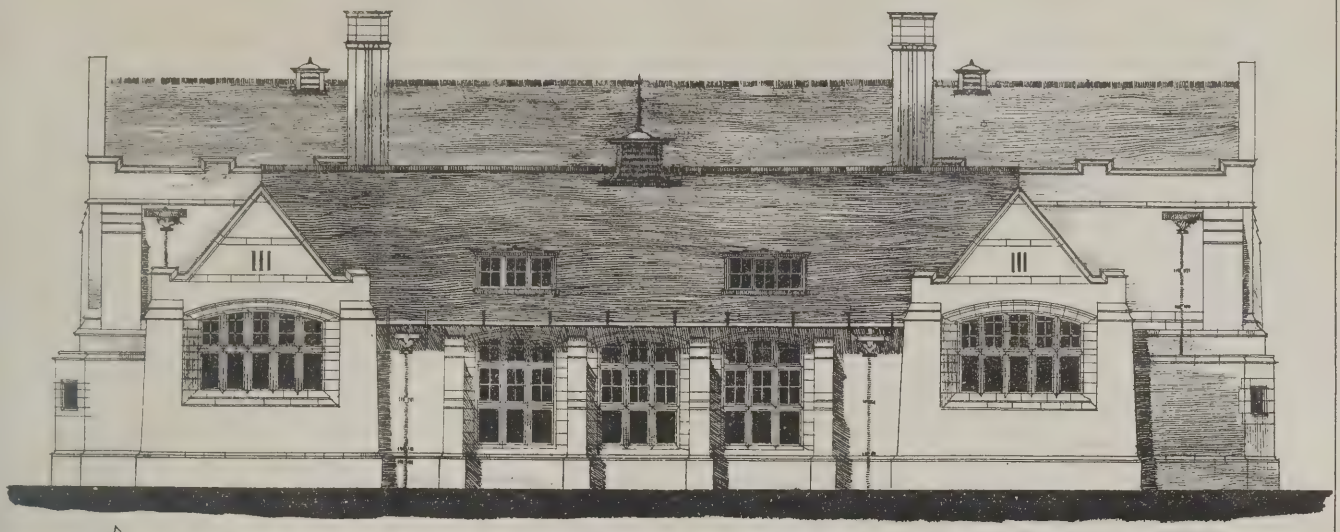

WESLEYAN COLLEGE, SCARBORO

·EAST·ELEVATION·TOWARDS·ILEY·ROAD·

·SIDE·ELEVATION·OF·DINING·HALL·

·WEST·ELEVATION·

SCALE OF FEET

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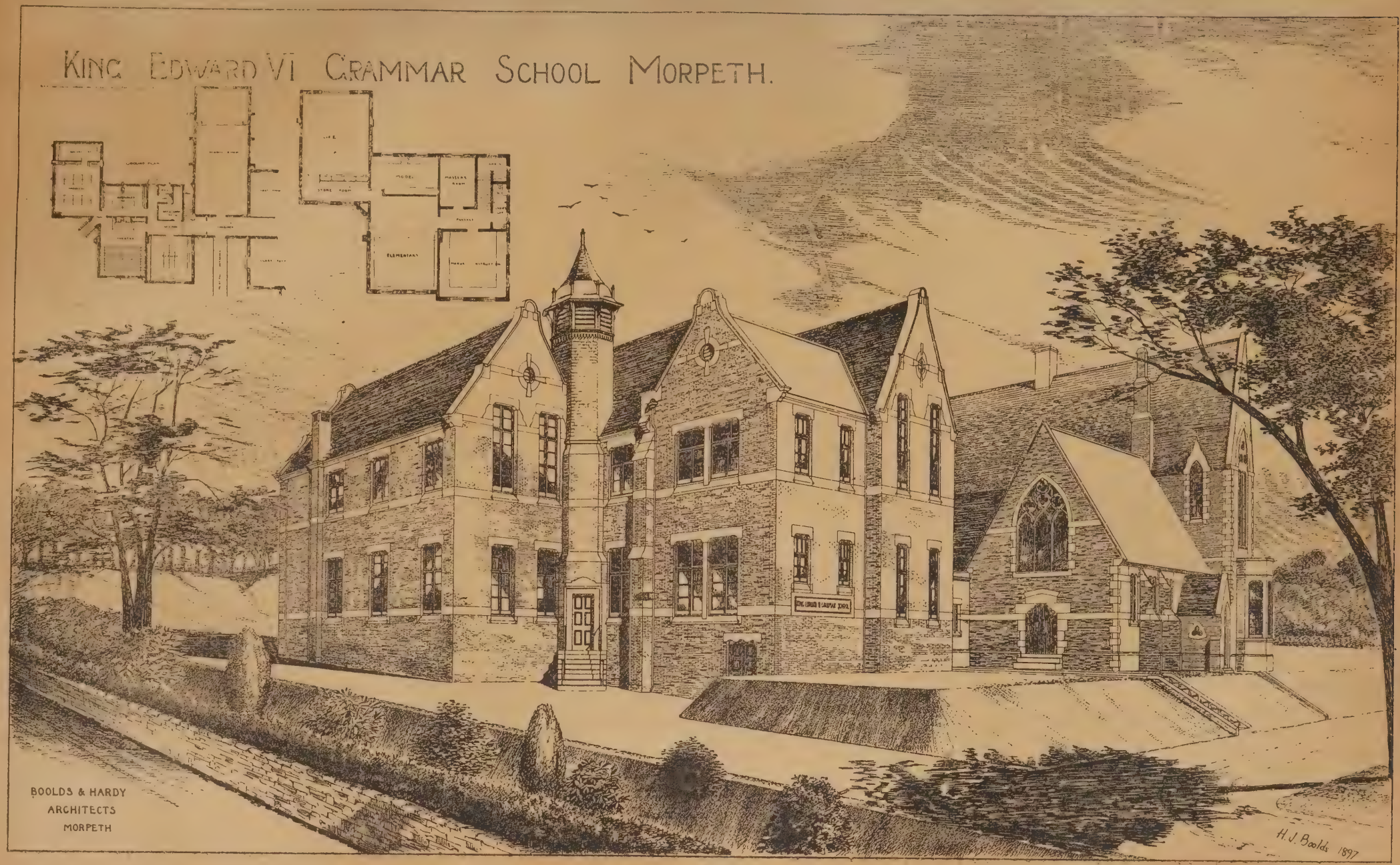
FIRST PREMIATED·DESIGN·BY·MESSRS HALL·COOPER & DAVIS·


KING EDWARD VI GRAMMAR SCHOOL MORPETH.
BOOLDS & HARDY
ARCHITECTS
MORPETH
H. J. Boolds 1897

Engineering Notes.

New Naval Docks at the Cape.—Definite plans for the erection of new docks, basins, and coaling jetties at Simon's Town are now engaging the attention of the Admiralty. The scheme is a large one, and will, if approved, have a strong influence on the fortunes and progress of the naval port. They involve an expenditure of some £2,500,000, although they have been so drawn up that the scheme will admit of modification and curtailment if considered desirable. Mr. Shield, the civil engineer who had been sent to Mauritius to draw up plans for docks by the Admiralty, called at Simon's Town on his way back, and his scheme, which has been approved by the Commander-in-Chief at Simon's Town, is at present under consideration. It is tolerably certain that docks will be constructed at Simon's Town; but the actual site, the date of commencement of the work, and plans to be followed are matters on which no decision has yet been arrived at. The docks, if constructed, will take the largest ironclad afloat, and it is possible that an arrangement will be come to with the harbour board, under which the Royal Navy shall be entitled to a prior claim on the Capetown Dock in time of war. For the construction of extensive docks for the navy, Capetown is, of course, utterly unsuited. It is anticipated that the new reservoir at Simon's Town, which has a capacity of 40,000 tons of water, will be completed in the course of a couple of months. The reservoir, which has been constructed by the Imperial authorities, will be an immense benefit to the port and to the ships, and will obviate the possibility of drought for the future.

CHIPS.

The Princess Henry of Battenberg visited Whippingham Church on Tuesday to inspect the screen being placed in the Memorial Chapel by Mr. Alfred Gilbert, R.A.

The Chancellor of the Exchequer has informed the executors of the late Sir Wollaston Franks that he will remit the estate duty on the bequest to the British Museum, and the collections bequeathed with the condition that the duty should be remitted have now been handed over to the trustees of the British Museum. So large an accession will involve a rearrangement of some of the galleries, and this will be effected in a few weeks, when the whole of this magnificent bequest will be shown to the public.

A stained-glass window in memory of Dr. William Robertson Smith, late professor of Arabic at Cambridge, was unveiled on Tuesday in King's College Chapel, Aberdeen. The four principal lights of the window contain figures of the Hebrew prophets, Isaiah, Jeremiah, Ezekiel, and Daniel. Mr. A. Marshall Mackenzie, A.R.S.A., designed the windows, and the cartoons for the figures were drawn by Sir Edward Burne-Jones. The Marquis of Huntly, Lord Rector of Aberdeen University, of which Professor Robertson Smith was a graduate, performed the ceremony of unveiling in the name of the subscribers.

On Thursday evening in last week the new organ, presented to St. Agnes' Church, Birch, by the congregation, was dedicated for divine service. The cost of the instrument is over £500. The builders were Messrs. Jardine and Co., of Manchester.

The Congregational mission buildings on the Victoria Estate at Wellingborough have just been reconstructed from plans prepared by Messrs. Sharman and Archer, of that town. The infant school fronting Ranelagh-road has been converted into a chapel seated for 400 persons, and new infant school and vestries have been added. Mr. C. W. Abbott, also of Wellingborough, was the contractor, and the outlay has been under £700. Reopening services took place last week.

The Yarmouth magistrates have granted a provisional license for an hotel to be known as the Cliff Hotel, Gorleston. The proposed expenditure is £25,000; there will be sixty bedrooms.

At the last meeting of the Mersey Dock Board it was decided to provide deep water and improved shed accommodation at the Huskisson Dock and Huskisson Branch Docks at an estimated cost of £86,700, and to accept a tender for the supply of wrought steel and ironwork for the extension eastward of the double-story shed at the west end of the north side of the Huskisson Branch Dock No. 2.

The work of repainting and redecorating Blackfriars Bridge has just been commenced, and is expected to occupy a staff of 60 workmen about three months. Messrs. Harrison and Spooner, College-street, E.C., are the contractors.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the Building News, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable The Strand Newspaper Company, Limited.

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One Pound per annum (post free) to any part of the United Kingdom; for Canada, Nova Scotia, and the United States, £1 6s. 0d. (or 6dols. 30c. gold). To France or Belgium, £1 6s. 0d. (or 33fr. 30c.) To India, £1 6s. 0d. To any of the Australian Colonies or New Zealand, to the Cape, the West Indies, or Natal, £1 6s. 0d.

ADVERTISEMENT CHARGES.

The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of Eight words, the first line counting as two, the minimum charge being 5s. for four lines.

The charge for Auctions, Land Sales, and Miscellaneous and Trade Advertisements (except Situation advertisements) is 6d. per line of Eight words (the first line counting as two), the minimum charge being 4s. 6d. for 40 words. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front-page Advertisements 2s. per line, and Paragraph Advertisements 1s. per line. No Front-page or Paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

Situations.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is One Shilling for Twenty-four Words, and Sixpence for every eight words after. *All Situation Advertisements must be prepaid.*

NOTICE.

Bound copies of Vol. LXXII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Pupil.—Some mistake. Architects are not registered or licensed yet. We hope they will be some day.

Received.—F. C. R. and Co.—H. T. G.—W. D.—H. B.—C. and A. B. (Bristol).

Correspondence.

POOR MORTAR.

To the Editor of the Building News.

Sir,—You reported (p. 313) the conviction of a builder, at the instance of the Corporation of Southampton, for the use of mortar not in accordance with the by-laws. I don't doubt the correctness of the decision, as it appears that the sand had a considerable mixture of unctuous, clayey earth, which would cause the mortar to crumble very quickly after its first setting. The clayey particles are soon dissolved on the surface of the work by the action of rain, and disintegrated by frost. This accounts for the squalid appearance of so much of our modern brickwork; it is merely a question of dirty or too fine sand. If only clean sharp sand be used, free from clay, then the bricklayer cannot cheat the mortar of its proper quantum of sand. Were he to attempt to do so, the mortar would be so "short," and would run off the trowel so quick that he could not use it, much less strike a joint with it. Here is the real question for the use by the cheap (and nasty) builder of dirty sand. The dirt takes the place of the lime, and makes the mortar "fat" with less lime. Take care of the cleanness and sharpness of the sand, and the (quality of the) lime will take care of itself.

The above by the way only. Why I write is to comment on the evidence of the building inspector, who said that "mortar deteriorated by being kept after mixing." How does that square with the method of the old Romans, who mixed their mortar and then buried it in pits for two years before using it, with such excellent results that we now, so many centuries after, find it harder than the stones and brick which it joins. It would be interesting to know whether the inspector's knowledge is derived from experience in buildings, old as well as new, or merely from books and exam. crams.—I am, &c., A. H.

INCOME-TAX OVERCHARGES.

Sir,—The interest which has been aroused in regard to Income-tax by the correspondence in the *Times*, and the articles which have appeared in a large number of other metropolitan and provincial papers, has resulted in calling attention to many grievances which taxpayers suffer; but there is one practice of the Inland Revenue Authorities which we think quite unjustifiable, and which seems to have been overlooked. The practice referred to is that of sending to traders and others at this period of the year a blue notice of charge, showing an assessment of profits at £160, and allowing the whole by way of abatement, no tax being demanded in respect of the business profits. Of course, where those who receive such notices have no income from any source other than their business, no injustice is done; but in the case of such as have income from other sources from which tax has already been deducted, the effect is to bar their right to claim repayment, unless the assessment of the business profits be appealed against, the full abatement having already been allowed.

It is, therefore, of the utmost importance that those of your readers who are now receiving notices of charge for the year 1897-8 should, if the amount at which they are assessed is greater than the average of their profits for the three year ending April 5, 1897 (or at such a prior date as they usually make up their accounts), at once give notice of appeal in accordance with the instructions on notice of charge. Moreover, if they find that the profits of the three years named show an average profit less than the amount upon which they paid tax for 1896-7, they should give notice of appeal in respect of that year also, and claim repayment of the amount overpaid. There is no time to lose in business appeals, as this class of claim for repayment should have been made before now; while a claim to set off a loss in farming or business against income from other sources must be lodged before October 6th next.

Many people are now entitled to make a claim on one ground or another for three years to April 5th last, and the tax recoverable might amount to £38.

We are at all times happy to advise your readers whether they can make a claim, on their sending us full particulars of their income and a stamped envelope for reply.—We are, &c.,

The Income-Tax Adjustment Agency.

12 and 13, Poultry, London, E.C., Sept. 1.

The Health Committee of the Sheffield Town Council have appointed Mr. James Jackson, scavenging superintendent under the Huddersfield Corporation, to the charge of the similar department at Sheffield. The Huddersfield salary was £175 per year, and the Sheffield stipend is £225, rising by £25 each year until £300 is reached.

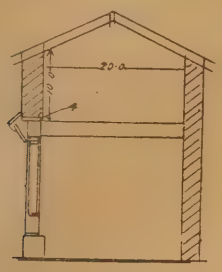
The corporation of St. Helen's, Lancs, having applied to the Local Government Board for sanction to borrow £67,328 for various projected works, Colonel W. Langton Coke, M.I.C.E., held an inquiry yesterday (Thursday) into the matters concerned at St. Helen's Town Hall. It is intended by the corporation to borrow £20,228 for increasing the water supply to the town by erecting a pumping station on the site at Melling, near Ormskirk, purchased some time ago; £25,000 is required for the extension of the gasworks; £17,000 for extending the electric-lighting plant; £2,600 for paving streets, and £2,500 for the alterations to the town-hall.

Since the Court of Session at Edinburgh rose for the summer vacation, Messrs. William Bryden and Sons, George-street, Edinburgh, have been engaged, under the direction of Mr. W. Wybrow Robertson, H.M. Board of Works, in fitting up an installation of electric lighting in the various courts and other rooms. The hall is to be lighted by 48 32c.p. lamps fixed to the bottom of the pendants of the ornamental oak ceiling. These will be lighted in eight circuits of six lamps each. All the court-rooms, eight in number, will be lighted with electricity, as well as the judges' retiring-rooms, the advocates' robing-room, the entrance hall, and other places. The whole contract includes 208 lights of various candle-power, equivalent to 640 lights of 8c.p.

Intercommunication.

QUESTIONS.

[11764.]—**Size of Girder.**—What is the best and most expeditious way of calculating the weight of brickwork, flooring, &c., to be supported on iron or steel joists fixed at both ends, so as to calculate the necessary size of joist to be taken from a well-known maker's catalogue? Suppose the above to be a section through a shop-front.



I should like to have the calculations for determining the size of girder at A, span of girder 22ft. Any other particular will be thankfully received by—A STUDENT.

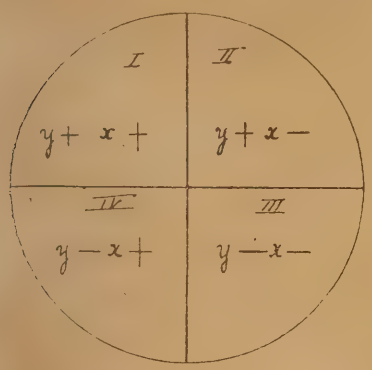
[11765.]—**Architect's Claim.**—Some time ago I prepared plans for a three-story building in a neighbouring town which were carried out. The joiner contractor had a friend who was to build also, and he (the joiner) made an exact copy of my plans off the working drawings, for a two-story block, which has been carried out. All conform to mine. Can I make any claim against the joiner, or against his friend, for this piece of work? An early reply will be much esteemed.—A YOUNG ARCHITECT.

[11766.]—**Dumpy Level.**—What differentiates a dumpy level from any other level? What is the exact meaning of "dumpy," as applied to a level?—W. M.

[11767.]—**Magnesium Cement.**—I shall feel obliged if some reader of the "B.N." will kindly inform me what the ingredients are for making this cement.—AN OLD SUBSCRIBER.

[11768.]—**Measuring Ditch.**—Can any of your readers inform me what is the distance allowed in different counties from grower to edge of ditch when the latter is not well defined, and whether there is any book or pamphlet published giving this information? The practice varies, I believe, in different parts of the country.—SURVEYOR.

[11769.]—**Mathematical.**—In the regulations for the guidance of surveyors issued by the Cape Colonial Government, one of the sections reads as follows:—Par. 6, § d. "The positive directions of the axes to which



co-ordinates stated on any document are referred, shall be such, that positive angles increase in the same direction in which the angles increase from 0° to 360° as marked on the horizontal circles of theodolites." This method seems so plain and natural that one is surprised that in works on coordinate geometry the reverse should be practised. Will one of your mathematical readers please give an explanation?—M.

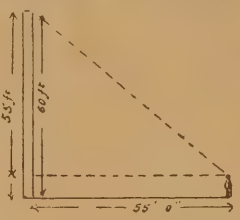
[11770.] — **Greenhouse Stove.**—I have a stove which heats my greenhouse. The inside of the furnace is circular (18in. in height, 12in. in diameter). I have been using coke, but wish to use gas. Can any reader suggest a plan for applying same? The inside of the furnace can only be approached by the usual door (about 4in. square).—AMATEUR.

REPLIES.

[11745.]—**Artificial Stone.**—Not knowing the exact shade of Dumfries red sandstone, I cannot do more than give a general formula, what is this:—Select a sand as near the colour you wish to imitate, and mix this dry with equal parts of Portland cement (by measure), and moisten the mixture with a saturated solution of sulphate of iron (*i.e.*, green vitriol or green copperas, as this salt is called by drysalters); this sulphate will redden the sand, and give it a deeper colour, because the sulphate of iron will become converted into iron carbonate, and eventually into iron or red oxide of iron on its exposure to the air.—H. C. S.

[11746.]—**Drainage of Street House.**—Speaking from personal experience of a leakage due to defective jointing of the drain-pipes, I would strongly recommend "Householder" to adopt the most sensible plan of having the defective drain-pipes repaired and cemented in. It is needless to describe my own experience through breathing the foul emanations that at times oozed up from the floor of the room from the defective drain-pipes laid underneath. Suffice it to say that the stench, and sometimes almost odourless sewer-gas nearly sent the writer and his family into the next world. One curious sensation of breathing these fumes was as if our heads were being cramped or squeezed in a vice. Where the writer lives, a village fast becoming a town, containing about 10,000 inhabitants all told, there are thirteen doctors, who make a fat living out of the extraordinarily numerous cases of illnesses rife in the parish. Most of these illnesses are due to defective drains, and those which are not are due to the houses being built on a clay soil or else dustbin rubbish.—H. C. S., Erdington, Warwickshire.

[11751.]—**Trigonometry.**—This question is not fully

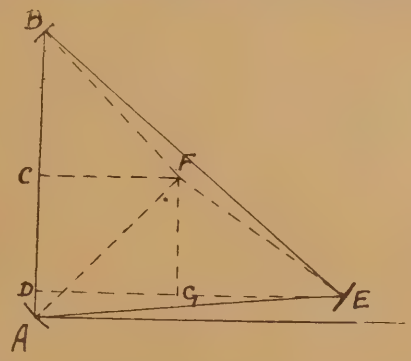


stated; but taking the column to be upright, the solution is obvious, as sketch will show.

Distance = cot. 45° × (60 − 5) = 1 × 55 = 55ft.
—NO SIG.

[11751.]—**Trigonometry.**—"Student" does not say whether the calculated distance is to be worked out geometrically or arithmetically. Here is a geometrical solution:—Erect a perpendicular A B, and measure it into 60 equal parts at C (five of these parts for the foot of the perpendicular), draw an indefinite line, C D, perpendicular (*i.e.*, at right angles) to A B, then from the point A draw a line, A E, at an angle of 45° with A B, cutting the line C D in F, then the length of C F will be the distance required, calculated accurately to the equal parts into which A B is divided.—H. C. S.

[11751.]—**Trigonometry.**—Let A B represent the pillar; let A C = C B = 30ft.; let A D = 5ft., the height of the eye; then the observer's eye must be somewhere in



the horizontal line D E; let C F be drawn at right angles to A B, and let C F be made = C B = 30ft.; then the circle described with F as centre and F A or F B as radius will cut D E at E, the position of the observer's eye; for, join E A, A B, then—

angle A F B = 2 angle A E B (Euc. III. 20)

that is— 2 angle C F B = 2 angle A E B

∴ C F B = A E B

∴ A E B = 45°.

Now— $FB^2 = FC^2 + CB^2$ (Euc. I. 47)

$= 2CB^2 = 2 \times 30^2 = 2 \times 900 = 1800.$

Again, draw F G perpendicular to D E, then—

$GE^2 = FE^2 - FG^2 = FB^2 - FG^2$

$= 1800 - 25^2 = 1800 - 625 = 1175$

$\therefore GE = \sqrt{1175} = 34{\cdot}278\text{ft.}$

∴ D E, the required distance = 64·278ft.

If the formulæ for compound angles are at our disposal, the problem may be worked as follows:—Using the same figure, let the distance D E = x feet, let angle A E D = θ, and let angle D E B = ϕ.

We have— $\tan.\theta = \frac{AD}{DE} = \frac{5}{x}$ ..... (1)

$\tan.\phi = \frac{DB}{DE} = \frac{55}{x}$ ..... (2)

Now— $\tan.(\theta + \phi) = \frac{\tan.\theta + \tan.\phi}{1 - \tan.\theta \tan.\phi}$

That is— $\tan.45° = \frac{\tan.\theta + \tan.\phi}{1 - \tan.\theta \tan.\phi}$

$\therefore 1 - \tan.\theta \tan.\phi = \tan.\theta + \tan.\phi.$

Substituting the values of tan. θ and tan. ϕ from equations (1) and (2), we have—

$$1 - \frac{5}{x} \cdot \frac{55}{x} = \frac{5}{x} + \frac{55}{x}$$

$$\therefore x^2 - 275 = 5x + 55x = 60x$$

$$\therefore x^2 - 60x = 275$$

$$\therefore x^2 - 60x + 30^2 = 275 + 30^2 = 275 + 900 = 1175.$$

$$\therefore x - 30 = \pm\sqrt{1175}.$$

$$\therefore x = 30 + \sqrt{1175},$$

as before, the only admissible answer.—J. C. PALMER.

[11752.]—**Cement for Marble.**—"Marmo" does not say what is the kind of marble he wants to cement, whether white statuary or a coloured marble. In the writer's book on "Cement, Pastes, Glues, and Gum" (published by Crosby Lockwood and Co. at 2s. 6d.) there are a dozen recipes or so for cementing marbles of all kinds. For white marble, dissolve alum in water until no more alum will dissolve, then mix the alum-water with plaster of Paris, and bake the mass in a hot oven until it is dry and hard, then reduce this hard mass to powder, and use it as required by mixing the powder with a little water pigment. This cement may be coloured with any mineral.—H. C. S.

[11754.]—**Student's Exam. R.I.B.A.**—I have found the following books very useful, and probably "W. R. H." would do well to work them up thoroughly, selecting such portions as are indicated in the syllabus of the Institute exams. It may be observed, however, that the examiners do not confine themselves strictly to the syllabus laid down, nor to any particular textbook, but appear to require a very sound and thorough knowledge of general principles, and of the various subjects as far as indicated in the syllabus:—*Classic Architecture.*—W. H. Leeds' "The Orders" (Weale's Series), Smith and Slater's "Classic and Early Christian Architecture," Spiers' "Orders of Architecture." *Gothic Architecture.*—Parker's "Glossary of Terms," Parker's "Manual of Gothic," Rickman's "Styles of Architecture in England," T. R. Smith's "Gothic and Renaissance Architecture." *Science Section.*—Seddon's "Builders' Work," Rivington's "Notes on Building Construction," Vols. I., II., and III., or Mitchell's "Advanced Building Construction," Magnus's "Lessons in Elementary Mechanics," Usill's "Practical Surveying," Angel's "Advanced Geometry and Projection." Besides the above, Gwilt's "Encyclopedia of Architecture" will be found useful for reference on particular subjects. A more complete list of works will be found in the Institute syllabus.—H. BUSBRIDGE.

[11755.]—**Architect's Drawings.**—The client and builder will still sign their names at one corner of each drawing; but it will be sufficient to get them to sign the agreement or contract referring therein to the drawings, which may be numbered.—AJAX.

[11757.]—**Asbestic.**—If "A Constant Reader" obtains the particulars from the company, he will get all the information he requires. There is no difficulty as to using, and it will answer as well on brick as on laths. Metal laths are particularly good, as they make a very secure "key," the plaster going through the apertures and expanding behind. The "expanded metal laths" make a capital groundwork.—A. J.

[11757.]—**Asbestic.**—"A Constant Reader" can obtain all information, and see specimens of asbestic plastering laid on many kinds of surface of Messrs. Witty and Wyatt, 86, Leadenhall-street.—A. M.

[11761.]—**Boundary Walls.**—It would certainly be best to build the walls in horizontal courses from stepped foundations, and not to course parallel with the falling roadway. The latter would not only be ugly, but would have a tendency to slip in the direction of the fall. Finish the tops with ramps, as you yourself suggest, or with piers. If concrete be used at the foundations, see that its continuity is not broken at the steps, but that it is there overlapped.—A. H.

[11761.]—**Boundary Walls.**—The foundations should be cut in long steps, according to the fall of roadway, by which means the quantity of brickwork is saved. The courses are, of course, on this plan laid level. There are several modes of construction. The top of wall is sometimes simply formed in steps, forming a kind of step-like embrasure, the horizontal portions weathered or coped, and the vertical ends built with square end, the coping being made to stop against it. In some parts of England, as in Sussex, we find a very nice wall built of flint or rubble, with brick copings and dressings at ends of each ramp. Sometimes the wall is panelled, the red brick being built all round a rubble centre. On the Continent, the top of wall is weathered by tiles, with cresting, these stopping dead against the upright ends, and the effect is pleasing. Walls of the local rubble or flint, the angles and plinths and copings and angles of walls being of dressed stone, are handsome, and at Eastbourne and Folkestone these walls are commonly used to inclose the villas and large residences. As regards cost, the saving in building with raking courses would be slight, as such walls are less durable than the ramped.—G. H. G.

[11761.]—**Boundary Walls.**—There are several ways of building boundary walls. If the ground or roadway falls, or has an inclination, the best way is to ramp it at intervals; the greater the fall, the more numerous the ramps. Walls are sometimes built in courses parallel to the roadway when the fall is not great; but such never look well. The ramps should be finished by curves in the ordinary manner; but a better and more effective wall has piers built at the various steps, or changes of height, which piers, give both strength and appearance. These piers may be 18in. or 22½in. square, according to the thickness of wall. Of course, this method of ramping is the most costly. In the ramped plan the foundations are stepped to the incline, and the courses made level.—CRASTER.

The 49th annual report of the Operative Bricklayers' Society shows that the society has made steady progress during the past year. The members have gained the following increases in their wages:—Six towns 1d., 22 towns ½d., and three towns ¼d. per hour. Next year will be the Jubilee year of the society, and there is one member surviving who entered in 1848—viz., James Garland, of the Lambeth branch.

The death is announced of M. Léon Gautier, the eminent palæographer. Born at Havre in 1832, he entered the Ecole des Chartes in 1855, and, on the completion of his studies, was appointed archivist of Haute Marne. In 1859 he received a post in the National Archives, and in 1871 he became Professor of Palæography at the Ecole des Chartes. In 1887 he succeeded M. Natalis de Wailly in the Academy of Inscriptions.

WATER SUPPLY AND SANITARY MATTERS.

MANCHESTER.—The city council, at a late meeting, again had under consideration the problem of how to dispose of its sewage. The artificial filtration scheme reported upon by Mr. T. de Courcy Meade, the city surveyor, was discussed, and the cost of it was declared to be prohibitive—viz., first cost of the proposed filters to deal with the tank effluent, £275,000; annual outlay in renewing the filtering materials, £31,820; working expenses per annum, £5,220. The Rivers Committee have advised that the culvert scheme be reverted to, the effluent after chemical treatment to be taken to the tidal waters of the Mersey. This scheme was explained in detail at Wednesday's meeting of the city council. The proposal is to construct a culvert 16 miles long, extending from the sewage works at Davyhulme to the estuary of the river Mersey. It was explained that, if Parliament granted permission for the undertaking, the culvert would be used, not for the purpose of conveying the crude sewage of the city into the river, but the effluent, which would have no deleterious effects whatever upon the water. The cost and maintenance of the culvert was estimated at £258,000, or much less than the expense attending upon artificial filtration. The deputy chairman of the Rivers Committee, Mr. Saxon, said that one great argument in favour of the scheme was that it would be definite and comprehensive, and provide a clear way out of their difficulties. It was also mentioned that plans for a similar culvert had been passed by Parliament, at the instance of the Glasgow Corporation, for discharging the effluent of that city into the Clyde. The council, with a few dissentients, adopted the proposal, and authorised application being made for Parliamentary powers.

PORTSMOUTH.—Efforts have been made by the Portsmouth Town Council to acquire the water-supply of that town. The directors of the water company have been communicated with, and it has been ascertained that the purchase would cost more than a million sterling. The Local Government Board have been asked to extend the time for the repayment of the money, which would have to be borrowed from sixty to eighty years, but they decline to do so, and intimate that they should oppose any such proposal if embodied in a Bill. Recently, attention has been directed to the water company's charges, and the opinions of counsel have been taken. Mr. Asquith, Q.C., and Mr. Cripps, Q.C., are of opinion that the company are not justified in charging upon the gross value of the houses, but that their assessments should be based upon the rateable value. Sir Edward Clarke, Q.C., inclined to the view that the company are authorised under the provisions of their Act, which was passed in 1857, to charge upon the rent, but was not very positive upon the point. The special committee having the question of water purchase in hand are about to submit the legal opinions to the town council, and to ask for further instructions.

THE WELSH WATER SUPPLY FOR BIRMINGHAM.—The members of the Association of Municipal and County Engineers, with their president (Sir A. R. Binnie, Chief Engineer to the London County Council), on Saturday visited the works which are in progress in the Elan Valley (Mid Wales) for the supply of water to the City of Birmingham. The visitors were received by Mr. James Mansergh, the engineer, who, with his staff of assistant engineers, conducted them over the works, and explained the various points of interest of what is the largest water supply scheme which has yet been undertaken by any municipality in England. On the conclusion of the visit, Mr. Mansergh entertained the party to dinner in the Public Hall in the Elan Village. Sir A. R. Binnie, in proposing the health of Mr. Mansergh, said they had had an opportunity of inspecting one of the largest engineering works of their time. It was his and Mr. Mansergh's fate many years ago to first visit that district on works of another kind, and since that time they had always carried with them the most pleasant recollections of the time they spent in Mid-Wales. Mr. Mansergh, in replying, said that when 35 years ago he and Sir Alex. Binnie were surveying the Cambrian Railway, they both of them chose the Elan Valleys as sites for reservoirs, and if he (Mr. Mansergh) had not got a little ahead for Birmingham, no doubt Sir Alexander Binnie would have seized on that site for London.

At Grimsby last week, a memorial stone was laid of a girls' school for St. Andrew's parish, now being built in Strand-street. Mr. F. S. Kelton, of Grimsby, is the architect, and Mr. Hewins is the builder.

The Dingwall Town Council have decided to adopt the electric light, the scheme submitted by Mr. R. F. Yorke, of Glasgow and Stirling, being the one accepted. This scheme includes Strathpeffer also, and the two places will be worked from one centre. The water-power will be obtained from the river Peffry.

Our Office Table.

THE Corporation of Walsall has arranged to hold the first exhibition of oil pictures in the Borough Art Gallery during the coming autumn. It will be opened on October 4 and closed on January 1, 1898, the "sending in" days being September 16 and 17. Should this exhibition be a success, it is proposed to repeat it annually. The nucleus of a permanent collection for the town has already been formed, and the arts committee, following the plan adopted by Liverpool, have decided each year to purchase pictures from the autumn exhibition.

THE sudden stoppage of Big Ben one day last week was not, it seems, due to eccentricity, but was the result of accident pure and simple. The large cap, or nut, weighing 13lb., which fastened the hands of the south dial, became unscrewed, probably on account of the vibration caused by the striking of the great clock. On being released the piece of metal fell upon the official residence of the Serjeant-at-Arms, a distance of 200ft., penetrated one of the iron plates of the roof, and lodged in the ceiling below. The clock continued on its course, but, as there was a possibility of the hands falling away, the south dial was stopped. The makers were communicated with, and soon succeeded in replacing the nut.

MR. RICHARDSON EVANS, the hon. secretary of the National Society for Checking the Abuses of Public Advertising, calls attention to the fact that one of the shot towers near the approach to Waterloo Bridge has been disfigured by huge letters advertising the trade of Mr. Dewar, one of the persons designed for the post of Sheriff of the City of London during the coming year. Mr. Evans appeals to the Sheriff-elect to remove this colossal eyesore from a once picturesque feature of Thames-side, adding: "One who occupies a conspicuous place in municipal life is under a particular obligation to abstain from affronting his fellow-citizens. As matters stand, it must be thought that Mr. Dewar is wanting either in perception or public spirit. He demonstrates his unfitness for civic honours if he is content to say that he will do all that the defects of the law will allow him to do towards destroying the dignity and beauty of the city which he professes a desire to serve."

PREPARATIONS have now been completed for holding at Leeds the 16th Congress and Exhibition of the Sanitary Institute, which will open on Wednesday week, September 14, with a reception of the members, who are expected to number 1,200 or 1,300. A strong local committee, of which Sir James Kitson, M.P. (Lord Mayor of Leeds), is chairman, has been formed, upon which upwards of 1,000 of the leading men in the county have placed their names. Dr. Robert Farquharson, M.P., has been appointed president of the congress, and among the vice-presidents are the Duke of Norfolk, Marquis of Ripon, Bishop of Ripon, Dr. Eden (the new Bishop of Wakefield), the Earl of Scarborough, Earl of Cranbrook, Earl of Harewood, and Lord Halifax. On the opening day, after the reception by the Lord Mayor and a public luncheon, the president will deliver his inaugural address, and in the evening the Lord Mayor of Leeds will open the Exhibition buildings to the public. The remaining days will be occupied with discussions in conferences and sections on "River Pollution," "Municipal Work," "Sanitary Work," and, for ladies, "Domestic Hygiene." More than 700 delegates have been appointed by the universities, learned and scientific societies, county, urban, and district councils, and other public bodies, to follow the discussions.

THE annual report of the borough surveyor of Stockport, Mr. John Atkinson, A.M.Inst.C.E., states that during the twelve months ended March 31, 1897, 187 plans were submitted for approval, including four places of worship, one school, ten factories, and 440 houses, the total being slightly above the average for the past few years. The buildings, for which plans were approved during the past year, have mostly been commenced or completed, with the exception of about 200 dwelling-houses, of which, however, a large quantity are in course of erection. Number of houses actually built, 219; including 162, plans for which were passed prior to March, 1896. Excluding private estates, land for which plans of intended streets have been approved, and the land necessary to be set apart for streets in the future, the area available in the borough for building purposes at March, 1896, was about 425 acres. The amount absorbed for building operations during the year ending March, 1897, was five acres, leaving an area of land yet unbuilt upon of about 420 acres. Various street improvements are in progress, at an estimated expenditure of about £7,200, in addition to the construction of a main intercepting sewer and outfall works, for which Mr. A. M. Fowler is the engineer, at a cost of about £45,000, gasworks extensions, costing some £36,000, and the building of public baths, £3,000, and weights and measures offices and police parade-room, each costing £2,000. The area of the borough is 2,200 acres, the estimated population 79,000, the density of population being 35·7 per acre, and the death-rate 20·6 per 1,000.

THE Thirty-first Annual Convention of the American Institute of Architects will meet in Detroit, Michigan, on Wednesday, September 29, continuing three days. Papers will be read by Professor C. F. Osborne, of Cornell University, Mr. Henry Van Brunt, of Kansas City, and Mr. Cass Gilbert, of St. Paul, on "Architectural Education, and its bearing on Membership in the Institute"; by Mr. R. C. Sturgis, of Boston, on "Church Architecture"; and by Mr. Henry Rutgers Marshall, of New York, on "Architectural Truth." Many radical amendments to the constitution and by-laws will be brought forward by the committee, and some of them are expected to give rise to a considerable amount of discussion.

THE *Yale Scientific Monthly* describes a new process of manufacturing mosaic floors. Small particles of wood, such as sawdust, wood, flour, and fine shavings, are treated first with a mixture of shellac and alcohol, and with them a cement made of curd and slaked lime, and, while this mixture is still damp, it is put into hot moulds of the desired shape and size and placed under pressure; the joint action of the heat and pressure unites the wood most thoroughly with both the shellac and the cement, and after a few minutes the compound is taken out of the moulds and completely cooled and hardened. Great care is necessary that no foreign substance, especially of an oily nature, be present, as this would prevent the cement from being absorbed into the pores of the wood. In making different-coloured mosaic the natural colour of the woods used is taken into account, then the wood itself is dyed, and, lastly, dyes dissolved in alcohol are mixed with the shellac. The process is then performed as before. It is said that, notwithstanding its hardness, this compound possesses all the perfection of wood, thus rendering it of particular adaptation for use as a floor-covering in the case of living-rooms and private dwellings, and the advantage is claimed for it of being unaffected by any changes of temperature.

THE coming election of the first mayor of Greater New York is creating quite a stir in political circles in that extended municipality. He will rule over a city containing 359·75 square miles and a population of 3,200,000. The Department of Buildings is to consist of three commissioners, each of whom has the power to appoint and remove subordinates. The superintendents of buildings shall, it is ordained, each be a competent architect, engineer, or builder, of at least ten years' practice. The inspectors shall be competent men, either architects, engineers, masons, or carpenters, who shall have served five years as such; but it shall not be lawful for any employé of the department to be engaged in carrying on any such business while holding office in the department. The commissioners shall have the power to pass judgement upon all plans for buildings of any kind, and such plans must conform to the rules and regulations established by the board. An appeal from the decision of a commissioner will be decided by the board. The new city will start with 167,000 buildings, 130,000 of which are residences.

A Wesleyan chapel is about to be built in High-street, St. Alban's, from plans by Messrs. Gordon Lowther and Gunton, of Finsbury House, Blomfield-street, E.C. The contractor is Mr. E. Dunham, of Victoria-street, St. Alban's.

Mr. John Hall, of Newcastle-on-Tyne, ship-owner, has offered £100,000 to build a new infirmary for the city, conditionally upon a site being procured on the Castle Leazes or Recreation Ground, upon the outskirts of the city, and also that the subscribers of the £100,000 already raised to erect a new infirmary on the site of the existing institution allow that money to be devoted to its maintenance.

Trade News.

WAGES MOVEMENTS.

KEIGHLEY.—The joiners of this town have agreed to accept 7½d. per hour, a forty-eight hours week, and overtime to be paid time and a quarter.

NORTH WALES SLATE QUARRIES.—After a strike extending over nearly a year, "bargain-letting" recommenced on Wednesday at Lord Penrhyn's Carnarvonshire slate quarries. There was no friction, and most of the old hands have been re-engaged.

THE STRIKE OF BLACK COUNTRY BRICKMAKERS.—The whole of the yards in the Oldbury and West Bromwich districts which were affected by the recent strike are now in full swing, the discontented section of the operatives having all resumed work. It is very probable that early steps will be taken for the establishment of a wages board, with the view to prevent similar disputes in the future.

CHIPS.

The David Lewis trustees handed over, on Tuesday, to the corporation of Manchester, 19 acres of land at Blackley, to be used as a recreation ground for children. The ground cost £8,000, and the laying of it out about as much more. The whole expense has been borne by the trustees. A similar gift was also made on the same day to the Salford Corporation, the trustees presenting 25 acres of ground at Peel Park, to be used for the recreation of children. The cost has been £16,000.

The parish church of Knutsford is now undergoing considerable repairs and alterations under the superintendence of Messrs. Darbyshire and Smith, of Manchester. The work consists of general repairs to the fabric, new staircases to the north and south galleries, and the removal of the west gallery, together with a scheme of decoration prepared by the architects.

The War Office has asked the sum of £40,000 for the site of the infantry Barracks in Regent-road, which the Salford Corporation has been urged to acquire for the purposes of are creation ground. It is extremely doubtful whether the Salford Corporation will consent to pay such a price. The area of site is 50,000 square yards.

A new workhouse infirmary is being constructed at Lanchester, Co. Durham, from plans by Mr. J. W. Rounthwaite, A.R.I.B.A., of Mosley-street, Newcastle-on-Tyne.

Disorderly demonstrations took place at Newquay on Tuesday in support of the supposed popular right to the unimpeded use of the headland and the neighbouring heights. A large crowd assembled, and, headed by a band and a flag bearing the Cornish motto "One and All," marched to a spot near the headland, where preparations are being made to build a new hotel. The crowd demolished a tool-shed and board advertising the hotel, and threw them over the cliff into the sea. On Wednesday, the architect of the building, Mr. Silvanus Trevail, of Truro, visited the place. A telegram announcing his arrival had been sent to someone in the town, and the result was that there was a large gathering at the railway station to receive him. Mr. Trevail was followed through the town and hooted; but the police protected him from actual violence.

Mr. Hall Blyth, C.E., the engineer of the new North Bridge, Edinburgh, has informed Lord Provost M'Donald and the town clerk that the bridge will be completed next week, and that on an early day in the following week it will be ready for opening.

New Roman Catholic schools have just been completed at 43, Newington-road, Edinburgh. About eighteen months ago the Newington Academy was purchased by Archbishop Macdonald for school premises for St. Columba's congregation, and the work of alteration and addition has now been finished. Two halls have been added, capable of affording accommodation for 200 children, while the entire premises are now sufficient for 350 children. Large covered-in sheds have been utilised for playgrounds, the floors of which have been laid in concrete. A kitchen for the use of the school, as well as cloak-rooms and teachers' rooms, have been provided for. The schoolrooms have been heated by Messrs. Moncur and M'Kenzie, of Edinburgh.

The Liverpool Corporation formally took possession, on Wednesday, of the tramway system of the city, having paid the sum of £567,375.

The foundation-stones of a new aisle which is about to be added to the parish church of Sacriston, near Durham, were laid on Monday. The church was originally erected between 20 and 25 years ago, and some six years back it was found necessary to add a south aisle. Notwithstanding this addition, the church has again become too small, and it is now intended to build a north aisle, which will increase the sitting accommodation to 535.

New schools at Singlegate, Church-road, have just been opened by the Mitcham School Board. They have been built from plans by Mr. H. P. Burke Downing, A.R.I.B.A., and provide a central hall with classrooms for 240 boys, masters' room, and other accommodation. The building will eventually be doubled in size, and occupies a site of one acre. The outlay has been £4,800.

Messrs. Ramage and Ferguson, of Leith, launched on Tuesday a pneumatic grain elevator, built to the order of the London Grain Elevator Company for use at some docks in London. This is a new method of discharging grain straight from the holds of steamers into barges, the whole process, even to the weighing, being automatically done; while the rapidity of discharge is very much greater than by the ordinary methods, being at the rate of 120 tons per hour. The pneumatic system is known as Duckham's patent, and this elevator has been built under the superintendence of Mr. Hough, consulting engineer to the Grain Elevator Company. The barge is 70ft. by 24ft. by 15ft. moulded, and contains powerful machinery for taking the grain from steamer's holds into barges.

At a sale at Yarmouth this week no less than £5,000 worth of land at Hemsby has been disposed of, and all the indications point to this being the next Norfolk resort to be developed. Hemsby is only six miles from Yarmouth, with a railway station and a good beach. Winterton, a mile beyond, is already well known to picknickers from Yarmouth.

A special service was recently held in the parish church of Frisby-on-the-Wreake, for the purpose of unveiling and dedicating a stained-glass window, raised by public subscription to the memory of the late clerk, Mr. H. Pearson. The work has been carried out by Messrs. Jones and Willis, of Birmingham and London. The window selected for treatment is a Decorated one (cir. 1350), and consists of quatrefoil surmounting two leaf-patterns in the tracery, with three cusped-headed lights below. The figures occupying the three lights symbolise "Faith," "Hope," and "Charity," under canopied work. An angel bearing a scroll inscribed "Holy, Holy, Holy," fills in the quatrefoil, and "A" and "Ω" surrounded by floriated work complete the leaf pattern.

A window, from the studio of Mr. Taylor, of Berners-street, W., has been erected in Pudsey Church, the gift of Miss Beanland, in memory of her father and mother, with the subjects of "Faith" and "St. Lawrence," the patron saint of the church.

A sum of £2,017 has been contributed towards the proposed memorial to the late Archbishop of Dublin. It is proposed to devote a portion of the money to the erection of a public statue.

A new railway-station is to be erected near Shottesbrook Bridge, between Maidenhead and Twyford, on the Great Western Railway.

A workmen's institute, gymnasium, and swimming-bath are about to be built at Abertillery, at an outlay of about £4,000. Mr. F. R. Bates, of Commercial-street, Newport, Mon., is the architect, and Mr. D. J. Davies, of the same town, the contractor.

New Wesleyan schools are being built at Denholme, from plans by Messrs. Judson and Moore, of Oakworth, at a cost of £2,200. The chief contract, that for masonry, is let to Messrs. Sunderland and Greenwood, of Lees.

The rebuilding of Cotham Wesleyan Chapel, Bristol, which was gutted by fire, is rapidly approaching completion, and the church will be reopened in October. Some improvements in the internal arrangements will be effected, and the enlargements will principally consist of the addition of organ and choir chambers, and a church parlour, with an ante-room, all designed in harmony with the other new and the original portions of the building. The architects are Messrs. R. Curwen (of London) and H. J. Jones (Bristol), and Messrs. Stephens, Bastow, and Co., Ltd., of Bristol, are the contractors.

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	Per ton.		Per ton.
Rolled-Iron Joists, Belgian	£5 15 0	to	£6 0 0
Rolled-Steel Joists, English	6 0 0	,,	6 10 0
Wrought-Iron Girder Plates	5 15 0	,,	6 10 0
Bar Iron, good Staffs	7 0 0	,,	8 0 0
Do., Lowmoor, Flat, Round, or Square	17 0 0	,,	17 0 0
Do., Welsh	5 15 0	,,	5 17 6
Boiler Plates, Iron—			
South Staffs	7 17 6	,	8 5 0
Best Snedshill	10 0 0	,,	10 10 0

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Builders' Hoop Iron, for bonding, &c., £6 15s. 0d. per ton.

Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.

Galvanised Corrugated Sheet Iron—

	No. 18 to 20. Per ton.		No. 22 to 24. Per ton.
6ft. to 8ft. long, inclusive gauge	£10 15 0	...	£11 0 0
Best ditto	11 5 0	...	11 10 0

	Per ton.		Per ton.
Cast-Iron Columns	£6 0 0	to	£8 10 0
Cast-Iron Stanchions	6 0 0	,,	8 10 0
Cast-Iron Sash Weights	—	,,	4 2 6
Cast-Iron Socket Pipes—			
3in. diameter	5 10 0	,,	5 15 0
4in. to 6in.	5 5 0	,,	5 10 0
7in. to 24in. (all sizes)	4 15 0	,,	5 5 0

[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]

	Per ton.
Pig Iron—	
Cold Blast, Lilleshall	105s. to 110s.
Hot Blast, ditto	57s. 6d. to 62s. 6d.

Wrought-Iron Tubes—Discount off Standard Lists f.o.b.

Gas-Tubes	75p.c.	Fittings	77½p.c.
Water-Tubes	70	,,	72½
Steam-Tubes	62½	,,	65
Galvanised Gas-Tubes	60	,,	62½
Galvanised Water-Tubes	55	,,	57½
Galvanised Steam-Tubes	45	,,	47½

	10cwt. casks. Per ton.		5cwt. casks. Per ton.
Sheet Zinc, for roofing and working up	£22 0 0	to	£23 0 0
Sheet Lead, 3lb. per sq. ft. super.	14 15 0	,,	15 15 0
Pig Lead, in 1cwt. pigs	14 5 0	,,	15 5 0
Lead Shot, in 28lb. bags	17 5 0	,,	18 5 0
Copper Sheets, sheathing and rods	60 0 0	,,	61 0 0
Copper, British Cake and Ingot	51 5 0	,,	51 10 0
Tin, Straits	62 15 0	,,	63 15 0
Do., English Ingots	65 15 0	,,	66 15 0
Spelter, Silesian	17 2 6	,,	17 12 6
	Per ton.		Per ton.
Cut Clasp Nails, 3in. to 6in.	£8 15 0	,,	£9 15 0
Cut Floor Brads	8 10 0	,,	9 10 0

Wire Nails (Points de Paris)—

0 to 7	8	9	10	11	12	13	14	15	B.W.G.
8/6	9/0	9/6	10/3	11/0	12/0	13/0	14/9	16/9	per cwt.

TIMBER.

Teak, Burmah	per load	£14 5 0	to	£15 10 0
,, Bangkok	,, ...	10 10 0	,,	15 0 0
Quebec pine, pitch	,, ...	—	,,	—
,, yellow	,, ...	2 0 0	,,	4 0 0
,, Oak	,, ...	5 10 0	,,	6 10 0
,, Birch	,, ...	4 5 0	,,	6 0 0
,, Elm	,, ...	4 0 0	,,	5 5 0
,, Ash	,, ...	3 5 0	,,	4 10 0
Dantsic and Memel Oak	,, ...	2 10 0	,,	3 10 0
Fir	,, ...	2 5 0	,,	4 5 0
Wainscot, Riga p. log	,, ...	1 10 0	,,	3 15 0
Lath, Dantsic, p.f.	,, ...	4 10 0	,,	5 10 0
St. Petersburg	,, ...	5 0 0	,,	6 10 0
Greenheart	,, ...	8 0 0	,,	8 10 0
Box	,, ...	4 10 0	,,	15 0 0
Sequoia, U.S.A.	per cube foot	0 1 8	,,	0 1 10
Mahogany, Cuba, per super foot 1in. thick		0 0 5	,,	0 0 6½
,, Honduras	,, ...	0 0 5	,,	0 0 6½
,, Mexican	,, ...	0 0 4	,,	0 0 5
Cedar, Cuba	,, ...	0 0 4½	,,	0 0 5
,, Honduras	,, ...	0 0 4	,,	0 0 5
Satinwood	,, ...	0 0 7	,,	0 1 0
Walnut, Italian	,, ...	0 0 3½	,,	0 0 7

Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 11in.:—

Quebec, Pine, 1st	£20 10 0	to	£26 10 0
,, 2nd	15 0 0	,,	17 10 0
,, 3rd	7 10 0	,,	11 0 0
Canada Spruce, 1st	10 10 0	,,	12 0 0
,, 2nd and 3rd	8 0 0	,,	9 0 0
New Brunswick	7 10 0	,,	8 0 0
Riga	6 10 0	,,	7 10 0
St. Petersburg	8 10 0	,,	12 10 0
Swedish	9 0 0	,,	15 10 0
Finland	8 0 0	,,	8 10 0
White Sea	9 10 0	,,	16 0 0
Battens, all sorts	5 0 0	,,	20 0 0
Flooring Boards, per square of 1in.:—			
1st prepared	0 8 6	,,	0 15 6
2nd ditto	0 7 0	,,	0 12 0
Other qualities	0 5 0	,,	0 6 6
Staves, per standard M:—			
Quebec pipe	—		—
U.S. ditto	35 0 0	,,	42 10 0
Memel, cr. pipe	230 0 0	,,	240 0 0
Memel, brack	200 0 0	,,	210 0 0

OILS.

Linseed	per ton	£16 0 0	to	£16 10 0
Rapeseed, English pale	,, ...	28 0 0	,,	28 5 0
Do., brown	,, ...	26 10 0	,,	26 15 0
Cottonseed, refined	,, ...	16 0 0	,,	17 0 0
Olive, Spanish	,, ...	28 0 0	,,	30 0 0
Seal, pale	,, ...	23 10 0	,,	24 0 0
Cocoanut, Cochin	,, ...	27 0 0	,,	28 0 0
Do., Ceylon	,, ...	22 15 0	,,	23 0 0
Palm, Lagos	,, ...	21 15 0	,,	22 15 0
Oleine	,, ...	18 15 0	,,	19 15 0
Lubricating U.S.	per gal.	0 6 3	,,	0 7 6
Petroleum, refined	,, ...	0 0 4¾	,,	0 0 4¾
Tar, Stockholm	per barrel	1 2 0	,,	1 5 0
Archangel	,, ...	0 12 6	,,	0 15 0
Turpentine, American	per ton	21 0 0	,,	21 10 0

LIST OF COMPETITIONS OPEN.

Sunninghill and Sunningdale—Sewerage Schemes	No premiums	The Clerk, Windsor R.D.C., Park-street, Windsor	Sept. 4
Matlock—Plans and Surveys of all Sewers	No premium	M. A. Sleigh, Clerk U.D.C., Matlock Bridge	„ 10
Ipswich—Higher Grade School, Tower-st. (local Competition)	No premium; 5 per cent. com.	J. Hepburn Hume, Clerk to School Board, Ipswich	„ 14
Battersea—Baths and Washhouses, Battersea Park-road	£100 (merged), £50, £25	W. M. Wilkins, Vestry Clerk, Municipal Bldgs., Lavender Hill, S.W.	„ 22
Blaenau Festiniog—County Police Buildings	£15 15s.	J. Morris Jones, County Surveyor, Trawsfynydd, Merioneth	„ 25
Skipton—Cottage Hospital (16 beds, £2,500 limit—no assessor)	£15, £5	W. H. Dawson, Hon. Sec. to Committee, Skipton	„ 30
Morecambe—Sewerage Scheme	£100	Jno. Bond, Surveyor, U.D.C., Morecambe	Oct. 1
Ludlow—Electric Lighting Scheme	£20 (merged)	John H. Williams, Town Clerk, Ludlow	„ 1
Lower Bebington—Sewerage Scheme	£50, £35, £20	Joseph Young, Surveyor U.D.C., 72, Stanley-terrace, New Ferry	„ 1
Leeds—Wholesale Dead Meat Market and Abattoir	£100 (merged), £50, £25	John Harrison, Town Clerk, Municipal Buildings, Leeds	„ 8
Dorking—Workhouse Infirmary (65 beds, £4,000 limit)	No first, £15, £5	Geo. Scales, Clerk, High-street Dorking	„ 13
Eastcote and Northwood, near Ruislip—Sewerage Scheme	£40 for Combined Scheme, £15 for Eastcote, and £25 for Northwood.	C. Woodbridge, Clerk, R.D.C., 38, High-street, Uxbridge	„ 30
Mexico—Legislature Palace (1,500,000dol. limit)	15,000dol. Mex.	Secretary Public Works, Mexico City	Nov. 30
Cardiff—Town Hall and Law Courts (A. Waterhouse, R.A., Assessor—£200,000 limit)	£500 (merged), £300, £200	J. L. Wheatley, Town Clerk, Town Hall, Cardiff	Dec. 4
Carlton, Victoria—Children's Hospital	£100, £50, £25	J. Nicholson, Hon. Sec., Pelham-street, Carlton, Australia	(1898) Jan. 30
New York—Sun Dial (Plaster Model)	500dol., 250dol.	Sec., National Sculpture Soc., 215, West 57th-street, New York	(1898) Feb. 28
Newcastle-on-Tyne—New Infirmary (local Architects)	(No first) £150, £100, £50	Secretary, Building Committee, Newcastle	(1898) Mar. 1
Brighton—Artisans' Dwellings (local Architects only)	£75, £25	F. J. Tillstone, Town Clerk, Brighton	—
Lewisham—Free Library (£4,000 limit)	25gs.	Edward H. Oxenham, Clerk, Town Hall, Catford, S.E.	—
Boscombe—Hospital Enlargement, Shelley-road		J. Pratt, Assistant Sec., 126, Christchurch-road, Boscombe	—
Tottenham—School Board Offices		J. F. Adams, Clerk, School Board Offices, Tottenham, N.	—
Forest Hill—Free Library (£4,000 limit)	25gs.	Edward H. Oxenham, Clerk, Town Hall, Catford, S.E.	—

LIST OF TENDERS OPEN.

BUILDINGS.

Briton Ferry—Seven Houses	Industrial Co-operative Society	H. Alex. Clarke, Architect, Briton Ferry	Sept. 4
Bempton—Repairs and Painting of Primitive Methodist Chapel		Charles Spivey, St. John's-avenue, Bridlington	„ 4
Marazion—Villa	Richard Phillips	O. Caldwell, F.R.I.B.A., Penzance	„ 4
Chippenham—Cottage Hospital		Graham Awdry, F.R.I.B.A., 3, Great George-street, Westminster	„ 4
Briton Ferry—Seven Houses	Industrial Co-operative Society	H. Alex Clarke, Architect, Briton Ferry	„ 4
Armagh—Alterations to County Infirmary		W. J. Griffiths, Secretary, County Infirmary, Armagh	„ 4
Leith—Public Baths at Great Junction-street	Corporation	T. B. Laing, Town Clerk, Leith	„ 4
Halifax—Stabling, &c., at Ravenswood		S. Wilkinson, Architect, Sowerby Bridge	„ 4
Hopewell Hill—Stables and Storerooms	West Gloucestershire Wtrworks Co.	S. F. Andrews, Secretary, Kingswood	„ 4
Worsborough Dale—Two Houses, Green-street		Wade and Turner, Architects, 10, Pott-street, Barnsley	„ 4
Sheffield—Additions to Workhouse	Board of Guardians	C. J. Innocent, Architect, 17, George-street, Sheffield	„ 4
Saltburn—House, Diamond-street		R. Lofthouse and Sons, Architects, Middlesbrough	„ 4
Langley Moor—Two Houses	W. J. Cordner	R. G. Cowe, Architect, Chester-le-street	„ 4
Leckpatrick—Reseating Presbyterian Church		W. Barker, Architect, Richmond-street, Londonderry	„ 4
Sheffield—Additions to Firvale Workhouse	Board of Guardians	C. J. Innocent, Architect, 17, George-street, Sheffield	„ 4
Redbourn—Additions, National Schools		W. Collyer, High-street, Redbourn, Herts	„ 4
Dundee—Six Iron Sheds (each 100,000c.ft.)	Dundee Harbour Trustees	G. C. Buchanan, Engineer, Works Office, Harbour Chambers, Dundee	„ 4
Sandhurst—Canteen, &c., at Royal Military College		Royal Engineer Office, North Aldershot	„ 6
Middlesbrough—Alterations to Premises, Newport-road	Henry Schumm	W. Duncan, Architect, 3, Zetland-road, Middlesbrough	„ 6
Mytholmroyd—Vicarage, Cragg Vale-road		Jackson and Fox, Architects, 22, George-street, Halifax	„ 6
Brentwood Asylum—Boiler House	Committee of Visitors	W. P. Gepp, Clerk to Committee, Chelmsford	„ 6
Keighley—Church and Schools of St. Barnabas, Thwaites Brow		W. H. and A. Sugden, Architects, Cavendish-street, Keighley	„ 6
Barry—Alterations and Additions, Intermediate School	Glamorgan County Council	T. M. Franklen, Clerk, Glamorgan County Offices, Cardiff	„ 6
Lancaster—Classrooms and Gymnasium at Ripley Hospital		Austin and Paley, Architects, Lancaster	„ 6
Gateshead—Nuns-lane School	School Board	Oliver and Leeson, Architects, Mosley-street, Newcastle	„ 6
Bradford—Stable for Sixteen Horses in Augustus-street		C. H. Lord, Estate Agent, Market-street, Bradford	„ 6
Prudhoe-on-Tyne—Twenty-one Houses	Blaydon Co-operative Society	Secretary to Society, Blaydon-on-Tyne	„ 6
Berkhamsted—Repairs and Alterations at Workhouse	Guardians	Samuel Stallon, Clerk, Workhouse, Berkhamsted	„ 6
Coventry—Enlargement of Board School		Wm. S. Perkins, Clerk, Wycombe Villa, Gosford-terrace, Coventry	„ 6
Huddersfield—Three Houses in Lees-road and Ashgrove-road, Deighton	Jonas Boothroyd	W. Cooper, Architect, 4, Kirkgate Buildings, Huddersfield	„ 6
Rothes—Additions, Seafield Arms Hotel		R. B. Pratt, Architect, Elgin	„ 6
Middlesbrough—Shops, Grange-road East	Henry Schumm	W. Duncan, Architect, 3, Zetland-road, Middlesbrough	„ 6
Salisbury—Additions to Schools		John Harding and Son, Architects, 51, The Canal, Salisbury	„ 6
Hebburn—Shedding, in Argyle-street	Urban District Council	The Surveyor, Argyle-street, Hebburn	„ 6
Mytholmroyd—Vicarage, Cragg Vale-road		Jackson and Fox, Architects, 22, George-street, Halifax	„ 6
Gateshead—Nun's-lane School	School Board	E. J. Harding, School Board Offices, Gateshead	„ 6
Coventry—Enlargement of School		Wm. S. Perkins, Clerk, Wycombe Villa, Gosforth-terrace, Coventry	„ 6
Bolton—Inland Revenue Office	H.M. Commissioners of Works	Hon. Reginald B. Brett, C.B., Secretary, 12, Whitehall-place, S.W.	„ 7
Highgate Hill—Workhouse Infirmary	Islington Board of Guardians	E. Davey, Clerk, St. John's-road, Upper Holloway	„ 7
Brierley Hill—Restoration of St. Michael's Church		Cossins, Peacock, & Bewlay, Archts., 83, Colmore-row, Birmingham	„ 7
Hampton—Workshop, Bell Hill Recreation Ground	Urban District Council	S. Kemp, Surveyor, Park House, High-street, Hampton	„ 7
Nelson—Walverton Board School	Nelson School Board	W. C. Murgatroyd, Clerk, Town Hall, Nelson	„ 7
Gravesend—Police Cells at Town Hall	Town Council	Chas. E. Hatten, Town Clerk, Court House, Gravesend	„ 7
Pontypridd—Enlarging Cilfyndd Board School		A. O. Evans, Architect, Pontypridd	„ 7
Stroud—Chimney-stack at Workhouse	Guardians	Fredk. Winterbotham, Clerk, John-street, Stroud	„ 7
Kidderminster—Additions, Borough Hospital	Corporation	A. Coombes, Borough Engineer, Kidderminster	„ 7
Nelson, Lancs—Walverden Board School		Thomas Bell, Architect, 14, Grimshaw-street, Burnley	„ 7
Rotherhithe, S.E.—Shelter at South Wharf	Metropolitan Asylums Board	T. Duncombe Mann, Clerk, Norfolk-street, Strand, W.C.	„ 8
Huddersfield—Shop, 19, King-street	Thomas Mellor	W. Cooper, Architect, 4, Kirkgate Buildings, Huddersfield	„ 8
Cabra—Play Halls at Auxiliary Workhouse	Guardians of North Dublin Union	John O'Neill, Clerk, Board-room, North Brunswick-street, Dublin.	„ 8
Loughlinstown—Enlargement, Registrar's House, &c.	Guardians of Rathdown Union	J. D. Cope, Clerk, Loughlinstown	„ 8
Marston Green, Birmingham—Two Cottages for Farm Labourers and a Laundry	Guardians	Walter Bowen, Clerk, Parish Offices, Edmund-street, Birmingham	„ 8
Dewsbury—Addition to Waiting-room at Workhouse	Guardians	Joseph Peace, Clerk, Union Offices, Wellington-street, Dewsbury	„ 9
Golcar—Two Dwelling Houses at Scarr Green		Arthur Shaw, Architect, Golcar	„ 9
Felling—Rebuilding Brandling Hotel		H. Miller, Architect, Felling	„ 9
Workington—Additions to Central Stores, Jane-street	Industrial Society	W. G. Scott and Co., Architects, Victoria Buildings, Workington	„ 10
Chesterfield—Four Semi-detached Cottages at Heath	Hardwick Colliery Company	J. W. Fearn, 31, Devonshire-street, Chesterfield	„ 11
Kilbonane—Church		W. H. Hill and Son, Architects, 28, South Mall, Cork	„ 11
St. Stythians—Sunday Schools		Wm. Swift, Architect, 23, Lemon-street, Truro	„ 11
Blackburn—Shops, Follywell-street	Blakey Moor Co-operative Society	J. Duerden, Secretary, Simmons-street, Blackburn	„ 11
Llanfihangel-y-Creuddyn—Restoration of Church Tower		Rev. J. P. Evans, Vicar, Llanfihangel-y-Creuddyn	„ 11
Clones—Four Houses in Fermanagh-street		Thomas Elliott, Architect, Enniskillen	„ 11
Devon—Lighthouse, Dwellings, &c., Foreland, near Lynton	Admiralty	Chas. A. Kent, Secretary, Trinity House, London, E.C.	„ 13
East Preston—Alterations to Workhouse		Arthur Shelley, Clerk, Town Offices, Littlehampton	„ 13
Ripley—Extension of Schools	School Board	Rev. F. H. Tuke, The Vicarage, Ripley	„ 13
Nailsworth—Rebuilding St. George's Church	Rev. G. M. Scott	M. H. Newland, Architect, Gloucester	„ 13
Beaumaris—Additions to County School		William Griffith, Clerk to the Governors, Beaumaris	„ 13
Lynton Foreland—Lighthouse	Trinity Brethren	C. A. Kent, Secretary, Trinity House, E.C.	„ 13
Folkestone—Fifty Artisans' Dwellings at East Cliff	Sanitary Committeee	John White, Borough Engineer, Folkestone	„ 13
East Preston—Alterations to Workhouse		Arthur Shelley, Clerk, Town Offices, Littlehampton	„ 13

THE BUILDING NEWS
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ADDITION AND ALTERATION TO OLD BUILDINGS.

WHETHER it is expedient for an architect to complete or add to the designs of another, and under what conditions, is a problem that has not troubled the profession to consider, but has been made a topic of discussion at the International Congress at Brussels. The practical needs of buildings require them to be altered and added to as occasion demands. A building is not like a painting or a work of decoration, any alteration or tampering with which would often be destructive to its design or merits. Utilitarian considerations are uppermost and exacting, and therefore any scruples as to integrity of design have to be disregarded. From what we know of old work in Mediæval and later times, such a question never troubled the minds of the builders of our great edifices —they enjoyed a full liberty to do what they pleased—adding, say, an aisle or a nave to a church built by a previous generation, in quite another style, or even going so far as to tack on to a Gothic church a Renaissance or Classic façade, as we see in many instances, notably in the Parisian churches of St. Etienne du Mont and St. Eustache. In the former of these the later builders certainly did not study the work of their predecessors: they added a western front so completely at variance with the older style that it has evoked the surprise of all who see it. Our own cathedrals show abundant instances of the same indifference, as we may see at Winchester, Durham, St. Alban's, and many other great churches which are historical records in stone;—and do they not become more interesting in consequence? We cannot call them anachronisms, at any rate. They may be wanting in architectural unity of design; but they are epitomes in stone of the changes in national taste. For the last half a century, at least, modern architects have been practising the purist theory of carrying out every restoration in one style, ignoring entirely the process by which all our historical architecture has been produced. In their restoration of 13th-Century buildings they have thought it was necessary to follow that style in every addition and detail, though separated by five or six hundred years from the period when they were evolved. If it was a new transept or aisle, the addition of a new front, or the rebuilding of a decayed tower, the 13th-Century style must be adopted, so that the whole may appear of the same date and character throughout—a make-believe that it was all built at the same time. What a deception! What an anachronical subterfuge to go back so many centuries!—unnatural and contradictory to all that had gone before. And yet this is what our architects are doing now, under the plea of being true to a style, respectful to the old builders. On the contrary, is it not showing them disrespect to imitate their method while adding to or restoring their buildings five centuries earlier in date? We will not strain an analogy by saying it is like copying the English of Chaucer in making an addition to an old book of his age; but it is, at least, a burlesque, or something like it. But there is something to be said for this modern way of restoring the old building when we have no style of our own. Let us take a practical example. We have lately added a nave in the 13th-Century style to the collegiate church of St. Saviour's, Southwark. It has been carefully carried out. The architect has followed with fidelity the details of the old nave as far as they could be discovered. By our reasoning this was wrong: he ought to have added the nave according to a Victorian fashion, probably a brick structure of wide span, with iron roof, dispensing with the aisles, or he might have selected a much Later style of Gothic to the Early choir and Lady chapel. We suppose the modern advanced cult of architects who think that architecture is the result of the association of the several building trades would have taken this course as the most reasonable and respectful. Be this as it may, we have to face the difficulty of having no style or building method of our own, and so when we have to add to, or restore any ancient building, we think it more respectful to adhere closely to the original. We prefer to show our scholarship—to repeat what is good and beautiful in itself, than to run the risk of adding something that is ugly and distasteful. Our mode is one way of showing our politeness and our respect to our predecessors' work. But the question is whether in doing what we conceive to be the best, we are not unknowingly doing something disrespectful. We may be parodying our ancestors' work by adding to it, after all, a poor imitation, or in doing something or designing a feature which, under the circumstances, they would never have done—as, for instance, in copying a feature for which we have no use, in erecting a spire where they would have been satisfied with a tower or a simple lantern roof. How many modern restorers have removed Late Perpendicular roofs and substituted high-pitched ones, because they thought in so doing they were following more correctly the earlier design? Others have replaced Late flat-arched windows and doorways by sharp-pointed ones. All these and like alterations have been made, under the impression that the restorer was faithfully carrying out the intentions of the original builders, whereas, under like circumstances, they would have proceeded in a very different manner. Leaving the original design as it was, they would have acted on independent lines, taking down parts of the building that did not suit or were out of date, and rebuilding them according to their wants in the current style of the day. Our ideas of architecture have no doubt led us into these errors of judgment. We have been brought up in the belief that architecture is an exoteric art that must be learned from books and examples and applied to buildings when occasion requires, instead of looking at it as the current mode of working in materials—as nothing more, in fact, than artistic building itself. If we had come to look on it in this light, who shall say what our modern restorations had been? If we had a beautiful sculptured gable that had decayed and become dangerous to deal with, we should probably have taken down the whole of the decayed portion, two or three of the upper stages at least, and have rebuilt it in the current style of the day, regardless of the old detail. It would not have been done piecemeal, stone by stone, taking care to repeat exactly the old design, as we are now doing at Peterborough. Because we had only one kind of workmanship derived from tradition, we could not do otherwise. It would be the only honest mode. As it is, we now have two kinds of workmanship—the "ancient" and the "modern"—and whenever we touch an ancient building we adopt the former, because it appears to us more reverential. We even tool and dress the stones in the same way as the ancient masons did, observe the same thickness of joints and the same sizes of stone, so that really this duality of our methods has led us into the habit of restoring our ancient buildings according to one system, and adding to or altering our modern buildings on quite another plan. We show great reverence to an ancient structure, though really it is not honest; while, in dealing with a new building, we proceed on quite different lines, and not always with common respect to its first architect.

The International Congress of Architects held at Brussels discussed this subject under three heads. They first considered whether it was right for an architect to repeat or correct mistakes of construction or errors of the ancients? We have generally dealt with our historic monuments on the first principle rather than the second. Whenever we have tried to improve or correct mistakes of construction we have committed errors, as when we have introduced modern roofs on old buildings. The question, however, suggests an important question in the restoration of buildings. When we are to let them alone and when alter? what we ought to preserve and what to improve? The two last questions which were put down for discussion were, Whether it is necessary to finish those portions of a work the old architects did not finish? and whether it is right to suppress those parts like construction or furniture for unity of style? The old builders often left portions of their buildings incomplete: towers were often only partially built, probably from want of means; sometimes because the foundations were not sufficient. The modern restorer is inclined to finish these parts, but has reluctantly given way to his better judgment. Many a modern builder would like to finish central towers and spires, to carve blocks which the old mason left for want of funds. Where the design is obvious, there can be no reason why the unfinished parts should remain as they are; and it is no disrespect to the old builder to carry out his intentions when they are sufficiently clear. Many of our large churches would have remained incomplete fragments if other generations had not carried out the original design. As to the remaining question of suppressing parts of construction for the sake of unity, it strikes at the very root of our modern restoration. The desire to preserve unity of style has been the main reason why so many buildings have been spoiled. We have already spoken of high-pitched roofs being put over old churches for the sake of preserving their original or early character. The same tendency is seen in adding a number of new windows and tracery and buttresses to correspond with the old, carving, bosses to match the ancient ones, repeating the same design of pillars and arches and so on. Half the copying of old work has been due to this reason —of seeking to preserve the harmony. The consequence has been that improved construction has been suppressed where it would have been of importance. We have seen an old timber roof slavishly copied, though it was faulty in construction, simply because it was preserving the original design. The desire for unity of character is very commendable, when it can be attained without the sacrifice of common-sense and good construction; but when we add to or restore old buildings it is better far that the new portion should boldly indicate a departure in our design and methods. Why should such anxious care and study be spent over such things as furniture and decoration to buildings erected several centuries ago? We have been far too fastidious in our tastes in these matters. The character of an edifice ought, of course, to be observed as far as we can. To place Louis XV. furniture or decorations into an old Gothic interior would be as absurd as to put Tudor or Stuart into a building of Greek design; but these nice distinctions have been carried too far in the past. As to interfering with buildings designed by contemporary architects, a point of delicacy comes in; but such a scruple does not arise when the architect has to deal with buildings some centuries old.

THE TRAINING OF ENGINEERS.

In his valuable address before the Section of Mechanics at Toronto in connection with the meeting of the British Association, Mr. G. F. Deacon, M.Inst.C.E., dealing with the Education of Engineers, dwelt on one point of importance in the training of students that is in danger of being neglected. He asked: "Are we not in some cases attempting at too early a stage the teaching of subjects instead of principles? Complete subjects, I mean, including the practical working of details, which will become the regular study of the student in the office or works of an engineer. It certainly seems to me to be so. I do not say," continued Mr. Deacon, "that subject training of this kind at college may not be useful; but we have to consider whether it does not, for the sake of some little anticipation of his office work, divert the attention of the student from the better mastery of those principles which it is so essential for him to grasp at the earliest possible time, and which do not limit his choice in the battle of life to any branch whatever of the profession of an engineer, but which, on the contrary, qualify him better to pursue with success whatever branches his inclination or his opportunities may suggest."

Mr. Deacon thinks that there is some danger in the limitation of compulsory subjects in examinations for certificates and degrees. And he is right. Students are required to coach up in a few subjects to the neglect of others equally important, such as electricity and chemistry. We should like to know how many of our students in engineering are versed in either of these. Not a few of our engineers are quite ignorant of the principles of electricity and chemistry. Their early studies have been restricted perhaps to such subjects as mechanics or sanitary engineering, or workshop practice. The consequence is they enter the profession only half-equipped for its duties and responsibilities, and unable to turn their attention to any other branch of engineering which they may be called upon to advise upon. This restriction has been largely due, as Mr. Deacon observes, to the method of education pursued at our schools. Every professor has an interest in his own particular subject, and it is natural that he should try to limit the attention of every student who attends his lectures or his laboratories to his own particular study; it is his interest to make each of his students as proficient as he can, and to represent to them the great importance of his particular branch of engineering. He at least cannot be expected to encourage his pupils to pursue other and collateral studies that lie outside of his own subject. Thus it is that there are restricting agencies at work which limit the engineering student to one or two subjects, and so confine his attention to details which are better learned afterwards in the office or workshop. Such a course of study makes academical specialists, but not competent engineers able to grasp the laws of forces and materials with which they may be called upon to deal in the practice of their profession. The engineer should possess the principles of many subjects, and the practice of a few. We now find engineers either clever machinists or sanitarians, but unable to turn their attention to other branches like hydraulics, the construction of docks, harbours, and reservoirs, or to electrical engineering. Mr. Deacon therefore pleads for a moderate standard in all these subjects—that this standard should be made compulsory if a certificate of proficiency is to be given. Taking mathematics as taught at Cambridge and our public schools, it is suggested, and with much truth, that much that is claimed for it as a mode of mental culture might be profitably omitted from the engineer's curriculum. There are parts of mathematics which have only an abstract value. The engineer's attention would be more usefully directed rather to those applications of the science which "give points and direct utility" to his solutions. He would, for example, find it more to his interest to study quadratic equations, than those higher theorems of mathematics which can only be appreciated as analytical exercises. The strength and elasticity of iron and steel for construction, as in bridge-building and roofs, boiler-plates, and the application of mathematics to the steam-engine, electrical engineering, and hydraulics are absolutely necessary applications.

We are quite sure these remarks will be appreciated by those who have the training of engineering students. When it is possible for the youthful engineer to be trained in the engineer's office or on the works, according to the old apprenticeship plan, he cannot do better than to devote his school or college course to the principles which underlie the many sciences with which he may be called upon to deal. It is better for him to lay a foundation of fundamental knowledge that can be applied to a wide field of practice than that he should acquire only a few special details in a school course. Mr. Deacon refers to the conditions of success amongst engineers, and he points to a conclusion which has been observed by men in other professions—namely, that the "most successful men in after-life are not produced exclusively from the ranks of those whose college course has been most successful." No one can dispute this fact, and it leads one to the inference that other conditions are quite as necessary as academical training. The power of marshalling facts, of presenting the principal points of a problem, is one of those mental faculties so valuable to the engineer and to the architect also. The power of formulating knowledge is, as Mr. Deacon says, one of the most valuable gifts; but even this faculty can be exercised and improved if proper means are employed to cultivate it.

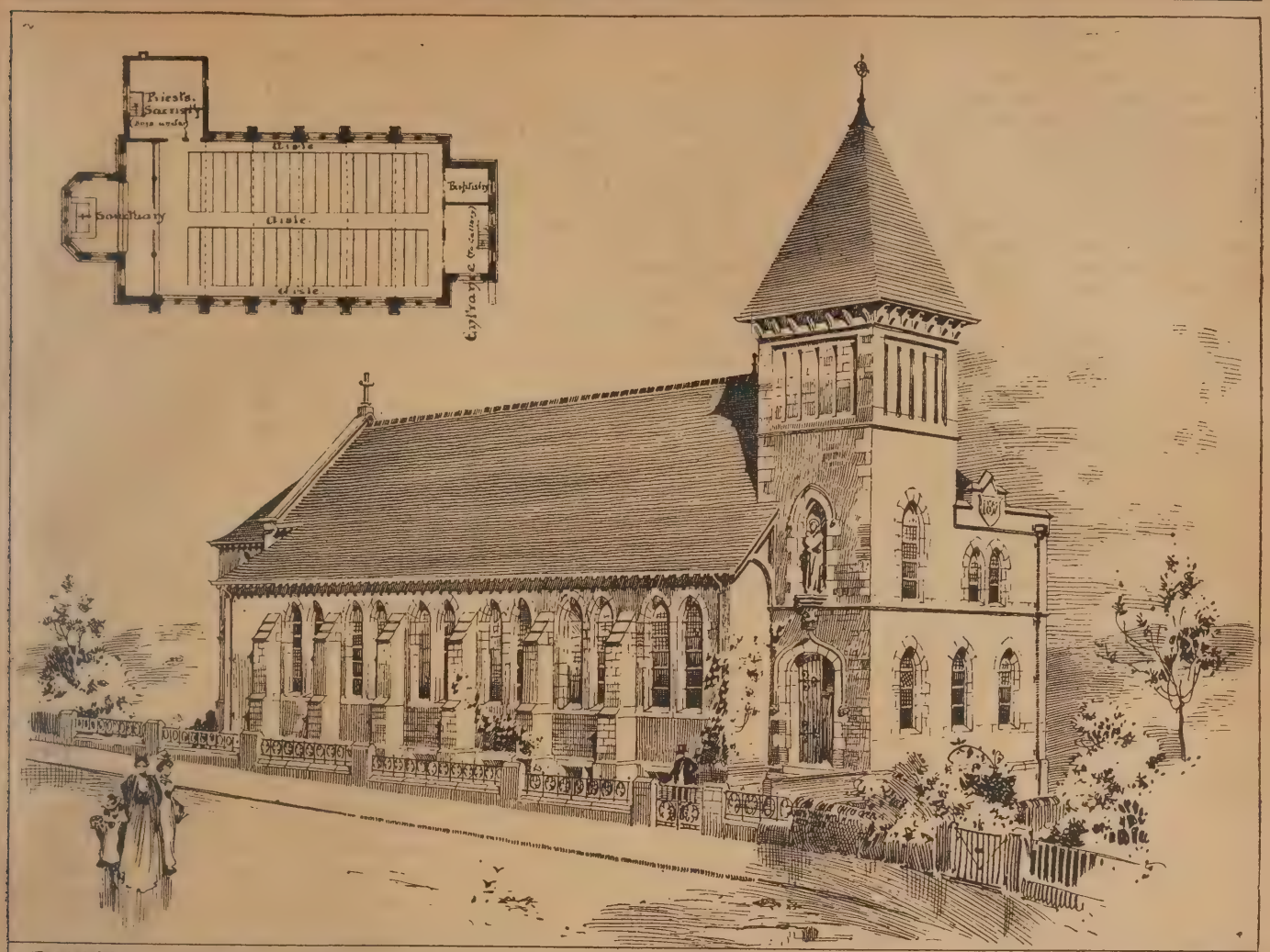
THE A.A. "BROWN BOOK."

The calendar, report of committee, time-table of classes, list of officers, and roll of members of the Architectural Association, familiarly known to all students by a title derived from its brown paper covers, has just been published, in readiness for the fifty-first session of the Association, to be inaugurated on Friday, October 8, by the presidential address from Mr. Hampden W. Pratt, F.R.I.B.A.

In their annual report the committee announce with satisfaction a marked increase in the number of members. 87 new members were elected during the session, 12 members were reinstated, and the losses by death, resignation, and other causes, amounted to 20, the total membership now being 1,190. (The roll showed, it may be mentioned, a total of 1,111 both in 1896 and 1895, 1,131 in 1894, 1,129 in 1893, 1,125 in 1892, 1,138 in 1891, 1,129 in 1890, 1,094 in 1889, 1,052 in 1888, 993 in 1887, 972 in 1886, 1,013 in 1885, 995 in 1884, 960 in 1883, 884 in 1882, and 863 in 1881, the present total being the highest yet reached in the history of the Association.) The committee has entered into a lease of the present premises at 53, Great Marlborough-street, W., terminable at certain short periods. During the spring of the present year well-attended visits have been made to the Tate National Gallery, Mr. Sidney R. J. Smith, architect; the L.C.C. working-class dwellings at Bethnal Green, designed by Mr. Thomas Blashill; Her Majesty's Theatre, Haymarket, the late Mr. C. J. Phipps, architect; the Building Trades Exhibition, at the Agricultural Hall; Royal Palace Hotel Extension, Kensington, Messrs. Legg and Son, architects; No. 27, High-street, Kensington, designed by Messrs. Banister Fletcher; and the Park Fever Hospital at Hither Green, Mr. Edwin T. Hall, architect. During the session papers were read by Messrs. Beresford Pite (president), G. Ewart, F. Walker, T. Stirling, jun., F. Inigo Thomas, H. H. Statham, W. H. Seth-Smith, E. Prioleau Warren, A. S. Flower, W. H. Bidlake, F. S. Granger, J. A. Gotch, T. G. Jackson, R.A., H. Stannus, and S. S. Hellyer; the attendance at those meetings showed an increase on those of the previous session. The Jubilee of the Association was celebrated by a banquet, held at the Trocadero Restaurant, on May 5, and on the following day a conference on the work of the Association was held. The work of the classes and students has been very successful during the session, showing a continued improvement, especially in Division I. The handicraft classes have been considerably developed. For the first time in the history of the Association a class of students followed a coherent course of manual training in masonry and leadwork, and the attendance was well maintained throughout. The thanks of the Association are due to the London Technical Education Board, who made all the arrangements necessary for these classes. Several students availed themselves of the permission accorded by the Carpenters' Company and several Polytechnics for the admission of members to the Trades Training Schools and Workshop Classes. The annual balance-sheet appended to this report shows a much more satisfactory and healthy state of affairs than has been apparent for some years. The previous session, with a total outlay of £1,720 17s. 6d., closed with an excess of expenditure over income of £141 18s. 4d. This year, with a gross income of £1,684 13s. 11d., shows, for the first time since the introduction of the new educational scheme, that the Association has paid its way, there being an excess of income over expenditure of £37 15s. 1d. The principal sources of revenue were: members' subscriptions, £841 2s. 6d.; entrance fees, £178 10s., and students' fees £605 15s. 3d., each of these items showing a marked advance on last year. The chief items of expenditure were: £320 for rent, £192 6s. 8d. for salaries, £484 7s. 2d. for teachers' and instructors' fees, the last a reduction of nearly £100 on the previous year, balanced, however, by a new feature of the present year, "Grant to *A.A. Notes*, £100." The premises and general fund account, to which was transferred the credit balance of £37 15s. 1d. just referred to, and the annual grant of £100 from the R.I.B.A., now stands at £609 14s. 10d., against £515 8s. 6d. last year and £612 7s. 2d. at the close of the session of 1895. The entry of members' subscriptions received in advance is set down in the general balance-sheet at £11 0s. 6d., while subscriptions in arrear figure for £113, a reduction, and therefore an improvement, of £2 on last year's statement.

THE NEW LONDON WATER ACT.

"The Act to amend the law respecting the Metropolitan Water Companies," which recently received the Royal assent, came into force on the 1st inst. By this Act, which is formed to give temporary relief to water consumers, and with a careful eye to the interests of the existing companies, the Railway and Canal Commissioners are constituted the proper authority for hearing any complaint which may be made by any water consumer or local authority against any of the eight Metropolitan water companies. The complaint may refer to the failure of the company "to perform some statutory duty," or "as to the quantity or quality of the water supplied for domestic use." The commissioners, if satisfied that the complaint is well founded, may, within a fixed period, order the defaulting company to remove the ground of complaint, and may impose any penalty upon them which can be imposed under any of the Metropolitan Water Acts, and may award damages to the complainant, and enforce their order in the same manner as they now enforce orders made against railway and canal companies. These powers are embodied in Clause 1 of the Act. Under Clause 2 the local authorities are given power to financially aid consumers in obtaining a judgment from the commissioners. The clause enacts that: "A local authority may aid any water consumer in obtaining the determination of any question which appears to be of interest to water consumers within the district of such local authority, with respect to the rights, duties, and liabilities of any of the Metropolitan water companies in reference to the quantity or quality of the water supplied, or the charges made by them. A local authority aiding any legal proceedings under this section may, if the Court thinks fit, be made a party to the proceedings, and shall be liable for costs accordingly." Under



PROPOSED CATHOLIC CHURCH DENHOLME LUDDENDENFOOT FOR REV FATHER TILLMAN W WRIGLEY ARCHITECT.

Clause 3, the provisions of the Metropolis Water Act, 1852, and the Metropolis Water Act, 1871, are extended, so far as the eight Metropolitan water companies are concerned, to the whole area within their limits of supply, whether those limits are within the Metropolis or not. As regards the area outside the administrative county of London, the council of a county or the county borough is to be the authority mentioned in those Acts as "the Metropolitan authority." The remaining three clauses in the Act provide that the Railway Commissioners shall include in their annual report a return of all proceedings taken under this Act. It is also provided that the expression "water consumer" shall mean "any person who is supplied with water by any of the Metropolitan water companies, or who pays, or is liable to pay, any money charged by any of those companies for or in respect to the supply of water, whether under the name of rent, rate, or otherwise, and includes any householder, or owner or occupier of a house entitled to make a communication with the mains or pipes of any of those companies." The expression "local authority" is defined to mean "the council of any county, borough, or district, the mayor, aldermen, and commonalty of the City of London, and any vestry, district board, or local board of health in the county of London." The Act expressly provides that the powers contained in it "shall be in addition to and not in substitution for any existing proceedings or remedy," and that nothing in it "shall affect the terms of any agreement existing at the time of the passing of the Act between a water company and a water consumer as to the supply of water."

CHURCH AT LUDDENDENFOOT.

THIS church is now in course of erection at Denholme, Luddendenfoot, Yorks, and provides accommodation for 400 persons. The site is a very steep one, allowing for a large assembly-hall under the whole of the church, the interior of which will be left incomplete at present. The walls are of pitched-faced wallstones, with local stone dressing. The cost of the building will be about £1,650, exclusive of furnishing and heating. Mr. W. Wrigley, M.S.A., of Hebden Bridge, is the architect for the work.

THE SANITARY CONGRESS AT LEEDS.

THE sixteenth annual congress of the Sanitary Institute is to be held at Leeds next week, opening on Tuesday and closing on Saturday evening. A large local committee has been formed, of which the Lord Mayor of Leeds (Sir James Kitson, M.P.) is the chairman, and the Town Hall, the Yorkshire College, and other buildings have been placed at the disposal of the congress for meetings. A number of delegates, representing the War Office, county and town councils, urban and rural district councils, port sanitary authorities, school boards, universities, societies, and medical bodies, have been selected to attend.

The President of the Congress is Dr. Robert Farquharson, M.P., who will deliver his inaugural address in the library of the Yorkshire College at three o'clock next Tuesday, his subject being "Some Defects of Modern Civilisation, with Hints for the Improvement of the Human Race." An exhibition of sanitary appliances will be opened in the Camp-road-buildings in the evening of the same day. The second day will be occupied with a series of conferences, six in number. In every case the president will deliver an address, and papers will follow. The conference on river pollution will be presided over by Major Lamorock Flower, sanitary engineer to the Lea Conservancy Board. Amongst his recommendations will be found one in favour of the creation of a central inspector of sources of water supply. Papers on the general question and on the purification of trade effluents are also to be read. The conference of municipal representatives will be presided over by Mr. Councillor B. Womersley, chairman of the Leeds Sanitary Committee, whose address will be local and historical. Papers are promised dealing with the subjects of the Church and Sanitation, Working Class Dwellings in Belfast, the Influence of Large Towns on the Sanitary Progress of Neighbouring Small Towns, and other matters. Medical officers of health also meet in conference under Dr. Edward Seaton, and there the papers will deal with Small Isolation Hospitals, Poisoning by Tinned Foods and its Prevention, &c. Dr. Sykes (St. Pancras) will contribute a paper on Artisans' Dwellings as affected by Customs and Inland Revenue Acts; and the Assistant Professor of Public Health at University College, Mr. H. Kenwood, M.B., will detail some experiments showing that formic aldehyde vapours effectually disinfect rooms quickly and without affecting the colours and textures of fabrics. Mr. Thomas Hewson, the city engineer and surveyor of Leeds, will preside over the conference of municipal and county engineers. Subjects for discussion comprise the Disadvantages and Dangers of Combined Drainage, Sanitary Aspects of Wood Pavement, Storm Water Drainage, &c. The sanitary inspectors will meet under Mr. Peter Fyfe, chief sanitary inspector of Glasgow, at the School Board offices. The ladies' conference on domestic hygiene, under Mrs. Fawkes, will meet in the Methodist New Connexion Hall. The subjects already fixed include Health in Infant Schools, Women as Hygiene Teachers, and the Milk Supply and its Dangers. The day's work will be followed by a conversazione and reception by the Lord Mayor in the Art Gallery in the evening.

The three sections will begin their work on the Thursday and continue it on the Friday. Mr. T. Pridgin Theale will preside over and address the section on Sanitary Science and Preventive Medicine. The subjects for papers include Infant Mortality, Hygiene in Elementary Schools, and Sewage in Estuaries. The last-named paper will be by Dr. Francis T. Bond. Section II. deals with engineering and architecture. Its proceedings will be opened with an address from its

president, Mr. Lewis Angell. The topics of the papers will include Sewage Filtration, Disposal, and Purification, Fever Hospitals, Baths and Washhouses. Section III.—Chemistry, Meteorology, and Geology—has for its president, Mr. W. Whitaker, who is to offer suggestions about Federation for Water Supply. On Thursday the lecture to the congress in the Albert Hall will be given by Mr. H. Percy Boulnois, city engineer of Liverpool, on Some Sanitary Advances in Municipal Engineering. The congress will conclude with a lecture by Mr. Philip Boobbyer, medical officer of health, Nottingham, on the Essentials of Popular Hygiene. The Sanitary Exhibition will remain open until October 9.

PLASTERS, CEMENTS, AND MORTARS FOR BUILDERS' USE.

WATERGLASS.

THIS is chemically known as silicate of soda and silicate of potash. It is a very useful medium for preparing plasters of special kinds. Thin waterglass and chalk form a cement or mortar that hardens completely in six to eight hours; whilst if metallic salts be incorporated with the mass, a variety of cements are produced which are suited to special purposes. For example, if zinc filings, chalk (in the dry powder state), and waterglass be mixed into a suitable paste, a mass is produced which will cement metallic zinc to various substances; if sulphide of antimony be used in place of the zinc filings, a dark mass is produced which takes a very high polish; whilst if iron filings be used, a greyish-black mass is produced.

AN HYDRAULIC MORTAR OR CEMENT

is made by quickly mixing finely-ground Portland cement with a solution of waterglass. This compound dries very quickly, and hardens under water. Before applying the cement, coat the stones with a solution of waterglass.

A FIREPROOF CEMENT

can be made by mixing together, as quickly as possible, 1 part of glass powder, 2 parts of fluor-spar powdered, 6 parts of waterglass. In three or four days after use, this cement will stand fire-heat. With lime salts, waterglass slowly hardens. Thus a soft mortar in which to stamp or press sharp-edged stones may be made by mixing 1 part of quicklime and 10 parts of whiting (elutriated chalk) into a paste with 2½ parts of waterglass. Moulds should be used for forming the mass. By using quicklime alone with the waterglass, a very hard and quickly-drying mass is obtained, very useful in filling up cracks, &c., in stone, plaster, or brickwork.

For cementing pipes exposed to heat, a mixture made of 1 part zinc white (zinc oxide), 8 parts of pyrolusite (manganese black oxide), 2 parts of waterglass. This compound will stand a red heat, and when once it is fused it will form a glass-like mass, very tenacious.

For cementing slabs of marble together, a mixture made of 4 parts of whiting and 1 part of thick solution of waterglass forms a hard mass in a few hours that can be polished.

A SOLUTION FOR COATING STONE WALLS

and rough-cast or plastered ditto. can be made by mixing 1 part of waterglass with 3 parts of soft water (i.e., free from lime); it will cause a coating to form on the surface which is hard and weather-proof. The carbonate of lime in the mortar is converted into a silicate of lime by the decomposition of the waterglass, whereby the surface becomes coated as if with glass. A solution of waterglass brushed over whitewashed walls will prevent the whitewash being rubbed off, and enables the wall to be washed.

A white, enamel-like paint is produced by grinding up 4 parts of zinc white, 2 parts of permanent white (sulphate of barium), in waterglass.

As a special waterproofing and rust-preventer on metals, a solution of waterglass with manganese is very useful, particularly so as, if the metal be submitted to heat, an enamel-like surface is produced. Several applications of water-glass solution will render its surface very hard and smooth and weather-proof, while by dissolving powdered chalk in water-glass, a paste is made which can be used either as a wash for the surface of stone, but also for repairing chipped places, cracks, and by diluting 1 part of water-glass of 33 per cent. with 5 parts of rain or soft water a fire-protective coating is formed when such solution is applied to wood, allowing each coat to dry before putting on the next.

Ceiling plaster is variable in its composition, but a good, sound-proof, non-cracking plaster is made by mixing together 35 parts of sawdust, 35 parts of sand, 10 part of plaster of Paris, 10 parts of glue (softened in water), 10 parts of whiting. A plaster from clay is made by stirring gradually 1 part of rye-flour into 26 parts of water, and boiling the mixture until it is reduced a trifle in bulk, then take 1 part of this mixture, 8 parts of dry clay, and water sufficient to make the compound of a workable consistence.

Damp walls should be plastered as follows:—Give two coats of ordinary mortar to the walls, and smooth the last coat with a steel float, then give a third coat of very fat lime, and finally glaze this with pure lime compounded with $\frac{1}{20}$th part of alum, and some alumina (clay).

HARD WEATHERPROOF PLASTER.

No. 1.—Mix into a paste with water-glass, 12 parts of Portland cement, 6 parts of chalk (made into a paste with water), 6 parts of fine sand, 1 part of silicious earth (kieselguhr or "fossil" meal).

No. 2.—Prepare as above, 6 parts of Portland cement, 12 parts of chalk paste, 6 parts of fine sand, 1 part of fossil meal.

No. 3.—This is the hardest of the three grades. 9 parts of Portland cement, 6 parts of chalk paste, 6 parts of fine sand, 1 part of fossil meal.

A WHITE HYDRAULIC CEMENT

is prepared by mixing with lumps of brick the following ingredients, which, after being dried and burned at a white heat, are ground and used in cement or mortar; 10 parts of fossil meal (also called infusorial earth or kieselguhr) free from iron, 30 parts of chalk also free from iron, 1 part of silicate of soda or of potash.

TO MAKE CEMENT-WORK WEATHERPROOF.

Dissolve 1 part of sulphate of iron (green copperas) in 3 parts of water, and well soak the cement work with this solution for 24 hours, and then dry it in the air; oxide of iron will be produced in the cement, when it will become a browner colour, and the oxide that is found will enable the cement to be more resisting to weather influences. As a still further protection against the weather, dissolve equal parts of paraffin wax and paraffin oil and brush this over the cement work, after having previously warmed the cement by holding a brazier of live coals in front of it. If, instead of the wax solution, two applications of a 5 per cent. solution of soap in water be brushed over the cemented work, and the latter then dried, it can be polished and painted with oil paints. The soap, when it comes in contact with the oxide of iron in the cement, will become converted to ferrum sebate, which is insoluble in water, and will fill the pores of the cement and so save the paint being absorbed. If alum be added to the green copperas solution the cement becomes of a pale yellow-ochre tint, while if chrome alum be added to the copperas solution, the cement work will become green. Chalk surfaces, after treating in this manner, can be washed.

FIREPROOF PLASTER FOR CEILING.

Make into a paste slaked lime, bullock's blood, burnt alum, cement, sand, and brickdust, or else pumice-stone, coal-ashes, sawdust, broken glass or porcelain, and water-glass. The proportions may vary. Lay this mass on as a first layer, and then as a top layer above it lay on a mass composed of linseed-oil in which asphaltum and litharge has been heated. Mix them into a mass of broken glass, burnt alum, blood, cement, plaster of Paris or chalk, and pumice-stone. It is not necessary to use all these solid bodies; a selected few may be made. If the above compounds are desired as fireproof roofs, both masses should be laid on in a cold and liquid state on a solid and firm base, or else on wire net which has been coated with water-glass, and then spread on it the top layer or compound.

Sawdust in plaster is a good non-conductor of sound, and also as a substitute for sand in some cases. Thus, one formula for such plaster is to mix equal parts of sawdust and plaster of Paris, while another formula directs the mixture to be made thus: 56 parts of slaked lime and sawdust, 16 parts of plaster of Paris, 4 parts of softened glue (or boiled glue in liquid state), 1 part of glycerine. Mix altogether, and use like plaster.

Columns and pillars which are not intended to sustain any weight, but only for ornament, may be made thus:—Mix 1 to 3 parts (according to the degree of porosity desired) of resinous sawdust with 1 part of china clay (dry), and add sufficient water to form a plastic mass of a spongy consistency, and submit this mass to strong pressure in steel cylinders, so as to produce columns 8in. to 12in. diameter, and 4ft. or 6ft. long. Dry the blocks in the open air, then in a drying oven, and finally submit them to a white heat in a furnace. When cooled, these columns can be cut, sawed, planed, or worked like terra-cotta. It is fireproof, and only about half the density of ordinary bricks.

TURKISH PLASTER FOR COVERING PIPES.

Ingredients: 150lb. fresh lime reduced to powder, 15 quarts of linseed oil, 1½oz. to 3oz. of cotton waste. Preparation: Put the lime into a wooden trough, and then gradually mix in the linseed oil and cotton waste until the whole is of the consistency of bread-dough; then dry the mixture, and, for use, mix it with linseed oil to reduce it to a consistency that will allow it to be laid on in coats.

WATERPROOF CEMENTS.

No. 1.—For Cementing Glasswork. Ingredients: 6 parts of whiting, 3 parts of plaster of Paris, 3 parts of white sea-sand (shingle), 3 parts litharge, 1 part of rosin powdered, coach-varnish q.s. Preparation: Mix all the solids together in the dry state by sifting them several times, and then make the mixture into a putty with sufficient coach-varnish. A week's exposure to the air is required before the cement is thoroughly proof against water.

No. 2.—For cementing stone, metal, glass, or wood tanks for fresh or salt water. Ingredients: (All parts by measure, not weighed.) 10 parts of litharge, 10 parts of plaster of Paris, 10 parts dry white sand, 1 part of rosin (powdered), boiled linseed oil q.s. Preparation: Mix the solids dry, and when wanted for use make a putty of the compound by mixing it with sufficient boiled oil. Give three days' exposure to the air before allowing it to come in contact with water.

CEMENT FOR BUILDING CONSTRUCTION.

Ingredients: 1 heaped bushel of mortar (made in the ordinary way) 3½ quarts (dry measure) of iron scale, 1½ quart of treacle. Mix all together, and use the same day.

CONCRETE.

No. 1.—For foundations. Ingredients: 5 parts of gravel and sand, 1 part fresh-burned stone lime powdered by grinding (both components measured dry). Well mix these together with the shovel, and add sufficient water while doing so to slake the lime into the state of very thick mortar. Chips and bits of stone may be added if considered desirable.

No. 2.—For masonry. Ingredients (by measure): 9 parts of screened sand, 7 parts of slaked lime, 1 part of forge-ashes, 1 part of pozzuolana. Mix as in mortar-making.

No. 3.—For brickwork. Ingredients, by measure: 7 parts of slaked lime, 12 parts of sand. Mix as mortar.

Mason's cement for joining stone pavements. Ingredients: 20lb. clean river sand, 2lb. litharge, 1lb. quicklime, linseed oil q.s. to make a thin paste. Mill-grind up all together in a mortar-mill.

CEMENT FOR PIPES.

No. 1.—For joining large pipes. Ingredients: (parts by measure) 12 parts of Roman cement, 4 parts of white lead (dry), 1 part of litharge, ½ part rosin powdered, old linseed oil, boiled with rosin (1oz. per gallon) q.s. Preparation: Mix all the solid ingredients together, and then mix 2½lb. to 3lb. of this mixture with sufficient of the linseed oil to form a suitable putty or mortar.

No. 2.—Ingredients: Equal parts, dry measure, of burnt lime, Roman cement, potter's clay, ordinary clay, linseed-oil q.s. Preparation: Dry each ingredient, and then grind them separately, and mix by sifting, and finally mix up the compound with sufficient linseed-oil.

No. 3.—Ingredients (by measure): 2 parts of red lead, 5 parts of white lead, 3 parts of clay that has been mixed in water, allowed to settle, collected, and dried, boiled linseed-oil q.s. Mix all the solids together by sifting them, and then make into a putty with sufficient of the oil.

No. 4.—For water-pipes, and to resist fierce heat. Ingredients, by weight: 5 parts of zinc white, 4 parts of pyrolusite (mixed dry), 1 pint sodic silicate.

No. 5.—For covering steam or gas-pipes, as it is impenetrable by air or steam. Ingredients: 6 parts of powdered graphite, 3 parts of slaked lime, 8 parts of sulphate of lime, 7 parts of boiled oil. Knead all well together.

No. 6.—Ordinary cement for stone pipes. Ingredients (dry measure): 1 part of good Portland cement, 3 parts of sharp sand or gravel, water q.s. Mix the ingredients in the dry state, and then make into a mortar with sufficient water, and use as fast as it is made.

PLASTER OF PARIS CEMENTS.

No. 1.—Ingredients: Plaster of Paris, saturated solution of alum. Preparation: Bake the plaster of Paris, and then grind it; next steep it in the alum solution for 24 hours, and afterwards dry it, and then bake it a second time, and grind up for use. Mix with water when wanted.

No. 2.—Make a solution of 20 parts of water, 1 part of borate of manganese, 1 part of cream of tartar. Bake the plaster of Paris in an oven until it is hard, and then steep it in the above fluid until it is saturated; bake it again until dry and hard, and then grind to a powder for use by mixing it with water, and using it at once.

CEMENT FOR POINTING BRICKWORK.

Six equal parts of Portland cement, lime, and white sand; water q.s.

CEMENT OR PLASTER FOR FACING BUILDINGS.

Ingredients (dry measure): Mix together 1 part powdered quicklime, 2 parts of baked clay, powdered; mix together 1 part freshly-baked plaster of Paris, powdered, and 2 parts of baked clay. Make the two mixtures, and then mix them together to form one compound. Make into a putty or mortar with sufficient water, and apply like mortar. It becomes very hard and durable.

PLASTER OF PARIS ARTICLES OR WORK

may be made hard enough to enable nails to be driven into it by treating it with a solution of glue or gelatine until it is thoroughly saturated.

SUBSTITUTE FOR PLASTER OF PARIS.

Ingredients (by weight): 2 parts of best whiting, 1 part of glue, 1 part of linseed oil, raw. Preparation: Heat all these materials together (having first soaked the glue in water until soft, but not lost its shape); mix thoroughly, and when cool, lay it on a stone which is covered with powdered whiting, and heat until the mass is bright, tough, and firm, or else press into moulds; it becomes very hard in time.

Plaster for Inside Buildings.—Fine stuff: Slake lump lime with water to a paste, and then add more water until it is of a creamy consistency, and allow it to harden by the evaporation of the water. It is then used for slip coat, but is ready for finishing coat when prepared with plaster of Paris or sand. Coarse stuff: 2 parts of lime paste, 4½ parts of sand, ½ part of cowhair. Gauge stuff, or hard finish: 1½ to 2 parts of "fine stuff" and ½ part of plaster of Paris.

For cornices: Use equal parts of "fine stuff" and plaster of Paris.

PORTLAND CEMENT

Is manufactured from chalk or some other salt of lime (chalk is calcic carbonate or carbonate of lime), river-mud, or clay and oxide of iron, the proportions of each varying according to the formula of each maker of the cement, the proportion of limestone varying from 65 per cent. to 80 per cent., and of clay and iron oxide 20 per cent. to 35 per cent. These ingredients are intimately mixed with water in a mill, then slowly dried on hot plates, and afterwards calcined in a kiln and reduced to fine powder. By keeping this compound as thus prepared several months before use, its adhesive and cohesive strength is increased. By mixing this compound with water to a paste, it hardens rapidly; the addition of sand decreases the rate at which it hardens. To use this cement as "stucco," 3 to 4 parts of sand should be mixed with it to 1 part of the cement. The sand must be sharp clean sand, free from loam (that is, it should be pure sand, not sand and lime, or clay), otherwise it will not harden, but crumble to pieces in the wall; for this reason, washed river-sand is generally used. If stucco is to be painted, some months should be allowed to elapse before applying the paint; otherwise the paint will peel off, and form blisters. This is probably due to the quantity of the quicklime in the cement not being thoroughly slaked before becoming hardened.

POZZUOLANA CEMENT.

This cement takes its name from an earth of volcanic origin; it is rough, dusty, and granular in texture. When mixed with one-third its weight of lime and water, it hardens very suddenly, and is the best and most durable cement to harden under water; but as the pozzuolana is obtained from but few places in Italy, it is not commercially cheap enough to be used for general purposes.

MANGANESE OXIDE

(De Blout oxide or pyrolusite) is a valuable ingredient in cement, and are mixed with water. This is a most excellent formula for sand or cement:—4 parts of grey clay, 6 parts black oxide of manganese, 90 parts (about) of good limestone reduced to powder and calcined to expel the carbonic dioxide. Mix all the ingredients, calcine the mixture, and when cooled work it into a stiff paste with sufficient water to 60 parts of clean (washed) sand.

MARBLE CEMENT.

No. 1.—Ingredients (by weight): 8 parts of rosin, powdered, 1 part of wax, 4 to 5 parts of plaster of Paris. Melt the wax, then dissolve the rosin in the hot wax, and next stir in the plaster of Paris. Use the compound while hot, and make the pieces of marble hot where they are to be joined.

No. 2.—Ingredients (by measure): 12 parts of Portland cement, 6 parts of slaked lime, 6 parts of fine sand, 1 part of infusorial earth (fossil meal), silicate of soda q.s. Mix all the solids in the dry state, and then make into a thick paste with the soda silicate. Use the cement cold, and the marble also should be cold. After cementing, leave the joined pieces 24 hours undisturbed.

No. 3.—Ingredients: 100 parts of chloride of zinc solution (specific gravity, 1·490 to 1·652), 3 parts borax (powdered), or salammoniac dioxide of zinc q.s. Preparation: Mix 3 per cent. of borax with the solution of chloride of zinc, and then work in sufficient zinc oxide to make a stiff paste. This cement becomes as hard as marble, can be polished, and even be used for moulding.

ROMAN CEMENT

is similar to pozzuolana cement, but sometimes bullock's blood is used instead of water to mix up the ingredients.

ROOFS: CEMENT FOR ZINC OR LEAD.

Ingredients (by weight): two pints common pitch, one pint guttapercha. Melt the ingredients together in an iron pot, and then pour it on hot on the parts to be cemented, and smooth the cement with a plumber's soldering iron, having previously run the hot iron over the parts of the metal where the cement is to be used.

BRICKLAYERS' CEMENT FOR POINTING.

No. 1.—50 parts slaked lime, 40 parts bullock's blood, 1 part alum.

No. 2.—50 parts slaked lime, 25 parts fine ashes, 8 parts to 10 parts of bullock's blood.

SIDEWALKS, CEMENT FOR PREPARING ARTIFICIAL.

Remove the earth to a depth of 18in., and then fill up to a depth of 12in. with large stones, and on top of these lay a bed of concrete 4in. thick, made of one part Portland cement and six parts of stone chip and gravel, and on top of this lay 2in. of a cement made of one part Portland cement and two parts of fine sharp sand. Lay this on up to the surface of the ground, and float the surface of the cement as considered necessary. To give a finish, line off into regular blocks.

CEMENT TO MEND SANDSTONE.

Ingredients: 10 parts of clean sand, 1 part of lead oxide (litharge), ½ part of ground lime, linseed oil q.s. Make into a cement with the oil to a thick paste.

To cement iron in stone, mix plaster of Paris with water, and to the mixture add 1 part of iron filings to 6 of plaster (by weight).

To fasten copper to sandstone. Ingredients (by weight): 7 parts of white lead, 6 parts of litharge, 6 parts of bole, 4 parts of broken glass, 4 parts of linseed-oil varnish. Mix up together to form a putty.

ENGLISH ROMAN CEMENT.

Ingredients: 1 bushel of slaked lime, 3½lb. of green copperas, ½ bushel of fine gravel sand, 15 gallons of water. Dissolve the copperas in hot water; stir it continually while in use. Mix as much as is required for the entire front of wall to be dealt with, as it is not always easy to match the exact colour again.

CEMENT FOR FLOORS OF CELLARS, BASEMENT, KITCHEN, ETC.

No. 1.—Five parts of clean, coarse, sharp sand (what plasterers call fine gravel), 1 part of cement (Portland or hydraulic). Just dampen sufficient to make it work well. Mix it in a box, and then tip it into the cellar, and spread smooth with a trowel, hoe, or trowel about 2in. thick, and then level it down hard and smooth with the flat side of a shovel.

For finishing, use 1 part of cement to one part of sand. Mix them thoroughly, and then water it like plastering mortar. Dump it on the first coat about ½in. thick; spread and smooth with a trowel. It will soon become as hard as stone.

No. 2.—For floors of rooms, &c. 6 parts of plaster of Paris, 1 part of lime. Mix together, wet, slake, and lay on the floor. When dry, lay on a solution of green copperas in water. Repeat this several times, allowing the surface to be perfectly dry before giving the next application. After several days' rest and drying, give it a soaking with boiled linseed-oil, and finally a coat of copal varnish. As the cement expands, perform the laying of the cement in sections. The colour will be a brown.

CEMENT FOR FIXING ROOFING TILES.

Ingredients: 4 parts of dry sand, 4 parts of whiting, 1 part of litharge, linseed oil q.s. Make into the consistency of putty. It will not crack when cold, nor be melted by the heat of the sun like tar or asphalte.

FIREPROOF CEMENTS.

No. 1.—140 parts of iron filings, 30 parts of hydraulic lime, 25 parts of quartz sand, 3 parts of salammoniac, vinegar sufficient to make into a paste. Let the cement slowly dry before heating it.

No. 2.—180 parts of iron filings, 45 parts of lime, 8 parts of common salt, vinegar to make a paste. Let the cement be perfectly dry before being heated, when it becomes stone hard.

No. 3.—Linseed meal or almond meal, milk, lime-water, or starch-paste. Make into a paste, which resists a temperature of 500° F. (260° C.)

No. 4.—Clay, sand, water. Puddle the clay in the water, and then mix in as much sand (previously sifted) as possible with the hands, and then lay it on the object to be fireproofed in coats more or less thick.

No. 5.—5 parts of dry clay, 1 part of iron filings, linseed oil sufficient to mix to a paste.

No. 6.—10 parts of common clay dried and pulverised, 4 parts of iron filings, 1 part of common salt, 1 part of borax, 2 parts of manganese peroxide. Mix with water.

WATERPROOF CEMENT FOR GUTTERS, TANKS, ETC.

No. 1.—1 part of tar, 1 part of tallow, 1 part of fine brickdust. Warm the tar and then add the tallow, and throw in the brickdust, apply hot after thoroughly mixing.

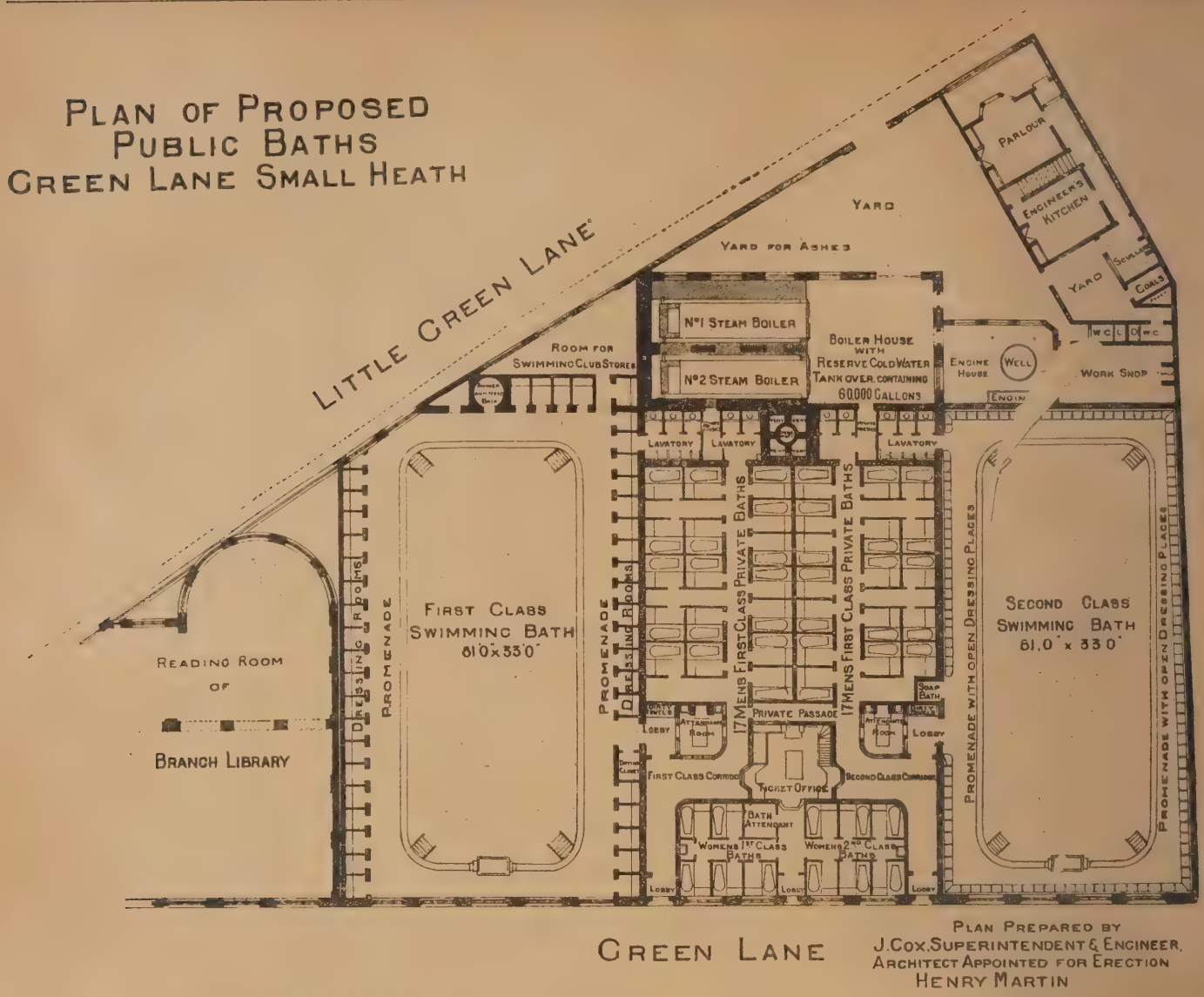
No. 2.—3 parts of manganese iron ore, 17 parts of lime calcined and mix with a little sand powdered, and when thrown into water the compound hardens rapidly.

No. 3.—4 parts of fine clean sand, 2 parts of quicklime powdered, 1 part of bone-ash, water q.s.

COMMON MORTAR

is composed of quicklime and sand, reduced to a paste with water. The lime should be pure and completely free from carbonic acid, the sand should be free from clay, partly in the state of fine sand and partly in the state of gravel. The water should be pure, and if previously saturated with lime so much the better. The best proportions are: 3 parts of fine sand, 4 parts of coarse sand, 1 part of quicklime recently slaked, and as little water as possible. The addition of burnt bones improves the tenacity of the mortar, and prevents the tendency to crack in drying. They should not exceed 25 per cent. of the lime employed.

The addition of garden-mould, cinder-ashes, and rubbish to this for the foundation of buildings spoils the mortar; moreover, the addition of dustbin ashes is positively injurious to the health of whoever inhabits the house built with such mortar or plaster, because the lime in the mortar, together with moisture, will breed a multiplicity of germs from the dust-bin refuse which will produce many infectious diseases. Anyone who doubts this should smell the offensive emanation given off from the plaster of a shoddy or "jerry-



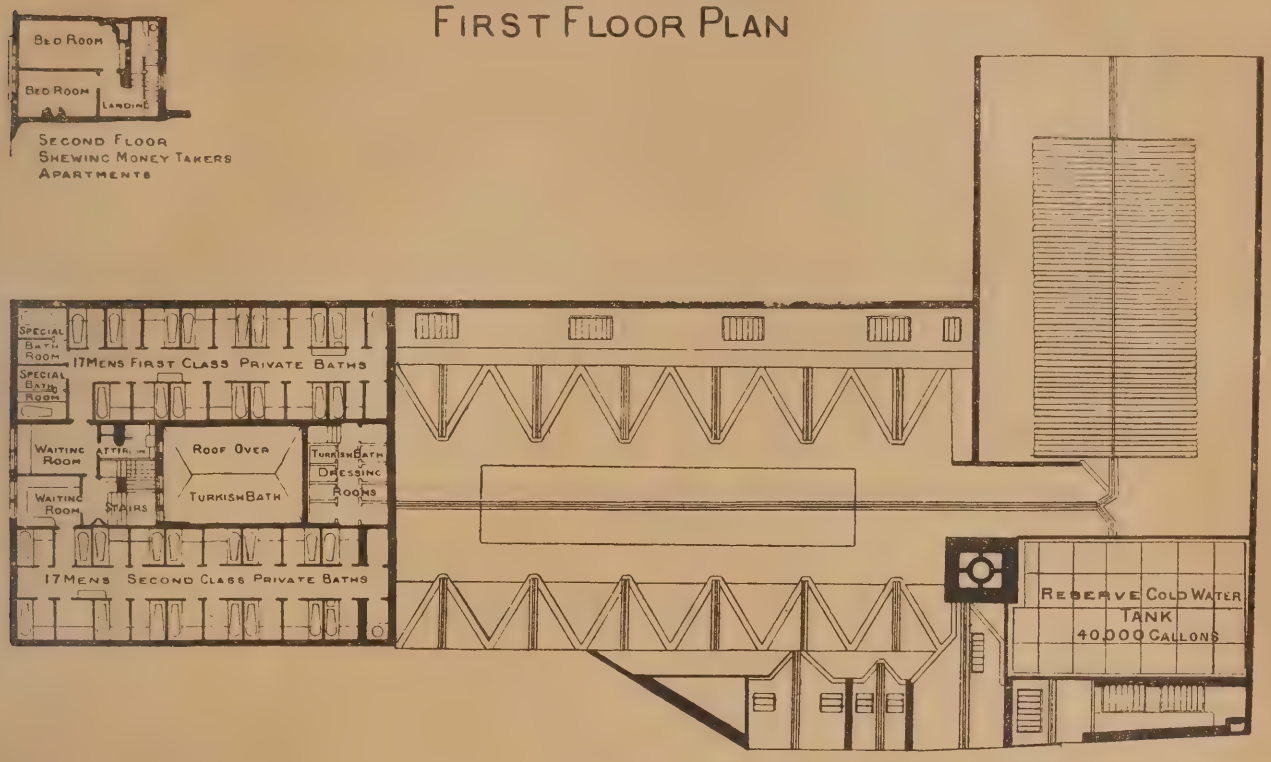
built" house. The odour is most disgusting, and if inhaled for any length of time will produce serious throat diseases. The sand should be hard, sharp, gritty, and not too fine; it should be free from all organic matter. Good sand suited for mortar only can be rubbed between the hands without soiling them. The water should also be free from organic matter, and on this account should not be taken from stagnant ponds. The presence of salt in mortar causes an efflorescence of white frothy blotches on the surfaces of the bricks, and renders the mortar liable to white moisture. To get rid of these white patches, wash the surface with hydrochloric acid and water. The sand in mortar is to increase the resistance of the mortar to crushing and lessen the amount of shrinking, and to reduce the bulk of the more costly material, lime. Water is the agent effecting a combination between the materials, and as sand does not increase in volume, it necessarily follows that no more of the diluting element should be employed than is absolutely necessary to fill the interstices between the sand, and render the whole into a paste convenient for use.

Hydraulic mortar can be made by mixing ½ to ⅓ part of alum shale to the lime. The compound dries very hard and impermeable. H. C. S.

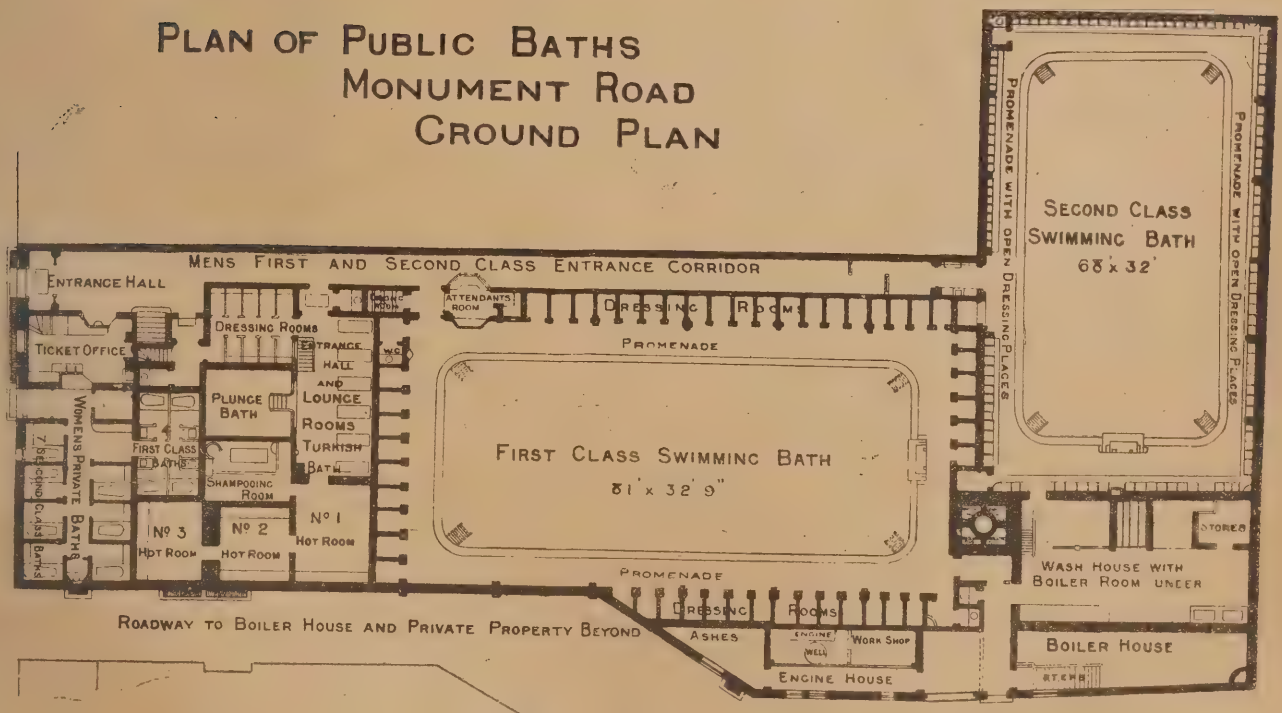
BIRMINGHAM PUBLIC BATHS.

EVER to the front in municipal progress, the city of Birmingham ranks among the earlier towns in which public baths on an adequate scale were provided out of the public purse. The account of their stewardship for the use of other governing authorities has now been issued by the Baths and Parks Department of the City Corporation, giving a comprehensive history of the Birmingham City Baths, their acquisition, cost, and annual maintenance. This most useful and carefully prepared book contains plans of these establishments, together with a variety of information as to the number of bathers, a summary of expenditure, and other statistics. For the information of district councils and other bodies interested in the erection of baths and washhouses for the material health and wellbeing of the communities in which they may be concerned, we may say that extra copies of the work under notice can be had of Mr. J. Cox, M.I.M.E., engineer to the City of Birmingham, for three shillings and ninepence post free. Inquiries from all parts for particulars of this kind are constantly being made, and applications come from America and South Africa, as well as our English towns, while Continental cities also frequently, seek information of this character. It is impossible for us, even in an abstract, to epitomise the tables and details to be found in this Birmingham record of useful municipal development in this one subject of baths. As early as 1794, in Liverpool, there was a large bath, then a private enterprise; but subsequently it was purchased by the town, and continued in use as a public bath till 1820. In 1828, the first specially erected public bath was built in Liverpool at a cost of £43,600. In 1842 the first public laundry was erected in Liverpool. Birmingham can, however, it seems, claim priority in this matter, for as far back as the year 1731 baths of some importance, described "as the most complete baths in the whole island," were in use as a private undertaking. In 1844 the baths and washhouses movement began to establish itself, and various Acts of Parliament rendered its development possible. The Kent-street Baths, Birmingham, from the plans of Mr. D. R. Hill, architect, were erected in 1851; but previous to the passing of Sir George Grey's Bill in 1846, voluntary effort had made itself felt in Birmingham when the Public Baths Association held lectures and public meetings, with the result, among others, that the site in Kent-street was purchased and ultimately sold to the Corporation in 1848, and the buildings were erected, as already stated, by the town, at a cost of £23,000. The Woodcock-street Baths, from the plans of Mr. Edward Holmes, were erected in 1860, and, as originally designed, were intended to provide two large swimming-baths, but only one was built at that time. Its cost, with subsequent alterations, was £12,378 10s. 6d. The Northwood-street baths, by Mr. William Martin, in 1862, has two large swimming-baths; the cost was £12,283. The next establishment erected was that in Monument-road, in 1881, the architects being Messrs. Martin and Chamberlain. Of their work we reproduce the two chief plans, which approach more nearly the more recent development of the planning of such buildings, and show in many ways a most convenient scheme well carried out, including a Turkish bath. The total cost was £27,339 6s. 8d. The inhabitants of Bordesley and that district are to be furnished with a bath in Green-lane, Small Heath, from Mr. H. Martin's plans, the engineer being Mr. J. Cox. We give the ground floor of this proposed establishment, which comprises two swimming-baths, each having a water area of 81ft. by 33ft. The various departments are conveniently grouped round one ticket-office, behind which is a private connecting corridor for the use of the staff. The women's entrance is in the centre of the façade. £21,000 is the estimated cost. It is likewise proposed to erect public baths at Balsall Heath. There are open-air swimming-baths at Cannon Hill Park and Victoria Park, concerning both of which various particulars are given in this volume. A general plan of the city adds value to the book, giving, as it does, the localities in which the several baths, parks, and recreation grounds under the control of the Baths and Parks

PLAN OF PUBLIC BATHS
MONUMENT ROAD
FIRST FLOOR PLAN



PLAN OF PUBLIC BATHS
MONUMENT ROAD
GROUND PLAN



PLAN OF ENGINEERS HOUSE

MARTIN AND CHAMBERLAIN
ARCHITECTS
BIRMINGHAM.

Committee are situated. The Baths and Washhouse Acts of Parliament are reprinted, with the by-laws framed and adopted by the City Council. It will thus be seen how thoroughly well this useful report has been made. Intelligence and cleanliness generally are intimately associated, and Birmingham institutions have gone far to prove the rule. Certainly the city sets in this respect a good example worth following.

ELECTRIC LIGHTING NOTES FOR ARCHITECTS.—II.

By an Assoc. Inst. Elect. Engs.

WORKED EXAMPLES.—(1) What is the length of a wire of which the resistance is 9 ohms, given that a wire of the same material and cross-section, and 20ft. in length, has a resistance of 30 ohms? Since $R = \frac{\sigma \cdot l}{A}$ (see Eq. 3), and σ and A are the same in the two wires,

$$R : R_1 = l : l_1 \text{ or } 30 \text{ ohms} : 9 \text{ ohms} :: 20\text{ft.} : l_1 \text{ ft.}$$

$$\therefore\ l_1 = \frac{9 \times 20}{30} = 6\text{ft.}$$

(2) Find the resistance of a wire 200c.m. long and ·05mm. diameter, given that $\sigma = 1{\cdot}642$ microhms:—

$$\text{Resistance} = R = \frac{\sigma \cdot l}{A},$$

and— $A = \frac{\pi}{4} d^2 = {\cdot}7854 \times ({\cdot}005)^2$ sq. centimètres.

$$\therefore\ R = \frac{1{\cdot}642 \times 200}{{\cdot}7854 \times {\cdot}000025} \text{ microhms}$$

$$= 16725235{\cdot}5 \text{ microhms} = 16{\cdot}725 \text{ ohms.}$$

(3) What is the diameter of a wire one mile long which has a resistance of 20·25 ohms, if a mile of the same wire, 45 mils in diameter, has a resistance of 25 ohms? (Note.—1 mil = $\frac{1}{1000}$in., or 0·001in.)

Since the length and resistivity of the two wires are the same, it is obvious that the areas of cross-sections of the wires are inversely as the resistances. That is:—20·25 ohms : 25 ohms : : area of second wire : area of first wire. And if d = diameter of wire required—

$$\therefore\ 20{\cdot}25 \text{ ohms} : 25 \text{ ohms} :: (45)^2 \times \frac{\pi}{4} : d^2 \times \frac{\pi}{4}$$

and— $$d^2 = \frac{25 \times 45 \times 45}{20{\cdot}25}$$

$$\therefore\ d = \sqrt{\frac{25 \times 45 \times 45}{20{\cdot}25}} = \frac{5 \times 45}{4{\cdot}5} = 50 \text{ mils.}$$

(4) The conductance of a wire 30ft. long is 4·5mhos.; what is the length of a wire of the same material and cross-section, the conductance of which is 3mhos.? The resistance of a wire is directly proportional to its length; therefore the conductance of a wire is inversely proportional to the length.

∴ Conductance of second wire : conductance of first wire : : length of first wire : length of second wire; and 3mhos. : 4·5mhos. : : 30ft. : $l$ft.

$$\therefore\ l = \frac{30 \times 4{\cdot}5}{3} = 45\text{ft.}$$

(5) Determine the resistance of 250 yards of wire 25 mils in diameter, the resistance of 1 mile of that wire 8 mils in diameter being ·09 ohm.

Let R = resistance required, and σ = resistivity of wire; then—

$$R = \frac{\sigma \times 250}{\frac{\pi}{4} \times (25)^2} \quad \ldots\ldots\ldots\ldots\ldots (\alpha)$$

but— $$\cdot 09 = \frac{\sigma \times 1{,}760}{\frac{\pi}{4} \times (8)^2} \quad \ldots\ldots\ldots\ldots (\beta)$$

And dividing (α) by (β), we get—

$$\frac{R}{\cdot 09} = \frac{250\,\sigma}{\frac{\pi}{4} \times 25 \times 25} \div \frac{1{,}760\,\sigma}{\frac{\pi}{4} \times 8 \times 8}$$

$$= \frac{250}{1{,}760} \times \frac{64}{25 \times 25} = \frac{4}{275}$$

$$\therefore\ R = \frac{4}{275} \times \cdot 09 = 0{\cdot}001309 \text{ ohm.}$$

This method of forming ratios is recommended for all cases of complicated calculations.

6. The resistance of three conductors of the same lengths are respectively 2, 4, and 5 ohms. What will be the resistance of a conductor formed by placing the three wires side by side so that the new conductor has a larger area of cross-section, but the same length?

This problem is much simplified by dealing with the conductance instead of the resistance. It is obvious that the conductance increases proportionately with the number of wires placed side by side, and is the sum of the separate conductances. And since conductance $= \frac{1}{r}$ mho., the separate conductances are, $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{5}$mho., and the joint conductance of the three wires

$$= \tfrac{1}{2} + \tfrac{1}{4} + \tfrac{1}{5} = \tfrac{19}{20}\text{mho.}$$

$$\therefore \text{ resistance of new conductor} = \frac{1}{\text{conductance}}$$

$$= \frac{1}{\frac{19}{20}} = 1\tfrac{1}{19}\text{ohm.}$$

Electrical Pressure.—Electromotive Force.—The Volt.—The remaining factor, electrical pressure, upon which the transference of electricity depends, is much more important and difficult to understand than either current or resistance. We have already observed that electricity is a form of energy, and that bodies electrified are capable of doing work In other words, electrification is accompanied by the accumulation of a certain amount of energy, and any body brought into such a position or condition that in consequence it is capable of doing work, is said to possess potential energy. Electrically we say that the body has a certain potential, which means that it possesses so much or so many units of potential energy. Now, potential is a measure of the work which can be done, and work is done when electricity passes along a conductor, for then resistance (obstruction) is overcome, and it is found, and can be proved experimentally, that currents of electricity always result whenever we have two points in a conductor at different potentials. A similar phenomenon occurs when a body has two points at different temperatures, in which case there is a transference of heat from the point of higher temperature to the point of lower temperature, and so long as this difference of temperature is maintained there is a continuous flow or current of heat. Hence the following definition:—

The difference of potential, or P.D., between two points is that difference in electrical condition which tends to produce a transference of electricity from one point to another.

The term difference of potential is usually abbreviated by using the letters P.D. Now, if two bodies are electrified to different potentials, and they are connected by means of a wire, a rush of electricity takes place from the body of higher potential to the one of lower potential—that is, we have a discharge or momentary current, and as the result the two bodies are reduced to the same electrical condition. To have a continuous current it is evident that we must have something more than a P.D. We cannot here, of course, inquire into the process of transformation of any one form of energy into electrical energy, but must assume that with every generator there is a something produced which maintains a P.D. This something is called electromotive force, and, as the name implies, it is a force in the sense that it sets up a pressure or stress which is a manifestation of the electrical energy. The P.D. at the terminals of a dynamo or cell is a measure of this stress.

In every circuit energy is expended, some usefully in performing work, and some is dissipated by the resistance which has to be overcome. It is thus obvious that to continue this expenditure of energy some external force (electromotive force) is required to maintain a permanent P.D., and so keep up a continuous current of electricity, and any agency which enables this to be done is a source of electromotive force. Hence the following definition:—

Electromotive force is the originating cause or capability of maintaining a P.D.

The term "electromotive force" is usually abbreviated by using the letters E.M.F. We thus see that the relationship between E.M.F. and P.D. is the same as the relationship between force of gravity and water pressure or difference of water level. Both E.M.F. and P.D. are thus phases of energy, and it is because they are so intimately connected that so much confusion exists respecting them. Throughout these articles the term "E.M.F." will be used to denote the measure of the electrical pressure generated, and the term "P.D." to denote the measure of the electrical pressure between any two points in a circuit. The pressure utilised in the external part of the circuit—outside the generator—is the terminal P.D. of the generator. Thus, if E be the E.M.F. of a generator, and e the terminal P.D., then—

$$E = e + e_1 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

e_1 being the electrical pressure used internally in the generator.

In the system of practical units, the unit of E.M.F. is that pressure which is required to send one ampère through a resistance of one ohm, and and is called the volt. This pressure is approximately the E.M.F. of a Daniell's cell. The terminal pressure, or P.D., of a generator is usually termed voltage (number of volts), and the following paragraph will help the student to distinguish between the different phases of electrical pressure.

"The term 'E.M.F.' should be reserved for the energy supplied, while the destruction of energy can be denoted by voltage. The voltage can always be measured by a voltmeter; but E.M.F. cannot always be so determined. Voltage must be caused by E.M.F.; but E.M.F. may exist without voltage. E.M.F. is generally local, while voltage is necessarily distributed. E.M.F. represents a condition of supply, which is generally fairly constant, however much power is supplied."

Ohm's Law.—So far we have considered current, resistance, and E.M.F. individually, and without reference to their connection with one another; but as these three fundamental factors are always present in an active circuit, we shall now endeavour to give an accurate idea respecting them in a collective sense. The relationship between them, and dependence upon each other, are conveniently expressed as a law, which, on account of its importance as the fundamental law of electrical measurements, may be considered in the strictest sense a law of nature. It was discovered and announced by Dr. G. S. Ohm, a German physicist, in 1827, in his "Mathematical Theory of the Galvanic Circuit"; and, in honour of the great service he thus rendered to the science of electricity, it is justly known as Ohm's law.

From what has been said, it is obvious that the strength of a current is proportional to the pressure acting, and inversely as the resistance of the circuit. Ohm discovered that for the same conductors the ratio of the E.M.F. to the current is constant, or—

$$\frac{E}{C} = \text{a constant quantity,}$$

where E = E.M.F. and C = current strength. This constant quantity was discovered by Ohm to be equal in all cases to the total resistance of the circuit; and subsequent experiments have so often verified this, that we say—

$$\frac{E}{C} = R$$

expresses in an algebraic or mathematical form the relationship known as Ohm's law. It is clear that, given any two of the three quantities, we can, in a simple manner, determine the third, for by transposing one term we get $E = C \times R$, and by a further step we get $C = \frac{E}{R}$. This form is probably the most useful practically; but to those only slightly acquainted with algebraic statements, the following will, perhaps, be the most serviceable way of remembering Ohm's law—

$$\text{Amperage} = \frac{\text{voltage}}{\text{ohmage}},$$

where ohmage is used to denote the number of ohms resistance in the circuit. Expressed in words, Ohm's law is as follows:—The strength of the current varies directly as the E.M.F. and inversely as the total resistance of the circuit. Collecting the algebraic forms of this law, we have—

$$\left.\begin{aligned} C &= \frac{E}{R} \\ E &= C\,R \\ R &= \frac{E}{C} \end{aligned}\right\} \quad \ldots\ldots\ldots\ldots\ldots\ldots (5)$$

We shall now illustrate this important law by giving some worked examples:—

Worked Examples on Ohm's Law.—1. A dynamo generating an electrical pressure of 120 volts sends a certain current through a circuit, the total resistance of which (including dynamo, lamps, &c.) is 10 ohms. What is the current?

Solution.—Since— $$C = \frac{E}{R}$$

$$\therefore\ C = \frac{120 \text{ volts}}{10 \text{ ohms}} = 12 \text{ ampères.}$$

(2) A 10-cell Daniell's battery (E.M.F., 1 volt

each), whose resistance is 10 ohms per cell, is used to work a telegraph line eight miles long, the resistance of the line wire being 12 ohms per mile; determine the strength of the current in milliampères, the resistance of the instrument being 200 ohms.

NOTES.—(1) A milliampère is the $\frac{1}{1000}$th part of ampère. (2) If in any circuit there are several sources of electrical pressure, or several portions of the circuit differing in resistance, then E and R in $C = \frac{E}{R}$ denote the sum of the pressures and resistances respectively, that is if e_1, e_2, e_3 = individual pressure, and r_1, r_2, r_3 = individual resistance.

then— $$C = \frac{e_1 + e_2 + e_3 + \dots}{r_1 + r_2 + r_3 + \dots} = \frac{E}{R} \quad \dots(6)$$

If the source consists of n cells, each having a pressure of e volts and r ohms resistance, then if the cells be connected in series—

$$E = ne \text{ and } r_b \text{ (of battery)} = nr \dots(7)$$

In a'dition to the resistance of the battery there may be the resistances of the leads, measuring instruments, lamps, &c. In the example, for instance—

$$C = \frac{E}{R} = \frac{n \cdot e}{r_b + r_w + r_i} \quad \dots\dots\dots\dots(8)$$

where— r_b = total resistance of battery.
r_w = total resistance of leads or wires.
r_i = total resistance of instruments.

Solution—

$$C \text{ (ampères)} = \frac{(10 \times 1) \text{ volts}}{[(10 \times 10) + (8 \times 12) + 200] \text{ ohms}} = \frac{10}{396} = 0{\cdot}0\dot{2}5 \text{ ampère.}$$

And since— 1 ampère = 1,000 milliampères,
$\therefore$ $\cdot 0\dot{2}5$ ampère = $25{\cdot}2\dot{5}$ milliampères.

3. Suppose that in the last example, it was required to reduce the current to 20 milliampères, what additional resistance would you interpose in the circuit?

Solution.—Now 20 milliampères = ·02 ampère, and if R = resistance added, 396 + R = total resistance, and—

$$\cdot 02 \text{ (ampère)} = \frac{10 \text{ volts}}{(396 + R) \text{ ohms}}.$$

$$\therefore \quad 396 + R = \frac{10}{\cdot 02} = 500,$$

and— $$R = 500 - 396 = 104 \text{ ohms.}$$

4. A telegraph line having a resistance of 100 ohms has a ten-cell battery connected to it, each cell having a resistance of five ohms. By how much would the current flowing be increased if the number of cells were doubled, the cells being joined up in series?

Solution.—Let e = E.M.F. of each cell. Then in the first case—

$$C_1 = \frac{10\,e}{100 + (10 \times 5)} = \frac{e}{15} \text{ ampères,}$$

and by doubling the number of cells—

$$C_2 = \frac{20\,e}{100 + (20 \times 5)} = \frac{e}{10} \text{ ampères.}$$

By forming a ratio between C_2 and C_1 we have—

$$\frac{C_2}{C_1} = \frac{e}{10} \div \frac{e}{15} = \frac{15}{10} = 1{\cdot}5$$

that is, the current flowing is increased 50 per cent.

5. How many volts are needed to send a current of 20 ampères through a conductor having 10 ohms resistance? What difference would it make in your answer if the circuit included a motor having a back-electromotive force of 450 volts?

Solutions.—First part: E = C × R = 20 amps. × 10 ohms = 200 volts.

Second part: If a circuit contains any source of back-electrical pressure (e volts, say), as when motors and electrolytic cells are included, the formula for Ohm's law becomes—

$$C = \frac{E - e}{R} \quad \dots\dots\dots\dots\dots\dots (9)$$

from which we get—

$$CR = E - e, \text{ and } E = CR + e.$$

$$\therefore \quad E = 20 \times 10 + 450 = 650 \text{ volts.}$$

(*To be continued.*)

RULES FOR MAKING GOOD MORTAR.

MORTAR for the plasterer's use should be well made, and the following rules should, says the *U.S. National Builder*, be strictly complied with when making: First, the lime should be thoroughly slaked, and brought to a paste or putty state; second, it should remain in the mortar bed until it is perfectly cool before mixing in the sand and hair; third, good mortar may be used with safety eight or ten days after it is made; but in no case should it be used before it is six days old.

Some authorities say it is best to use mortar for plastering within three or four days after it is first made. They claim that, in mortar which stands ten or more days before using, the lime loses a portion of its strength, and the mortar becomes deteriorated thereby. This, to a certain extent, is true; but, notwithstanding the loss of strength by the lime, and the consequent deterioration of the mortar, every observant plasterer knows that walls coated with mortar made two or three weeks previous to using stand better than those coated with "green" or freshly made mortar. Newly-made mortar, immediately applied, frequently causes the walls to chip, crack, and become mottled. Mortar well tempered, and as well seasoned, works better and cooler than the hastily-made new mortar, and invariably gives better satisfaction. Colonel Gillmore, quoting from Vicat, and apparently endorsing the statement, says: "It was supposed, for many years, that the longer the lime was slaked before it was used the better mortar it would make. Recent experiments prove, however, that this is not the case with mixtures of fat lime and sand only. Better results are obtained with such mortars if the paste be mixed with the sand as soon as the slaked lime has become cold, and care should be taken to use no more water, in the process of extinction, than may be required to produce a thick pulp."

In slaking lime, care should be taken that neither too much nor too little water is used. If too much is used, the lime will be "chilled," and lose a part of its strength; if too little, it will "burn," and a portion of it will pass into the bed unslaked and cause trouble there.

As the quality of lime varies in different localities, it is impossible to give the exact proportion of sand to be used to each bushel of lime.

The hair should be mixed with the lime and sand at once, for mortar should never be wetted up a second time. For the first coat on lath it will be necessary to use about two pounds of hair to every bushel of lime slaked, and the mortar should have only a sufficiency of sand in it to keep it from cracking while setting, as it requires to be "pasty" enough to stick firmly to the lath and "clinch" or "bond" securely between and behind them.

In many places the plasterer has also to lath the work he is to finish; when such is the case, he should make it a rule never to have more than ⅜in. key between each lath. Joints should be broken every 16in., and more frequently if the conditions will admit. If twenty or thirty laths are nailed so that the ends all joint on one stud, it will soon show itself, as the plaster will certainly crack at that point when the studs dry and shrink. In lathing for outside work, if the building has been first boarded, it is better to nail the lath on diagonally—say, at an angle of about 45° to the base of the building, and 1in. apart; then cross these laths again at right angles with another tier, nailing them on to the first lath, leaving spaces about ¾in. between them.

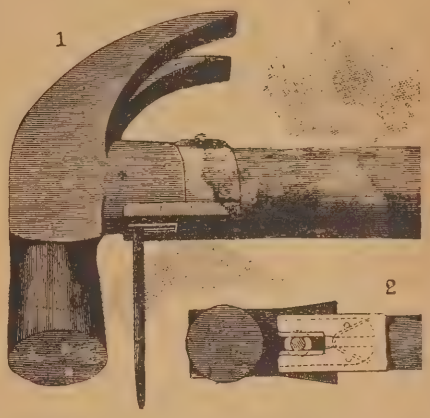
This method of lathing is a trifle more expensive (about one-fifth) than the ordinary way, but it insures good work, and if the frame of a house is well put together and firm, so that the wind will not rack it, the plastering will stand longer than either clapboards or siding for outside work. This method of lathing is extensively adopted in the Province of Quebec, Canada, and the Maritime Provinces, and when a little rye whisky is used in the making of the mortar—say, about one gallon to every twenty bushels of lime, into which it is thoroughly mixed—much strength and durability will be added. Many buildings which are known to have been plastered more than fifty years ago are as good now as when the work was first completed, where these precautions were adopted.—*The National Builder.*

BOOKS RECEIVED.

A Price-Book for Approximate Estimates for Architects, Engineers, &c., by T. E. COLEMAN, F.S.I. (London: E. and F. N. Spon, Ltd.), is a handy pocket reprint of a series of useful papers contributed some little time back to this journal. Readers who appreciated them will probably be glad to get the papers in this cheap and convenient form.——*Universal Directory of Railway Officials* for 1897. This handy book of reference, compiled from official sources by S. Richardson Blundstone, the editor of the *Railway Engineer*, and published at 8, Catherine-street, Strand, W.C., has now reached its third year of publication. Into its 350 pages a vast amount of reliable information on all railway matters is closely packed. The principal additions made to the present issue relate to the Selangor and Perak State Railways, Belgian and other Continental light railways, Japanese and Chilian State Railways, the railways in Africa and Siberia, and further particulars as to the principal United States lines. Twenty-six pages have been added to the foreign and colonial section of the directory, and the personal list is proportionately larger than last year. The length and gauge of every railway is given in English measurements.

TREAT'S NAIL-HOLDING DEVICE FOR HAMMERS.

AN attachment to carpenters' hammers, for placing a nail in the position where it is to be driven, is shown in the accompanying illustration,



the hammer and its attachment being then disconnected from the nail, and the latter driven in the usual way by the use of the hammer. The device has been patented in the United States by Albert R. Treat, of No. 1333, De Long-street, Los Angeles, Cal. Fig. 1 represents the application of the device, and Fig. 2 is a bottom plan view. It comprises a clamp and a jaw-holding casing, preferably formed from one piece of metal, the clamp opening sufficiently to be passed over the handle, close up to the shank of the head of the hammer, where it is secured in position by a screw. Within the casing, and extending at the side of and over a slot in its bottom face are two pivoted jaws, normally held closed by a spring, these jaws engaging and holding the nail-head as it is slipped into the slot, as indicated in Fig. 2, and the nail-head being thus held between the jaws and the shank of the hammer-head. With the nail held in such position it may be readily started in the surface where it is to be driven. The spring and jaws being entirely within the casing, there are no parts of the device liable to catch in the workman's clothes.—*Scientific American.*

The High School for girls at Truro is on the eve of completion. It has been built by Mr. John Colliver, of that city, from plans by Mr. E. R. Robson, F.S.A., of Westminster.

A sculptured reredos and marble chancel steps have been erected in Edgmond church to the memory of the late Rev. C. F. C. Pigott, canon of Lichfield and rector of Edgmond. The cost of the memorial has been four hundred guineas.

On Saturday afternoon Miss E. Walker set in motion a new illuminated clock, fixed in the tower of the parish church of Slaithwaite, near Leeds, to commemorate the Queen's long reign. The clock has three external dials, each 6ft. in diameter, and has been built by Messrs. William Potts and Sons, of Leeds.

The annual exhibition of amateur art work under the auspices of the Artists' Guild will be held at the Imperial Institute from November 1 to 13. Prizes are offered for embroidery, fans, oil, pastel, and water-colour painting, wood-carving, photography, &c. Princess Christian offers prizes for embroidery from the Royal School of Art Needlework designs. The judges this year will be Mr. W. P. Frith, R.A., Mr. H. Stacy Marks, R.A., Mr. Walter Severn, Mr. Leslie Ward, Mrs. E. M. Ward, Mrs. Jopling, and Miss Rowe.

Building Intelligence.

Alresford.—Sir Arthur W. Blomfield, A.R.A., reports that, on further examination of the parish church, he finds that the posts supporting the nave roof are in an extremely unsound state. One was split from top to bottom, and a collapse, with a part of the roof falling, might have occurred at any moment. The unsoundness of the posts was not visible, as they were cased. If the posts were removed, it would be necessary to disturb a large portion of the roof, timber, and as those are shaky and twisted, it would be almost impossible to replace them. Under those circumstances, he recommends that "columns and arcades, with clerestory windows, in stone of a similar character to those existing before the fire, should replace the existing wooden construction. The estimated cost of an entirely new roof to the nave in oak, with nave arcade and columns, and clerestory windows in stone, is approximately £1,000 beyond the present contract. An interesting discovery of an Early English window has been made, and also extensive remains of the Perpendicular period. The foundations of the new chancel are also found to be on exactly the same lines as those of the Perpendicular church, the latter having been brought to light in the course of the restoration.

Blackpool.—The old Prince of Wales Theatre has been demolished, and on its site is being built the Alhambra Music Hall, at a cost of over £100,000. The architects are Messrs. Wylson and Long, of King William-street, Strand. The style is Renaissance, treated freely, and the elevation to the promenade of stone, a feature being two wide projecting balconies carried on marble columns. The main entrance in front leads to a hall, in which the booking-offices will be situated. To the left will be a circus, and above it a dancing-hall, and on the right a variety theatre. The lower part of the front consists of an arcade and five shops. The circus will be seated to accommodate at least 2,000 people. There will be two entrances—one from the promenade and the other from Bank Hey-street. The ring is to measure 60ft. by 40ft., and arrangements are made whereby a portion of this area can be transformed at will into a bath, in which swimming entertainments can be given. The stabling for the horses will be situated under the tiers of seats. The dancing-hall overhead has been an afterthought; it will extend from front to back of the building. The tender of Messrs. Whitehead, of Blackpool, has been accepted for the erection of the general building work, furnishing, and decorations, at a cost of £76,200, and that of Mr. Samuel Butler, of Leeds, for the constructional ironwork, at a cost of £12,788. Messrs. Shoolbred's tender for the seating is £6,500.

Bolton.—The opening ceremony in connection with the new central higher grade board school, Bolton, was performed by Sir George Kekewich, K.C.B. (permanent secretary of the Education Department) on Thursday week. The new school provides accommodation for 1,080 scholars, and has been erected, including the site, at a cost of £32,000. The style is Renaissance, and the building is four stories in height, is lighted by electricity, and heated and ventilated on the most modern lines. The accommodation provided includes central halls on each floor, measuring 96ft. by 32ft., a gymnasium, physical and chemical laboratories, and lecture rooms; manual instruction room, kitchen and dining room, preparation and dark rooms, drawing instruction rooms, a series of classrooms on each floor, and apartments for the masters, and necessary equipment of storerooms, lavatories, &c. A caretaker's house, with cookery school over, is also provided in a separate building. The whole of the work has been carried out under the supervision of Mr. R. Knill-Freeman, F.R.I.B.A., of Bolton, whose design was selected in competition, confined to local architects, by the assessor, Mr. E. R. Robson, the architect to the Education Department. The contractors for the work were Messrs. E. and D. Maginnis, also of Bolton, and Mr. David Walch has acted as clerk of works.

Edinburgh.——The board schools in Edinburgh were reopened on Tuesday. The older schools have been freshened up by painters: in two instances—North Merchiston and Gorgie schools—large additions have been made; and the new school at Preston-street was opened for the first time. The accommodation provided in the new school is 339 seats for infants and 532 for juveniles—total, 871. There is also provided a gymnasium and a cookery and workshop department. The additions to Gorgie School will give space for 694 infants and 925 juveniles—a total of 1,619 seats. A gymnasium measuring 1,200ft. super. has been provided, besides a cookery and workshop department, giving 867sq.ft. At North Merchiston the additional accommodation provided is sufficient for 759 infants. A gymnasium measuring 1,200ft. super. has likewise been provided here, and also a cookery and workshop room.

Farsley.—A new board school erected by the Calverley United District School Board in New-street, Farsley, was opened on Tuesday. The school, in design, is in keeping with the infant schools adjoining, erected some years ago. The block is composed of a central hall 55ft. long, 31ft. wide, and 26ft. high, with five classrooms, all opening into the central hall. The classrooms and entrances have glazed partitions. The central hall has been provided with a solid wood-block flooring. Separate entrances, cloakrooms, and lavatories are provided for boys and girls, who have each also separate covered and open playgrounds. The schools provide accommodation for 340 scholars, and the cost, exclusive of the furniture, is about £3,000. The various works have been carried out from the architect's designs by—mason and joiner work, Messrs. Appleyard Bros., Bramley; slaters, Messrs. T. and A. Thornton, Eccleshill; plumbing, gas-lighting, and heating apparatus, Mr. Alfred Higginbotham, Idle; plastering, Messrs. J. Laycock and Sons, Stanningley; painting, Mr. D. E. Hutton, Shipley; wood-block flooring, Mr. Roger Lowe, Farnworth.

Gateshead.—The district church of St. George, in the parish of Christ Church, Gateshead, was consecrated, on Friday, by Bishop Sandford. The building has been constructed from designs by Mr. Stephen Piper, M.S.A., 52, Westgate-road, Newcastle, selected in competition, is capable of accommodating 624 persons, and is situated at the top of Durham-road. It is a plain and substantial stone structure, 13th Century in style, and consists of nave, 27ft. wide, north and south transepts and aisles, chancel, and organ-chamber, and clergy and choir vestries. The building has cost, with the tower, £6,400, and in the tower there is a peal of eight tubular bells, costing £200, which have been supplied by Messrs. Walker and Coxon, of Newcastle, who have also put in the gas fittings. The reredos was designed and executed by Mr. Ralph Hedley, of Newcastle. The contractor was Mr. Alexander Pringle, Gateshead. The glazing has been done by the Gateshead Stained Glass Company, and the heating by Messrs. Dinning and Cooke, of Newcastle.

Selly Oak.—The new workhouse infirmary adjoining the workhouse at Selly Oak, just built for the King's Norton Board of Guardians, was formally opened on Saturday. The land slopes from east to west about 11ft., an inclination which has been taken advantage of in the planning of the pavilions, of which there are four, with sufficient space for an extension of another four. The administrative department is in the centre, with the laundry, boiler-house, engine-hou e, dynamo-rooms, and water-tower at the rear, the whole covering an area of about six acres. The buildings have been erected by Mr. Thomas Rowbotham, Small Heath, from the designs of Mr. Daniel Arkell. A departure has been made from the generally acknowledged workhouse style, the principle adopted being to make the different rooms light and cheerful for the patients, and the surroundings pleasant and agreeable for those who have to attend on them. Externally the buildings are of red brick, relieved by dark-red coloured bricks and terracotta strings, the roofs being covered with bright-red Broseley tiles. The style is a free treatment of Renaissance. Accommodation is provided for about 300 beds for patients and officials, whilst provision has been made for a future extension of a similar number. In the centre are the one-story kitchen block and administrative buildings, which are connected to the building by covered ways. The doctors'-rooms, nurses' general sitting-room, sewing-rooms, matron's-rooms, steward's stores, dispensary, telephone-exchange room, and nurses' and servants' residences are in the centre and under the supervision of the matron, with lavatories, bathrooms, &c., complete. The cooking kitchen, sculleries, pantries, stores, &c., are at the rear of the administrative block, centrally placed. Adjoining the central block, and off the main corridor, are placed the receiving wards for male and female patients. The pavilions are axially arranged nearly north and south, with fire and sound proof floors. There is no direct internal communication between them, the upper floors being reached by an external staircase, opening from the staircase. A long wide corridor leads left and right to the different rooms, which comprise eight wards for 24 beds each, eight wards for five beds each, and eight wards for two beds each for special cases. The large wards are overlooked from the nurses' duty rooms and kitchens by a small window. The labour wards are provided for five beds each, and two separate wards of one bed each at the end of the north female pavilion, to be used for maternity cases, these wards being cut off from the main pavilion by corridors. Two large wards are lighted by means of windows on either side; all angles and corners are rounded, and the whole of the floors are of marble mosaic. Access and egress fireproof staircases are provided to each block, and balconies at each end of the pavilions for the use of convalescent patients. The male and female pavilions on the first floor are connected with the official block by a wide open asphalte roadway, which forms the roof of the corridor beneath. It was originally intended to heat the new building from the workhouse boilers; but, in consequence of the Local Government Board's requirements, the guardians have built a boiler-house, engine-house, dynamo-rooms, laundries, and water-tower at the rear of the new building, together with three large boilers and a tank in the water-tower. Adjoining the boiler-house are coal stores. Near to a high chimney-shaft is the engine and dynamo-room, in which are placed powerful steam-engines to create the electric supply for lighting the whole of the rooms in the infirmary, and also the arc lamps to illuminate the grounds at night. No gas-pipes are laid in any portion of the building, which is entirely dependent on the electric light, there being sufficient storage in the accumulator-house for one night's supply. The total cost of the infirmary has been £45,000.

Spennymoor.—On Wednesday, September 1, the foundation-stones of the new Sunday-school, in connection with the Baptist Church, Spennymoor, were laid. The building, which is situated at the rear of the church, consists of a lecture-hall or schoolroom, 33ft. by 33ft, with classrooms on each side. The lecture-hall is lighted by large windows at the end, and also by clerestory windows over the classrooms. The classrooms are separated from the hall by folding partitions, so that the accommodation in the hall may be increased when necessary. Ample ventilation is provided by means of clerestory windows, and by an exhaust ventilator on the roof. It is intended ultimately to renovate and reseat the church, build a new baptistry and platform, and form a new connection between the church and the new school. The work is being carried out from the plans and under the superintendence of Mr. J. Walter Hanson, architect, of South Shields and Jarrow, by the builder, Mr. R. Telfer, of Spennymoor, Durham.

Shieldmuir, N.B.—Bishop Maguire will lay the foundation-stone of the chancel arch column of the new Roman Catholic Church of St. Patrick at Shieldmuir, near Motherwell, on Saturday. The church when completed will seat 1,000 persons. Designed in the Early Decorated style, the building will consist of chancel, nave, side-chapels, aisles, baptistery, sacristies, confessionals, &c. The internal length is 125ft. by 58ft. in width, and the internal height 58ft. Red sandstone is being used in the construction, and the estimated cost is £6,250, the designs being by Messrs. Pugin and Pugin, London. The nave, 97ft. long and 28ft. wide, is divided into seven bays. The chancel, apsidal in form, is divided from the nave by a chancel arch. A feature of the church, however, is the western façade, in which are placed the two doors, deeply arched and recessed. The gable is supported both by buttresses at the sides and one in the centre, in which latter a niche has been placed to receive a statue of St. Patrick. Between the buttresses are two arched recesses 39ft. in height, and in these will be placed two four-light windows. The gable terminates with a stone cross.

It is stated that the unique western screen-front of Exeter Cathedral is being repaired and renewed under the direction of a local architect.

Engineering Notes.

DOVER.—The Admiralty selected list of contractors who will tender for the construction of the National Harbour at Dover have received an intimation that the plans and specifications of the works are ready. According to this, the tender should be in the hands of the Government authorities in a few weeks from the present time. The work at the eastern and western ends of the habour will be proceeded with simultaneously, so as to expedite the construction. The lengthening of the Admiralty pier seaward, which will form the western arm, is to be proceeded with at once, as it is necessary for the protection of the enlarged Continental and commercial harbour which is being constructed by the Harbour Board. Before the eastern arm can be commenced, a considerable area of the foreshore under the cliffs is to be reclaimed.

GLOUCESTER.—The construction of the Midland Railway Company's new dock branch at Gloucester has been commenced by the contractors, Messrs. Cruwys and Hobrough, of Birmingham. The new line will be about two miles long, and will connect the company's main line at Tuffley with the existing dock railways on the east and west sides of the Gloucester and Berkeley Canal. The fall from the Tuffley end will be 1 in 80. To secure this there will be three cuttings, which will involve the removal of some 60,000 cubic yards of earth. Five bridges will have to be constructed—three occupation bridges, a bridge to carry the Bristol main road, and a swing bridge over the canal. The line will be a single one except at the two last-named bridges, which will allow of a double set of rails. The new main railway will be 35ft. wide, and the gradient 1 in 35; the bridge will be of brick, with three arches, two of 24ft. each and one of 28ft., and the approaches will call for 22,000 cubic yards of material. The bridge over the canal—which at this point is over 300ft. wide—will be of steel and built on brick abutments, and it will swing on a pivot upon a steel caisson, 20ft. deep and 16ft. in diameter, sunk in the bed of the canal. The bridge and the caisson will weigh 140 tons, the weight of the caisson being 11 tons. Over one million bricks will be used in the bridges, &c. Fourteen months are allowed for the completion of the line. The carrying out of the contract will be under the superintendence of Mr. W. F. Hobrough, who has taken up his residence in Gloucester for that purpose, in conjunction with Mr. Brunton, Midland Railway Company's resident engineer.

HAVANNAH.—Last December Messrs. Swan and Hunter, of Wallsend, contracted with the Spanish Government to build what will be the largest floating dock in the world, and have now completed the job, although some important changes were necessary in their yard to permit of this class of work being undertaken there. From the time of laying the first plate to the launch of the completed dock has needed a period of six months only. The dock in question has been designed by Messrs. Clark and Standfield, Westminster, and is to be installed at Havannah, where it will afford a means of docking the largest ironclads in the Spanish navy. The dock consists, in the first place, of the pontoons, five in number, which give the requisite buoyancy, and of the high side walls which regulate the immersion of the pontoon, and secure the requisite stability. In addition, there are movable caissons or end-gates, only to be used when it is necessary to increase the lifting power. Of the five pontoons, the three middle ones are rectangular, while the end ones are pointed at the ends. All these pontoons are uniformly 87ft. wide, the middle ones being 75ft., the end ones 108ft. 4in. long. A space of 2ft. is left between the pontoons, which lie wholly between the side-walls, to which they are strongly bolted. The over-all length of the dock is 450ft., the width between the broad altars 82ft., and the depth over the sill 27ft. 6in. When immersed to this extent, the dock draws 42½ft. of water, the freeboard being then 4ft. 2in. The whole is designed so as to be self-docking. Any particular pontoon can be detached and docked for examination and repairs, whilst the under-water portions of the side-walls can be got at by careening the whole structure. The pumping machinery has been supplied by Messrs. J. and H. Gwynne, of the Hammersmith Ironworks, and is capable of lifting the dock with a 10,000-ton ironclad on board in 2½ hours. These pumps are driven by electric motors supplied, together with the necessary generating plant, by Messrs. Scott and Mountain, of Newcastle. The tanks which control the flotation are 30 in number, each pontoon being divided up into four watertight compartments, whilst the walls below the engine decks are each divided into five such compartments. The pumping plant is in duplicate. The dock is to be towed out to its destination, and left the Tyne on Tuesday last. For the voyage it has been fitted with a fore-mast and square sails, and with a jigger mast aft. Steam-steering gear is also provided.

LEOMINSTER AND BROMYARD RAILWAY.—The new line between Leominster and Bromyard was opened on Friday. The line from Worcester to Bromyard was commenced in 1860, but for many years only extended from the former city to Yearsett; but more capital being raised, the line was opened as far as Bromyard in October, 1877. The scheme for a line from Leominster to Bromyard had to face many difficulties, and passed through many changes. In 1880 the line was made as far as Steen's Bridge. In 1893 this line was acquired by the Great Western Railway Company, an agreement to complete the line being made. The contract was let to Messrs. Baldry and Yerburgh, of Westminster, who commenced operations in April, 1894. The work presented no great engineering difficulties, but some of the cuttings involved considerable labour. That at Fencote is about three-quarters of a mile long, and is 35ft. at the deepest point; while that at Foxholes, almost entirely through stone, is 40ft. deep. About 550,000 tons of material had to be removed from the various cuttings. All the bridges have been made of local stone. The stations are of red brick, and attached to them are the station-master's house and platelayers' cottages.

UNDERGROUND RAILWAY FOR NEW YORK.—The commission of three appointed by the Appellate Division of the Supreme Court of the United States to report upon the tunnel railroad proposed by the Rapid Transit Railroad Commission of New York City is now engaged in taking testimony from the commissioners, the chief engineer, and the property holders along the route of the road. The data furnished by the engineer places the prospects for building the road in a better light than they have presented at any time since the original scheme was first mooted, and the latest estimates show that the probable cost of the road will be less than that originally estimated for the amended scheme. According to the present plan, a trifle over 20 miles of road will be built under New York. This will reach from the post office to the Kingsbridge Station on the west side, and to Bronx Park and the Boston-road on the east side. Although this is about two miles longer than the route first proposed, known as the Broadway route, it involves two miles less of four-track tunnel. The estimated cost of the route which was vetoed by the Appellate justices was about 50,000,000 dol., whereas the estimated cost of the present proposed route beneath Elm-street will not be over 32,600,000dol. This total will be considerably reduced if the commissioners persist in their decision not to put up any pipe galleries at their own expense, and to replace the proposed enamelled-brick tunnel lining with painted cement concrete—a change which will probably be made. This would effect a saving of about 2½ million dollars, and would reduce the cost of the completed tunnel to something under 30,000,000dol. The preliminary borings which have been made through Center-street, Elm-street, Fourth-avenue, and the district beyond indicate that the work of excavation will be easier than was at first anticipated.

The foundation-stone has been laid of a new parish church for All Hallows, near Aspatria. The old church dates back to the 13th century, accommodates only eighty persons, and is in a state of disrepair. The new church will cost about £2,500, and will accommodate about 250 persons.

A suite of Turkish baths has just been constructed in St. Sampson's-square, York, from designs by Mr. F. Stubbs, of that city. The works have been carried out by Messrs. Thomlinson, Walker, and Son, of the Victoria Ironworks, York; Messrs. Boswell and Anderson, Layerthorpe, bricklaying; Mr. James Creaser, joinery; Mr. Atkinson, Walmgate, marble-work; Mr. Geo. Huggins, tiling; Mr. Lupton, Monkgate, glazing and gasfitting; and Mr. Edward Hodgson, Penley's Grove-street, slating.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

AUCTIONEERS' INSTITUTE.—The autumn meeting of the Auctioneers' Institute, which numbers close on 900 members, was opened at Cardiff yesterday (Thursday) under the presidency of Mr. James F. Field, of London. After a reception of the council by the Mayor at the town hall in the morning, the day was devoted to the transaction of business and the consideration of a large number of applications for membership, and was followed in the evening by a smoking concert, by invitation of the local committee. To-day (Friday) will be occupied by a round of excursions to the various places of interest, during which the party will partake of luncheon at the residence of Mr. D. T. Alexander, Dynas Powis. In the evening there will be a dinner at the Park Hall, when the president will be supported by the Mayor, local members of Parliament, representatives of the kindred professions, and of commerce. The proceedings will end with a visit to Cardiff Castle to-morrow (Saturday).

LEEDS MASTER BUILDERS' ASSOCIATION.—The annual meeting of the Leeds Master Builders' Association was held at the Royal Exchange, Leeds, on Tuesday, Mr. W. Nicholson presiding. The following officers were appointed for the ensuing year:—President, Mr. W. Nicholson; vice-president, Mr. J. Walker; and secretary, Mr. E. Schofield. It was stated that the association is in a very strong and healthy condition, notwithstanding the recent strike of bricklayers and labourers, the membership having largely increased since last year. Amongst other important business, it was unanimously decided that the association should join the Yorkshire Federation of Builders, the next meeting of which will be held in Leeds on the 16th. The trade of the city was reviewed during the meeting, and it was stated that things were quieter than they had been for some time. The members were afterwards entertained to tea at the Queen's Hotel by the President.

CHIPS.

The town council of Much Wenlock have adopted a scheme of water-supply for the town, prepared by Mr. Wyatt, C.E., and estimated to cost, in execution, about £2,500.

The four basins at Moon Island, that were built in 1884, for the storage of the sewage of Boston, Mass., are about to be duplicated by a new set covering five acres, and having a capacity of 25,000,000 gallons. They will be built with 17½ft. retaining walls and concrete floors, and the whole set, being emptied twice a day, will have a capacity of 100,000,000 gallons in twenty-four hours.

The assembly rooms at Crawshawbooth, Lancs, have just been reopened after extensive improvements. The architect was Mr. J. H. Spencer. The joiners' work has been carried out by Councillor Birtwistle, and the masons' work by Mr. R. Birtwistle. Mr. Miles Lonsdale has fitted up the heating apparatus.

The president of the New York Fire Department has been collecting some statistics which show that the losses by fire have been rapidly diminishing in the city for the last ten years, a fact which he attributes to the increasing efficiency of the fire brigade service. In the first six months of 1888 there were 1,736 fires, with a total loss of 3,751,519dol., or an average of 2,155·25dol. for each fire. Since then, while the number of fires has increased, the average loss has decreased quite steadily, so that in 1896, it was 928·28dol, and in the first six months of 1897 it was only 575·50dol.

A Local Government Board inquiry was held at Bootle on Tuesday, by Colonel Albert C. Smith, R.E., into an application for leave to borrow £2,027 for paving Litherland-road with granite setts; £1,293 to replace the cobblestones with granite setts in Dacre-street, a warehouse thoroughfare between Derby-road and the docks; and £864 for rounding the corner of Marsh-lane at the junction with Hawthorn-road, which is opposite to a new road Lord Derby is constructing in an oblique direction to Hornby-road, Walton, to replace the old footpath across Walton fields.

The town council of Edinburgh received on Tuesday a letter from the secretary to H.M. Office of Works, intimating that from the 1st April next the fee now paid for admission to the historical apartments of Holyrood Palace will be abolished, on the understanding that the magistrates and council will extend the present police assistance to the six days a week during the summer months free of expense, also that the hours of admission to the apartments from the 1st of April will be from 10 a.m. to 5 p.m.

COMPETITIONS.

HARRISBURG, PENN.—It is reported that the competitors for the new State Capitol for Pennsylvania, proposed to be erected at Harrisburg, have found it impossible to provide the accommodation scheduled within the sum specified as the limit, 350,000 dollars, and of the eight designs recommended by the expert jury to the Capitol Commission, not one, the jury believe, can be carried out for the sum prescribed. As not only this sum, but many of the other conditions set forth in the programme, are fixed by statute, the Commissioners, who are strictly bound by the statute, are placed in a dilemma. There is a possibility that they may try to escape by rejecting all the competitive designs, and holding a new competition, or selecting some architect of their own, and letting him try to design and carry out such a building as they want for the price set by the statute. The objection to this plan is that it may raise controversy and litigation with the competitors whose designs have been selected by the experts.

NEWCASTLE-ON-TYNE.—In consequence of Mr. John Hall's munificent offer to build a new hospital at a cost to himself of £100,000, providing the corporation will grant a site on the Castle Leases, the secretary has been instructed to intimate to each of the local architects who have responded to an invitation, and are preparing competitive drawings, that, in consequence of the offer of Mr. Hall, there is a likelihood of the site of the new infirmary being changed, and that the committee request them to delay in the mean time the preparation of their competitive designs, on the understanding that the time stated in the conditions of the competition will be proportionately extended after a decision has been arrived at.

RUGBY.—At the meeting of the Urban District Council, held a few days since, the special committee for selecting plans for municipal buildings reported that they had considered the 39 sets of plans submitted in competition, and unanimously recommended the council to adopt as the design for the first premium the plans marked "Avon B," and to award the second premium to the author of the plans marked "Rataplan." The committee further recommended that the authors of the design "Avon B" be engaged to carry out the work, and that the council instruct them to proceed at once with the preparation of the necessary drawings, &c., so as to be able to commence the work early in the New Year. Some objection was raised, when the report came up, to the committee having only submitted two sets of plans, instead of allowing the whole body a choice between some four or five of the most suitable, and after some further discussion, in the course of which it was mentioned that the estimated cost of the design recommended for adoption was £5,000, it was decided that the seven sets of plans from which the final selection was made by the committee should be arranged in the Council Chamber, so that for the next fortnight each member should have an opportunity of inspecting them.

WESTON-SUPER-MARE.—The urban district council held a meeting on Friday with reference to the plans for reconstructing the market premises. A letter was read from the architects, who respectfully pointed out that they had never received any instructions to prepare a scheme to cost either £3,000 or any other sum unhampered by conditions as to what the scheme was to be. They were quite prepared, and always had been, to produce a scheme for £3,000, provided no other conditions were attached. They, however, doubted whether such a scheme would meet with the approval of the council or the Local Government Board. It was proposed that the architects be asked to send in their account, as there is no intention on the part of the council to carry out a scheme of so expensive a character as that for which plans have been prepared. An amendment was moved to appoint a sub-committee to confer with the architects on the understanding that no plans should be adopted that should cost more than £3,500 to carry out. The amendment was rejected by six votes to five, and the proposition carried by the same majority, and subsequently confirmed.

Very little was done at the Auction Mart last week, the aggregate realisation, as registered at the Estate Exchange, being £10,370, as against £13,997 for the corresponding period of 1896. Sales were held on four days, but on two of them no transactions whatever were effected.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

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Front-page Advertisements 2s. per line, and Paragraph Advertisements 1s. per line. No Front-page or Paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and Sixpence for every eight words after. *All Situation Advertisements must be prepaid.*

NOTICE.

Bound copies of Vol. LXXII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

RECEIVED.—S. B. P.—A. M. C.—B. B. and Son.—W. R.

Intercommunication.

QUESTIONS.

[11771.]—**Cooperage.**—Will anyone accustomed to make vats, coolers, and tuns for brewhouses kindly inform me the best kind of wood, and the best mixture to joint the same? as I have been given to understand white wood gives less taste to the beer than any other kind of wood. Also, is white lead the mixture to joint with? If anyone that has had experience will kindly inform me if that is so, he will oblige—A THIRTY YEARS' SUBSCRIBER.

[11772.]—**Spires.**—Can any reader give any information as to the best methods of construction of spires, with special reference to brickwork? Also as to the method of determining the entasis of the same?—LECTOR.

[11773.]—**Dover and its Neighbourhood.**—Besides the castle and the old parish church of St. Mary the Virgin, Cannon-street, and one or two other interesting churches, there appears to be little of architectural interest. Will any of your readers favour a visitor here with any particulars of rambles where old buildings can be seen, and any information that may be useful? Writer will be thankful for same.—A TOURIST.

[11774.]—**Flint Walls.**—How are these built and finished internally? Are the same recesses made for window frames, &c., as in brick walls? What kind of mortar should be used?—G.

[11775.]—**Foundations on Soft Ground.**—Are there any recent examples of carrying high buildings in this country on foundations consisting of concrete rafts or platforms, from 4ft. to 6ft. thick, having twisted m.i. rods imbedded in same? and are there any publications or papers dealing with this method of founding on soft ground, either in this or any other country?—J. J.

[11776.]—**Pumping Liquid Cement.**—Will any practical builder or engineer state if it is possible to pump liquid cement through, say, a 2½in. pipe a distance of about 35ft.? It is desired to fill up a horizontal space (3in. to 6in. deep, and about 70ft. square) between ground and floor (which cannot be moved) so as to make it solid. If so, what proportion water to Portland cement, and what proportion cement to sand?—PUZZLED.

[11777.]—**Map and Plan Drawing.**—I should be glad if some reader would recommend me a good work on map and plan drawing. I have some works on surveying, and understand the measuring of land, but I wish to know the methods of delineating the outlines of fields, &c. What instrument is used to measure angles at the corners of fields, and how are the sinuosities of a stream shown?—B. D. A.

[11778.]—**Wood Staining.**—I have an oak bookcase which has been stained a dark oak. What can I do to get the stain out, or at least to make it lighter?—E. T. B.

[11779.]—**Temperature of Brick-Kilns.**—I wish to know if there is any apparatus in actual use by manufacturers for ascertaining the temperature in such kilns as those for burning bricks, lime, cement, &c.?—B. D. A.

[11780.]—**Wood Polishing.**—Will some kind contributor give me instructions for polishing wood material, and how applied?—RUSTIC.

REPLIES.

[11751.]—**Trigonometry.**—A B is the pillar, C D the person whose eye is at C. Draw C E parallel to B D.

Then A B = 60; C D = 5; therefore, A E = 55 Also, the angle A C B = 45°. We have to find B D or C E. Calling it x, and A C E θ, we have—

$$\tan.\ \theta = \frac{AE}{EC} = \frac{55}{x}$$

and— $$\tan.\ BCE = \tan.\ (45^\circ - \theta) = \frac{BE}{EC} = \frac{5}{x}.$$

From these two equations we can eliminate θ, and find—

$$x = 64{\cdot}2\text{ft. (nearly)}.$$

—J. G. GRANT, 32, Ampthill-square, N.W.

[11764.]—**Size of Girder.**—Taking the sketch section, the weight of brickwork over the girder will be found by taking its length over girder, 22ft., by the height of wall to eaves (deducting any openings like windows), and multiplying by the weight allowed for the required thickness per foot or rod. Having found the whole weight of wall, one-half of it may be supposed to act over the centre of girder. Having found this, the mode of finding the depth of girder and the size or dimensions of the flanges can be found by the ordinary rule. To detail the steps here will be superfluous, and I should recommend "Student" to study Prof. H. Adams's treatise on iron girders—it will give all he wants. The first part of question is obscure, unless it refers to brick walls carried on steel joists.—A. Z.

[11765.]—**Architect's Claim.**—"A Young Architect's" experience is, I am afraid, common. Contractors often copy architects' plans and elevations, and use them when they have an opportunity. I do not think "A Young Architect" can make any legal claim against the joiner or his friend. The contractor, of course, should have returned the plans after the building was completed for which architect was employed, and if he has not done so, "A Young Architect" may claim for his drawings. He may also charge joiner with having used his plans, but that is probably all he can do, especially if the plans are those of an ordinary house. At present, architects are in the unfortunate position of not being able to claim copyright of their designs, and this is a question that will soon have to be decided by the profession at large. No architect appears able to prevent anyone from copying his design.—ANOTHER ARCHITECT.

CHIPS.

The city surveyor of Liverpool (Mr. T. Shelmerdine) has been directed by the corporation to prepare plans of an extension of the North Haymarket, and estimates of the cost of the work.

Although Lord Penrhyn's slate quarries were formally opened last week, progress in getting materials has necessarily been slow. So far there have been no runs of slate trains from the quarries to Port Penrhyn, and there is not a single slate on the quay.

The new intermediate schools, Llandrindod Wells, Radnorshire, are being warmed and ventilated by means of Shorland's patent Manchester grates, exhaust roof ventilators, and special inlet tubes, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

The classes in architectural history and design, and in building construction at the Municipal School of Art, Birmingham, which opens for the session on Monday next, have been rearranged. Mr. W. H. Bidlake, M.A., A.R.I.B.A., will continue to teach architectural history and architectural design. Mr. Herbert T. Buckland has been appointed to assist him, on two evenings a week, with the class in architectural design (elementary stage); Mr. Alfred J. Dunn, A.R.I.B.A., Pugin scholar and honours candidate in building construction, will teach the last-mentioned subject on Mondays and Fridays, whilst Mr. Freeman Smith will lecture on architecture on Monday, and on practical plane and solid geometry on Tuesdays.

In the case of Thomas Brown, Armadale-road, Fulham, S.W., and New Kent-road, S.E., builder, the discharge from bankruptcy has been suspended for two years, ending August 11, 1899. In that of George Crook, Shawfield-street, Chelsea, S.W., builder, the discharge has been suspended for three years, ending August 11, 1900.

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ILLUSTRATIONS.

THE MEAT MARKET, YPRES.—CHRIST CHURCH, BRYN-Y-MAEN.—ST. JOHN'S CHURCH, HENDON.—NORTHERN POLYTECHNIC INSTITUTION.—ADDITIONS TO PADDOCKHURST, SUSSEX.—STACK BUILDING FOR PRINCETON UNIVERSITY.

Our Illustrations.

R.I.B.A. PUGIN STUDENTSHIP COMPETITION: MEDAL OF MERIT—THE MEAT MARKET YPRES.

THIS famous and suggestive façade furnishes an admirable subject for a careful detail drawing, such as that which we give to-day. The subject is the old Meat Market Ypres, which is now used as a museum. It is situated nearly opposite the well-known Cloth Hall, with which the lower portion of Late 13th-Century, in stone, is contemporaneous. The upper part, of 16th-century work, executed in buff bricks with stone dressings, is probably a rebuilding of the older work, and in the gables a still later rebuilding or restoration has been done. This latter is in red brick, the effect in colour being not unpleasing, as age has blended the contrast into a harmonious whole. Not the least interesting part of this façade is the beautiful treatment of wrought-iron ties. This is one of the drawings awarded Medal of Merit R.I.B.A. Pugin Travelling Studentship, 1897, to Mr. James A. Swan.

PARISH CHURCH, BRYN-Y-MAEN, NORTH WALES.

THIS church is being built on an elevated site in one of the most picturesque parts of North Wales, some three to four miles from Colwyn Bay. The church has seating accommodation for about 250 persons, and comprises nave and south aisle, entered by a south porch, with chancel, organ chamber, vestry, and a central tower containing a peal of tubular bells. The exterior walls are built of Lysfaen limestone, with Helsby stone dressings; the interior faced with Helsby stone throughout. The whole of the roofs, nave benches, screens, chancel stalls, and fittings are of oak, relieved with tracery; the body of the church is floored with oak blocks, the chancel with tiles. The church is being erected at the sole cost of Mrs. Eleanor Frost, of Min-y-Don, in memory of her late husband. The builder is Mr. Evan Jones, of Groeslon, near Carnarvon, Messrs. Douglas and Fordham, of Chester, being the architects.

ST. JOHN'S, WEST HENDON.

THE church, of which Mr. Temple Moore is the architect, is of the Late Decorated type of Gothic style. The nave, chancel, and one aisle are at present complete, providing accommodation for 500 persons. The roof is covered with hand-made red tiles, while the facings are of a warm-coloured yellow stock brick. The copings and all outside stonework of windows, &c., are of Bath stone, from the Box Ground quarries. The inside stonework is in Monks Park Bath stone; the entrance doors are of teak. The church inside is spacious and lofty, the columns of the arcade are tall and slender, whilst the arches of the arcade and the ribs of the aisle vaulting, all moulded in small members, spring directly from the piers without the intervention of any cap. The nave, chancel, and aisle are all vaulted, the nave and chancel with a long barrel-vault from end to end, divided with panels, with mouldings worked in with the arched moulded trusses of the roof, these latter springing from small vault shafts also developed out of the mouldings of the main piers. The aisle ceiling is in small bays of groined wood vaulting, the ribs also worked out of the mouldings of the main piers, with carved bosses at the intersections. The inside face of walls is plastered, except where the north arcade of the nave is at present filled in with temporary walling, which is left bare. The windows are all placed at a somewhat unusual altitude from the floor, but not without good effect, as the light, admitted thus well above the heads of the congregation, is much more diffused and softer in tone than when admitted directly at the side. The floors in the passages are of red bricks laid in bold squares, and the spaces under the seats are filled in with boarding. As the mortar-setting of these passages tones down with use the pleasant old-world effect of the red bricks will be better felt. The chequered pavement of two colours of stone in the chancel contrasts well with the rest of the floor. The church is seated throughout with chairs, in accordance with the prevailing modern practice. The general outside appearance will no doubt be greatly enhanced when the stone open-worked belfry, designed to finish the small south turret, is executed; and the west elevation will be improved when the north aisle is added, to balance the existing west front of the south aisle, which questions of expenditure have as yet prohibited. The contractor is Mr. G. Foster, of Bedford.

THE NORTHERN POLYTECHNIC INSTITUTION, ISLINGTON.

THE great hall, lately opened by the Lord Mayor, has seating accommodation for no less than 1,500 persons, including the gallery, where accommodation will be found for 250 persons. The orchestra, besides, will accommodate 350 choristers and instrumentalists. A perfect system of exits in case of fire has been adopted, and the improvements in regard to ventilation and heating are not overlooked. The hall is lofty, and its acoustic properties are effective. The ceiling is arched, and the hall is lighted by means of incandescent lamps, which have been fixed almost flush with the roof. As the hall will be largely devoted to the purposes of entertainment, accommodation has been provided for artistes. The floor of the building slopes upwards from the stage to the back of the auditorium, so that a view of any part the stage can be obtained. The Northern Polytechnic Institute is founded under a scheme of the City Parochial Charities Act. For building, some £25,000 subscribed (£17,500 by Clothworkers' Company, £2,500 by other public bodies, £5,000 or £6,000 by private subscribers). For equipment, certain amount of money set apart under a scheme, and annual grants from the Technical Education Board. For maintenance, there is an annual endowment under a scheme, with grants from Technical Education Board, besides attendance and examination grants from Science and Art Department, and City and Guilds of London Institute, students' fees, and annual subscriptions. Present buildings include in the front block of three stories, offices and administrative rooms, drawing office, general class-rooms, boardroom, physical lecture theatre and laboratory, classrooms for dressmaking, millinery, and general purposes. The rear block of three stories include engineering workshop, brickwork shop, plumbing and metal-plate shop, smithy, carpenter's shop, mechanical laboratory, engineering lecture-room, chemical lecture theatre and laboratory, and photographic rooms. To the north of the main corridor, connecting front and rear blocks, are the large hall, common-room, gymnasium, and boiler-house. To south of corridor, ground to be built on—women's department, library, refreshment-room, music-rooms, are among the buildings intended here. The hall has a separate entrance from the Holloway-road into a vestibule 24ft. square, with a panelled ceiling. On the right hand is a gentlemen's cloakroom, and on the opposite side one for ladies. The hall measures 100ft. by 55ft. The roof is of steel, elliptical shaped, and plastered with fibrous plaster, and divided into panels by ribs of the same material; each bay is 16ft. wide, and there are 27 panels to each. The panels have ornamental centres, every alternate one being arranged for electric light. The hall is lighted by circular-headed windows, supported by stone columns, each bay containing three windows, inclosed in moulded bricks. The gallery has a separate entrance from the Holloway-road, and an emergency exit to the rear. The hall has three doorways in the front, and three on the north side as exits, leading into a corridor connecting the front with the rear, for the use of the orchestra platform. The platform is entered from the rear, and also the orchestra, which has a separate exit by the corridor before-mentioned. Under the orchestra is a retiring-room, and also other rooms for artistes, speakers, &c. Suitable lavatories are also provided. The heating is by steam, each side of the hall, and radiators in other parts, which can all be regulated at will. The ventilation is arranged so that fresh air enters the steam-heated channels from the outside, and passes warmed into the building, and is drawn away through the ceiling openings into it from the hall to exhaust-ventilators on the roof. An additional supply of fresh air is also obtained by openings the full width of the side windows, forming a sill made of iron. The architect is Mr. Charles Bell, F.R.I.B.A.; the contractors, Messrs. Macfarlane Bros., of Holloway; and the clerk of the works, Mr. W. L. Kellaway. We published in our issue of August 24, 1894, a double-page perspective and plan of Mr. Bell's design as selected in competition.

PADDOCKHURST.

THE view shows a new wing which has lately been added to this house by the owner, Sir Weetman Pearson, Bart., M.P. It consists, on the ground-floor, of a new dining-room, 45ft. by 20ft., with two floors of bedrooms over a stone-vaulted winter garden, adjoining the dining-room, and, beyond, a conservatory, 90ft. long, a portion of which forms a foliche alley. The garden, terrace, fountain, &c., are being executed as shown in the view. The work has been carried out locally, without contract, Mr. S. E. Wallis acting as clerk of the works. New lodges and many other improvements are also being carried out. The gardens and houses have been entirely remodelled and rebuilt under Mr. H. E. Milner's superintendence. The architect is Mr. Aston Webb, F.S.A.

THE STACK BUILDING FOR PRINCETON UNIVERSITY, NEW JERSEY, U.S.A.

THIS extensive addition to this university is mainly constructed, as its name implies, for a book-store or library-buildings, attached to the old college, and grouped round a quadrangle, with "seminar" or classrooms and studies along the entrance fronts. A considerable feature is made of the tower over the main entrance, while the staircases on the return fronts afford the occasion for pleasingly-designed bays divided into two stories, the book-halls' windows rising in one height from plinth to cornice. The work architecturally is distinctly based on English types, and the building is treated with a dignified breadth and simplicity in its main lines, although some of the detail is somewhat florid in parts. As a specimen of Anglo-American building, this undertaking is of rather uncommon interest, and the architect, Mr. William A. Potter, is to be congratulated upon his design. We are indebted to the *American Architect* for the illustrations here given of his work. We regret that no particulars were furnished descriptive of the undertaking.

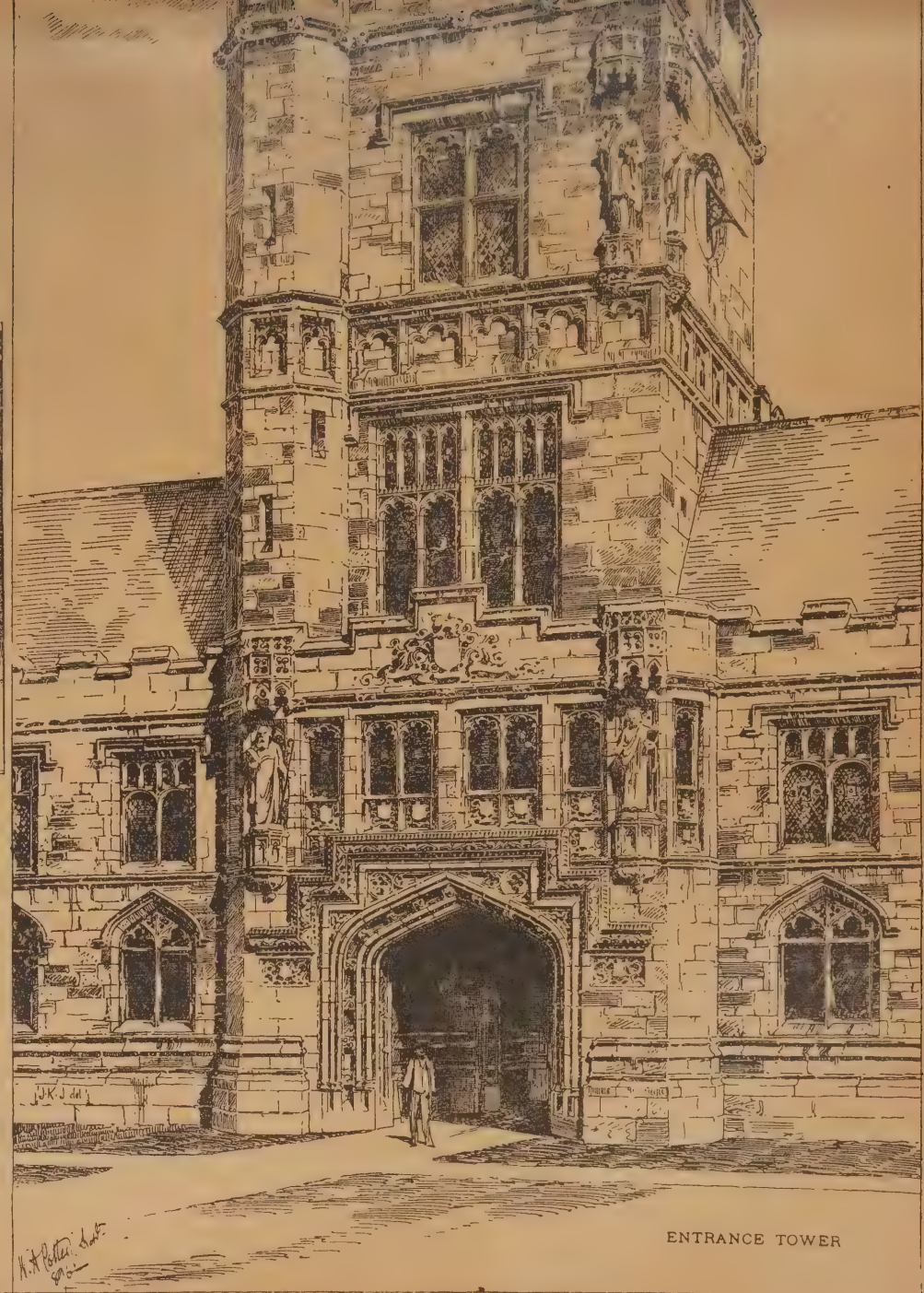
A new Established church is in course of erection at Brechin, N.B., from plans by Mr. J. J. Burnet, of Glasgow. It will comprise a nave, 99ft. by 24ft., and an aisle, 72ft. by 20ft. 6in., with gallery at west end, seating in all 600 persons. Adjoining are a service-hall, 46ft. by 20ft. 6in., seated for 160 persons, and a sermon-house. The buildings are faced with local grey rubble, with Corncockle stone dressings, and a prominent feature will be a square tower at the west end.

The corporation of Huddersfield have under consideration a report from the Tramways Committee, recommending various extensions of the system. These involve the continuation for 1,600yds. of the line to Paddock as far as Longwood; the continuation of the Fartown route for another 1,600yds. to Sheepridge; the extension of the Salendine Nook line as far as Outlane; and the continuation of the tramway along Manchester-road for another 1,400 yards, until the borough boundary is reached. Work in the centre of the town comprises the making of a double line of tramways from the station to Chapel Hill, including a well-known thoroughfare comprising John William-street, New-street, and Buxton-road.

THE STACK BUILDING FOR PRINCETON UNIVERSITY, PRINCETON, N. J.

WILLIAM A. POTTER, ARCHITECT.

COURT YARD FRONT



ENTRANCE TOWER

LEGAL INTELLIGENCE.

RE SIDNEY GREENWOOD.—The first meeting of creditors was held in this case on the 2nd inst. in the London Bankruptcy Court, before Mr. H. Brougham, Official Receiver. The debtor states that about March, 1891, he commenced business on his own account, without capital, as a surveyor, at 89, London-wall. In May, 1894, he was joined by a partner; but the partnership was subsequently dissolved at the instance of the partner, who instituted proceedings in the Lord Mayor's Court. The accounts showed liabilities £578 19s. 2d., and assets nil, the debtor attributing his insolvency to the action of his late partner. He stated, in reply to the chairman, that he was now out of employment. He made no proposal, and it appeared that he had been adjudged bankrupt. The matter was left in the hands of the Official Receiver as trustee. The public examination was fixed for the 28th inst.

CHIPS.

The plans prepared by Messrs. Pugin and Pugin for the new Roman Catholic church at Coatbridge have been approved of. The cost will be £10,000.

The Talla Reservoir, which was commenced two years ago by the Edinburgh and District Trustees, will be inaugurated on the 29th inst.

The Bristol Docks Committee, at their meeting on Monday, instructed their engineer to prepare plans for such extension of dock accommodation as will provide for the reception of the largest class of vessels afloat or building.

St. Paul's Church, Birmingham, has been reopened after renovation and decoration, carried out by Messrs. Sears and Son, from plans and designs by Messrs. Gately and Parsons, architects, of Birmingham.

A Constitutional Club, Cunliffe-road, Ilkley, was opened last week. Messrs. Adkin and Critchley were the architects, and Messrs. Dean Bros. the builders. The building is of stone, and three stories in height, the lecture-hall being 36ft. by 26ft.

The parish church of Llantrithyr, near Cambridge, was reopened last week, after restoration from plans by Mr. G. E. Halliday, of Cardiff. Mr. W. James, of Fommon, was the contractor.

Colonel A. J. Hepper, D.S.O., R.E., has held a Local Government inquiry at Desborough into the district council's application to borrow £7,085 for water supply.

The St. Luke's (Middlesex) Vestry received the gratifying news on Tuesday evening that the parish is absolutely out of debt, and has £13,630 in hand. This has been brought about by the alterations in the famous Golden-lane, which has changed from a mass of poor property into an important commercial centre. The Finance Committee now proposed that the £13,630 in hand be applied to the necessary repaving in the parish. This was agreed to.

The lecture-hall of the new Presbyterian church at Wellfield-road, Cardiff, was opened on Sunday. The building at present consists of a lecture-hall and classrooms adjoining the south-east entrance to Roath Park, but space is afforded by the site for the erection of a church to hold from 800 to 1,000 persons, and it is hoped that at a very early date building operations will be commenced. The architects are Messrs. Habershon and Fawckner, Cardiff, and Messrs. Knox and Wells, Cardiff, were the contractors. The heating system is on the high-pressure pipe system, and has been fitted by Messrs. Alger and Company, of Newport. The total cost has been £2,000.

Although Mr. Sheriff-elect Dewar has denied having been goaded into action by the scathing protests by Mr. Richardson Evans published by us last week, it is satisfactory to see that he has removed the gigantic letters which disfigured the Shot Tower, seen on the southern approach to Waterloo Bridge. The name "Dewar" still appears, however, in huge white enamelled letters on every side of the parapet.

The excavations at a Roman camp recently discovered near Holzhausen, Wiesbaden, have laid open four gates with their towers. Over the north-western gate, Porta Sinistra, an inscription in honour of Caracalla of the year 213 A.D. has been deciphered. Traces of another inscription have been found on the Porta Prætoria, but it is in too fragmentary a condition to be deciphered. Numerous silver coins of Caracalla, Septimius, and Alexander Severus have come to light, and also a silver armring, a leaden arm-ring, and fragments of glass vessels.

Lord Tredegar has given a site for a proposed new church for Newport, Mon., off the Risca-road, and one of the members of the St. John's Mission has promised £2,000 towards the building fund. Mr. F. J. Mitchell has promised £5,000, which is to be invested as an endowment, the revenue to be devoted to the vicar's salary.

A site has been secured on the Greenlaw estate to the west of Mansion House-road for the new Eye Infirmary at Paisley, which Provost Mackenzie has undertaken to build and equip in commemoration of Her Majesty's Diamond Jubilee. Mr. Charles Davidson, architect, has the plans in active preparation. The building is estimated to cost between £3,000 and £4,000.

A report just issued states that the London County Council, at the instance of its late Works Committee, granted compensation, in the year ending March 31 last, amounting to £880 16s. 11d., in respect of injuries sustained by workmen in the Council's employ, and to other persons for whose injuries, it was alleged, the Council was liable. This sum was equal to about ⅘ per cent. of the work executed. In other cases of injury sustained by the Council's workmen, where the Council were not liable, a compassionate allowance was granted the men—usually half-pay until they were able to resume work—and the sum paid on this account reached £107 8s. 1d.

The Tendring Board of Guardians have adopted revised plans by Mr. Frank Whitmore, of Chelmsford, for building a new workhouse infirmary, at an estimated outlay of £7,000.

The Local Government Board have in the main approved the plans prepared by Messrs. Worthington, architects, Manchester, for the erection of the new union hospital and infirmary at Patricroft.

At Tuesday's session of the Trades Union Congress, now assembled at Birmingham, it was resolved, on the motion of Mr. Will Thorne, London, to instruct the Parliamentary Committee to draft a Bill in favour of a legal eight-hours day in all trades and occupations in the United Kingdom. The voting was 923,000 for, and 141,000 against.

To the bishop's palace at Peterborough is being added a new wing, which will be set apart for the retainers' quarters and domestic operations.

The north-western section of the Great Northern of Ireland Railway is to be doubled. The traffic between Derry and Strabane is the heaviest on the system, and it is proposed to proceed with the doubling of that portion of the line first. The work will be undertaken immediately. It presents no difficult features, the land having been originally taken and all the bridges but one built with a view to the ultimate laying of a double line of rails. The line will be doubled the whole way to Omagh as soon as possible, and the next portion to be undertaken will be from Newtownstewart to Omagh.

The Bishop of Peterborough on Saturday week visited Burton Latimer for the purpose of dedicating a stained window in the chancel, given by the rector and his wife. The window is the work of Messrs. Hardman and Co., of Birmingham, the cost being £600, and represents notable scenes in the life of Jesus Christ.

A window in memory of the late Rev. Arthur Henry Turnour, first vicar of St. Augustine's, Stockport, was dedicated on St. Augustine's Day. Mr. A. L. Moore, of Southampton-row, London, executed the work. The subject of the window (the east window of the morning chapel) is the Adoration of Saints, the latter being St. Jerome, St. Ambrose, St. Augustine, and St. Gregory (the four Latin fathers); St. John-the-Baptist, King David, St. Paul, and St. Barbara; in the tracery are Seraphim.

The restoration of St. Swithin's, Woodborough, Notts, the chancel of which is one of the most perfect specimens of the Early Decorated period in the county, was celebrated on the 2nd inst., when the unveiling and dedication took place of the new east window, the subjects of which are the Crucifixion, the Blessed Virgin, St. John, St. Swithin, and St. Paulinus. The artist was Mr. C. E. Kempe, of London. Since 1891, when the late vicar began the work of restoration, a sum of £2,500 has been spent on the church.

The Old Chapel at Inverewe, near Rowlands Gill, whose south wall was in danger of falling, has been repaired by order of its owner, the Earl of Strathmore. This wall contains a plate tracery window, and a segmental arch once opening into a side chamber, no traces of which, except the tie-stones, remain. Mr. M. Cheeseman, of Gibside, who had charge of the operations, has restored the arch, numbering each stone as it was taken down, so that each, on being replaced, was in its original position. While digging for the foundations of the pier, portions of the mullions of the east window were found.

The new church which it is proposed to dedicate to St. Catherine has just been commenced at Horwich. The whole church, including spire, will cost over £7,000, and will accommodate, when finished, 780 worshippers. Owing to want of funds, the nave and aisles only are to be built at present, at a cost of about £4,000. The plans are by Mr. F. N. Palmer, architect, and the church will be built of Ruabon brick, with stone facings.

After a restoration, involving an outlay of £1,400, St. Peter's Church, Whetstone, near Leicester, was reopened last week for public service. The work has been carried out under the supervision of Messrs. Goddard and Paget, of Leicester.

On Tuesday afternoon, in Kelloe Parish Church, in the county of Durham, a marble tablet was unveiled on the south wall by the Very Rev. Dr. Kitchin, Dean of Durham, to the memory of the great English poetess, Elizabeth Barrett Browning, who, as the register in the church records, was born at Coxhoe Hall, near by, on March 6, 1806, and baptised on Feb. 10, 1807. The memorial tablet is of white marble, framed in dark grey stone, and was sculptured by Messrs. John McMillan and Son, of Sunderland.

The parish church of Loxbeare, near Tiverton, was reopened, after a restoration extending over eleven months, by the Bishop of Crediton on the 11th ult. The work at present done comprises new floors and new seating, the thorough renovation of the Jacobean pulpit, with the replacing of the old carved pulpit canopy, the taking down of the western gallery, and the construction of a drain course around the church. A new altar-table has been provided, and special tiles have been laid down showing the resting places of those buried within the building. The work has cost £423. The work has been carried out from the plans of Mr. E. H. Harbottle, Exeter. The church has been enriched by several gifts, amongst which are a stained-glass window (by Drake, of Exeter), representing our Lord with the Apostles.

The new Seamen's institute and church at Lowestoft was opened by the Bishop of Liverpool on Friday. It consists of a hall suitable for entertainments on the ground floor, and over this a mission church.

A schoolroom is being erected at the rear of Akerman Street Chapel, Tring. It is of red brick, and consists of an assembly-hall, with gallery on three sides, and has cost £1,600. Mr. Fincher, of Tring, is the builder.

On Saturday the foundation-stone of the chancel arch column of the new Roman Catholic church at Shieldmuir, near Wishaw, was laid by Bishop Maguire. When finished, the church will have seating accommodation for 1,000. The building is designed in the Early Decorated style, and will consist of chancel, nave, side chapels, aisles, baptistry, sacristies, confessionals, &c. The internal length is 125ft., the width 58ft., and the internal height 58ft. Red sandstone is being used in the construction, and the estimated cost is £6,250, the architects being Messrs. Pugin and Pugin, London.

Col. W. R. Slacke, R.E., an inspector appointed by the Local Government Board, held an inquiry at the Corporation Offices, Chatham, on Wednesday week, as to the application of the town council to borrow £10,170 for the purposes of wood-paving in the High-street, public works, and pleasure-grounds and public street improvements at the entrance to Sun Pier, Chatham.

It is proposed to build a new church to supply the wants of the north-west ward of Scarborough, and to form a parish with a present population of 7,000 inhabitants of the artisan class. It is intended to build a brick church, which, when completed, is to hold about 600 people, exclusive of the chancel. At first, however, only part of the church will be erected—viz., the chancel, the nave, and, if possible, one aisle. These will hold about 450 people. A site has been procured in the chief thoroughfare of the district.

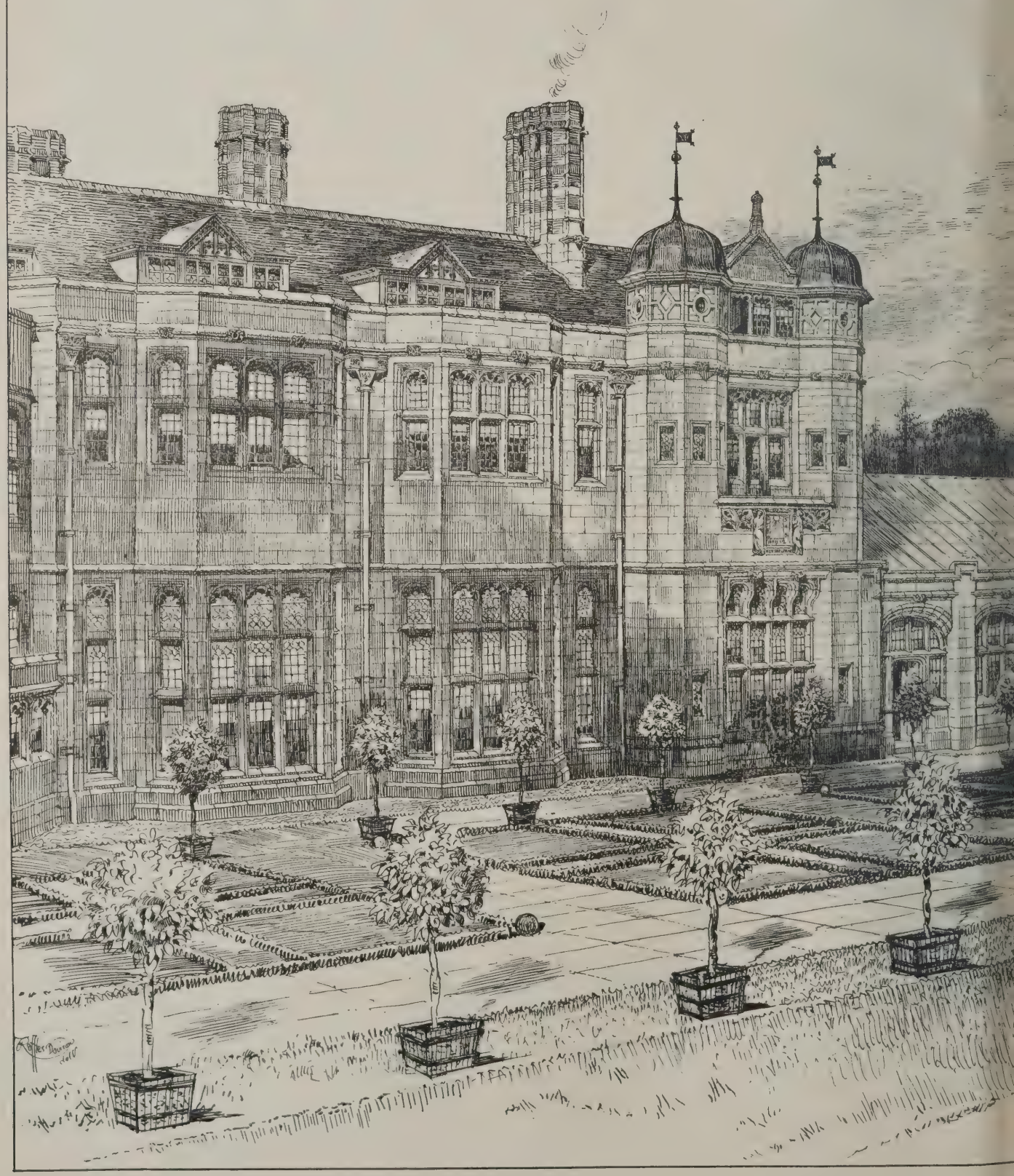
The Charity Commissioners have sanctioned a scheme for the development of St. Cross Hospital, Winchester, founded in 1132. Authority is given to the trustees to erect a residence for the master, outside the hospital, at a cost not exceeding £4,000, and the ancient residence close to the refectory is to be converted, at a cost of £1,500, into ten additional sets of rooms, making in all 27 residences for the Brethren of St. Cross, who consist of aged persons in reduced circumstances.

The organ at Hebron Chapel, Bedminster, which had been closed for some months in order that it might be repaired and enlarged by Messrs. Johnson, organ builders, Dighton-street, Bristol, was reopened on Friday evening.

At the last meeting of the town council of Longton, Staffs, Messrs. Wood and Hutchings, of Tunstall, the authors of the premiated design, were appointed to carry out the work of the new Sutherland Institute, which is to comprise free library and technical instruction buildings, at a cost not exceeding £8,000, exclusive of furnishing.

The Council of the London Chamber of Commerce has appointed a special committee to investigate, consider, and report upon the question of the practice of giving and receiving secret trade commissions, and the committee is to invite communications on the subject from traders, either through local chambers of commerce or direct to the secretary of the London Chamber.

ADDITIONS TO PADDOCKHURST SUSSEX ASTON WEBB F.S.A. ARCHT



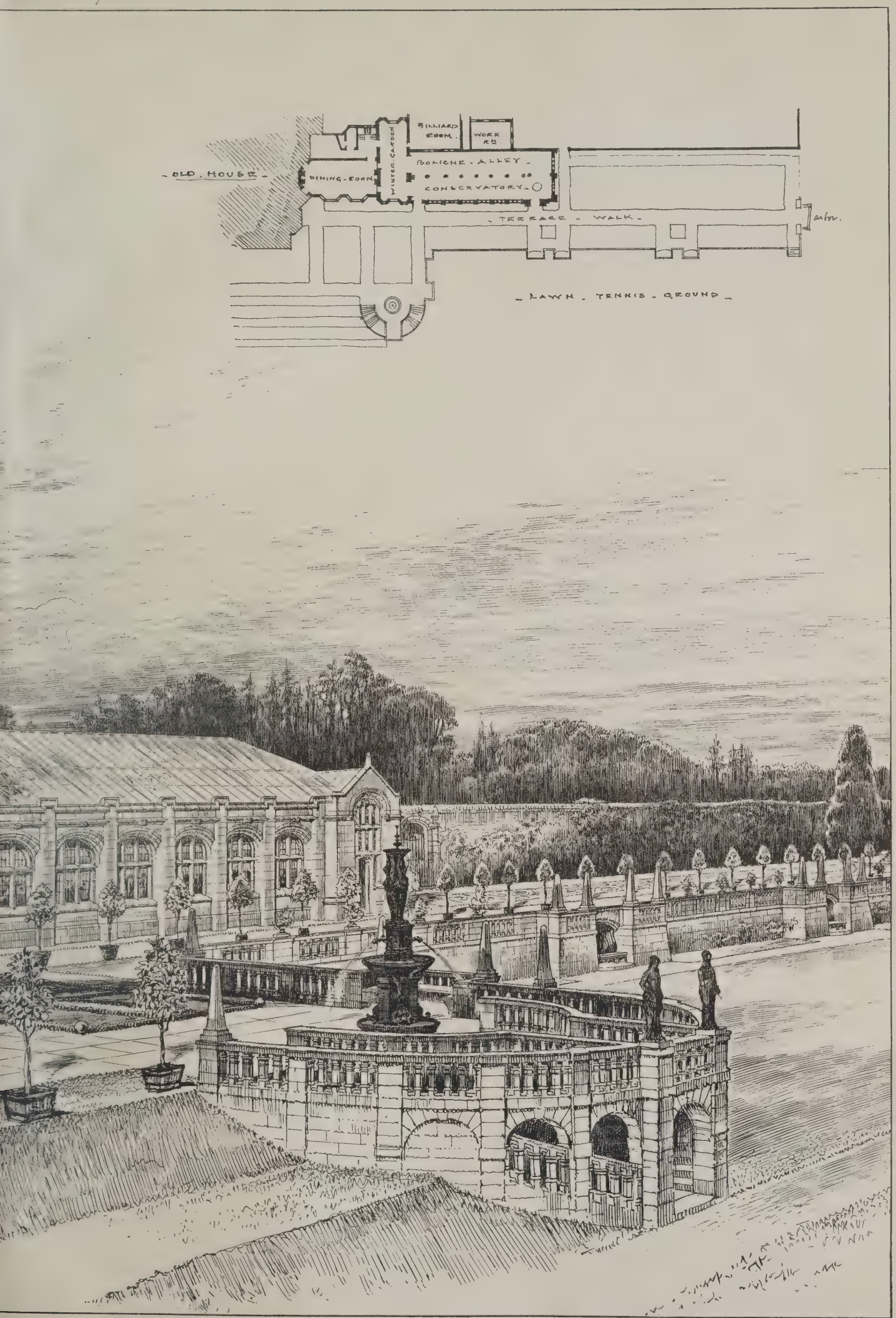
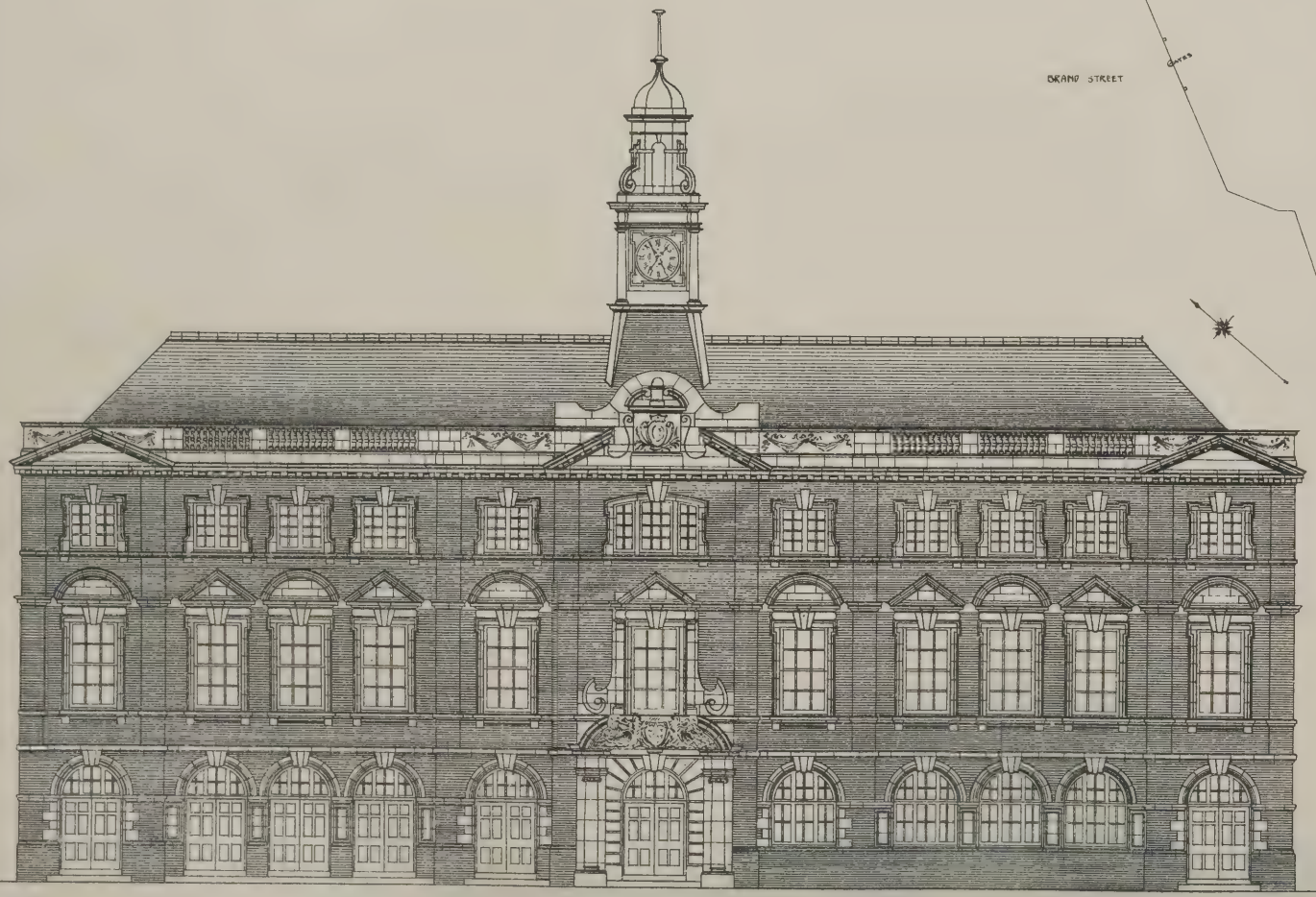
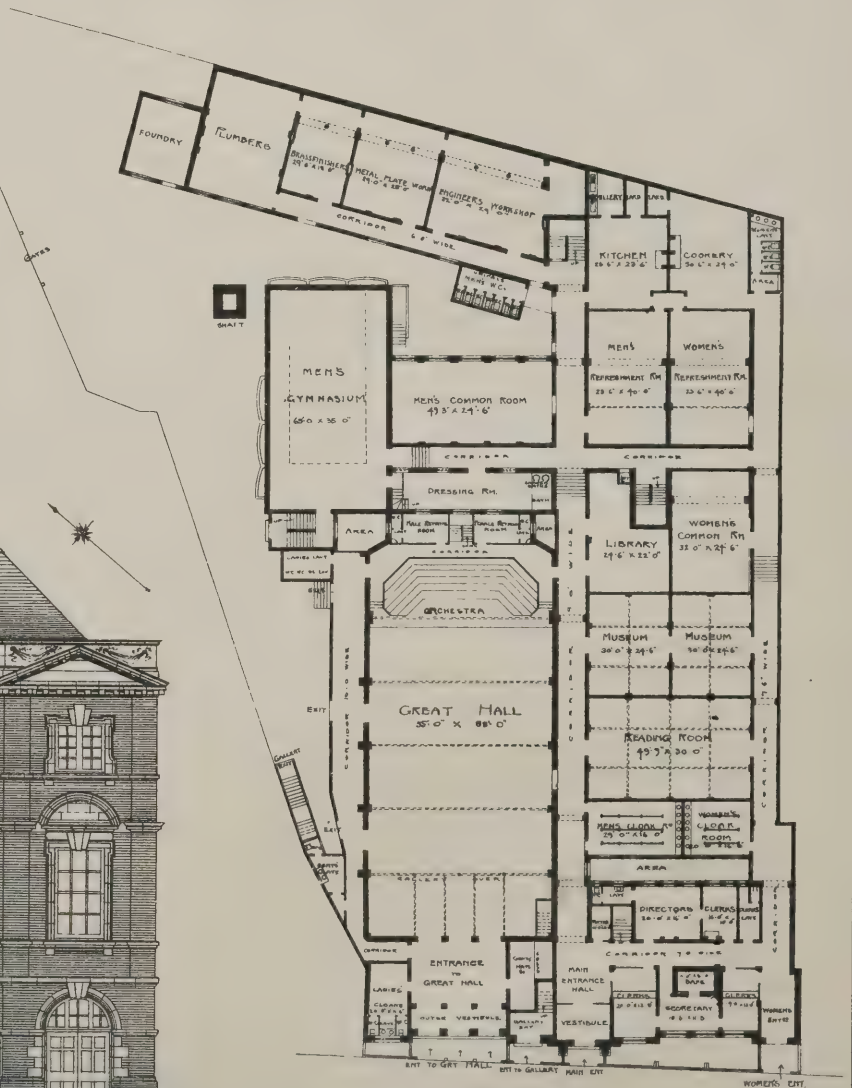


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

THE NORTHERN POLYTECHNIC INSTITUTION

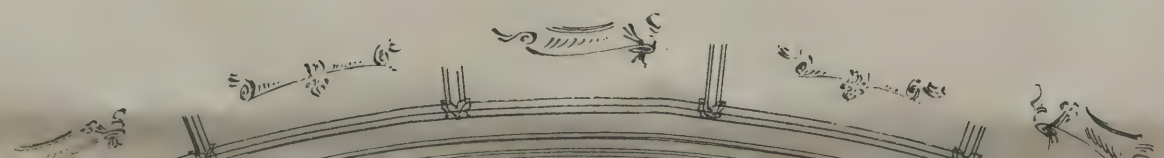
CHARLES BELL F.R.I.B.A.
ARCHITECT





GROUND PLAN

HOLLOWAY ROAD



THE GREAT · HALL

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

Our Office Table.

The autumn exhibition of the Royal Birmingham Society of Artists, which was opened to the public on Tuesday, is an unusually good display of pictures. Among the chief exhibits are Sir E. J. Poynter's "Horæ Serenæ," Sir E. Burne-Jones's "Dream of Lancelot at the Chapel of San Grael," and Holman Hunt's "May Morning: on Magdalen Tower, Oxford." "The Lonely Road," by Alfred East; Walter Langley's cottage interior, "Charity"; David Murray's "Hampstead Heath"; Val Prinsep's "Theodora: Empress and Comedian"; Melton Fisher's "Flower Makers of Clerkenwell"; and Arthur Hacker's "Great Cry in Egypt" are all works we have seen at Burlington House during the last two seasons. Among the portraits are examples of G. F. Watts (Dorothy Eleanor McCallum), F. Markham Skipworth, E. R. Taylor, and Kate Bunce; and the landscapes include works by Peter Graham, Vincent Yglesias, Douglas Adams, W. H. Bartlett, C. T. Burt, and Clayton Adams. The 250 water colours are an exceptionally fine and varied collection.

Dr. W. Clavell Ingram, the Dean of Peterborough, writes, stating that the restoration of the north gable of the west front of his cathedral is now completed. Those portions of the great arch and of the gable above it which have been taken down and rebuilt contained in all 2,006 facing stones; of these 170 only were found so decayed that they had to be replaced by new ones; the remaining 1,836 have been put back again into their original positions. The scaffolding is being removed, and the completed portion of the work can now be seen. The result, he holds, fully justifies the committee in the action which they have taken. The central and southern gables, portions of which are in a very dangerous condition, will next be dealt with as the architect, Mr. J. L. Pearson, R.A., may advise; but for the completion of this work funds are urgently needed.

The proposal to rebuild the north-west tower of Chichester Cathedral from Mr. Pearson's designs has called forth two letters of protest in the *Standard*, the objection being taken that it would conflict with the present south-west tower and the belfry tower to the north, being almost in line with those features. One of these writers says: "The glory of Chichester lies in two features—first, the Transition work of the presbytery, which is unique, and uniquely beautiful; and, secondly, the great Curvilinear south transept window, only equalled at Carlisle and York. It is not surprising that these features are somewhat overlooked, for the huge modern reredos has hidden the one, and the ugly modern glass has all but spoiled the other."

A new pier at Mingary, on the west coast of Scotland, was built two years ago at a cost of over £2,000, more than nine-tenths of the outlay being provided by Government. Since it has been officially passed it has been discovered that two or three sunken rocks lying in the short and narrow channel leading to it render the pier almost unapproachable. It is only on very rare occasions that steamers venture to approach it. Having regard to the heavy disbursement already made, and the smallness of the local contribution—less than £250—the Secretary for Scotland naturally declines to recommend the Treasury to make any more grants in aid of this pier; but suggests than an adequate amount should be locally subscribed for carrying out any further operations that might be necessary. A mass meeting of the inhabitants of the entire district is to be convened for the purpose of adopting some measures to raise funds for blasting away the rocks in question. It is not explained how the engineer and contractor for the pier alike failed to discover the obstructions that would render it inaccessible.

Jezreel's Tower, on the summit of Chatham Hill, New Brompton, a square crenellated structure of brick and iron, 124ft. square and 100ft. in height, with a turret at each angle, was again offered for auction on Monday, by order of the executors of Alderman J. G. Naylor, of Rochester, the builder by whom it was erected for "The New and Latter House of Israel," and who, payment for materials and labour not being forthcoming from the Jezreelites, had to foreclose the mortgage. The interior above the ground floor is arranged for a circular assembly hall, capable of seating 5,000 persons, while in the space between the square walls and the hall are numerous offices and rooms. The tower was intended to be the temple of the sect, but before it could be completed their leader died, in 1885. "Jezreel" was succeeded by his wife, who called herself "Queen Esther." She died three years later, and the community began to dwindle away. The Tower, having been roofed in, was not proceeded with, and stands, to-day, a huge shell, most substantially built of brick and iron—in the language of the catalogue, "a massive, unfinished building." A few families still remain in the settlement, to which they are much attached. About £40,000 was expended on the carcase of the Tower, which stands in seven acres of ground in the centre of a working-class district, but no advance was forthcoming at Monday's sale on £3,950, to which the bidding had slowly risen from £300, and the property was withdrawn.

An interesting discovery of inscribed stones and coins has been made at the Roman camp of Æsica, which is situate about two miles and a half north of Haltwhistle, and where excavations have been in progress during the past two years, under the direction of a committee formed in connection with the Newcastle Society of Antiquaries. As yet we are unable to give any particulars of the inscriptions upon the two stones or altars that have been found, but doubtless these details will be published in a few days. Hitherto the fragments of inscribed stones that had been turned up had been few and unimportant. Between the west gateway and the north-west angle of the camp is an extensive range of buildings erected against the inside of the western wall. Behind a stone trough near a hearth, in one of these, which seems to have been a smithy, were unearthed about twenty silver denarii of the earlier Emperor. In an adjoining building a quantity of charred wheat was found, the grains of which still retained their shape. At the north-west angle the camp adjoins the Great Wall, extending from Tyne to Solway, and frequently described as "Hadrian's Wall." The masonry of this angle-turret and that of the wall were found to be of similar character, and bonded into each other. During the course of the excavations, large quantities of pottery were turned up, chiefly consisting of the grey smother-kiln ware. A few small fragments of the parti-coloured Durobirvian ware and much of the beautiful red Saurian ware were also found. Two fragments of the latter had on them, scratched through the glaze, graffiti of names of centurions that have also been found on centurial stones in that district.

A peculiarly sad story was unfolded to Mr. D'Eyncourt at the North London Police-court on Monday by an applicant, who explained that he was by profession an engraver, but had had to give this up owing to defective eyesight, since which he and his wife had suffered the greatest privations. This was peculiarly hard upon his wife, who was widow of the well-known Henry Laxton, architect and civil engineer, who planned the Royal Botanic Gardens at Regent's Park, and who was the author of several standard works. At Mr. Laxton's death (his property going to a nephew, because of his dying intestate), the Architects' Benevolent Society granted her an annuity of £20, but this lapsed on her marriage with the present applicant. Mrs. Laxton invented and patented what is known as the Laxtonian ware, and had worked for many of the leading artists (Countess Gleichen, at St. James's Palace, being a patroness). However, little pecuniary good came of these inventions; so Mrs. Laxton-Clarke (her second marriage name) qualified as a trained nurse, and worked for some time in Islington. She caught fever from one of her patients, and thus was again temporarily *hors de combat*. At present they are utterly destitute. Mr. T. Holmes (the police-court missionary) said he had made inquiries into the case, and found the poor man's tale to be quite true. He also paid unlooked-for visits to his house, and found the unfortunate pair in a condition bordering on starvation. Mr. D'Eyncourt said he would give the applicant £2 from the poor-box, and Mr. Holmes, 12, Bedford-road, Tottenham, said he would be glad to receive other sums for them.

The eighth annual report of the Asylums Committee of the London County Council has just been issued. The asylums referred to, including one in course of construction and another about to be commenced, are seven in number, situated at Banstead, Cane-hill, Claybury, Colney Hatch, Hanwell, Bexley Heath, and Horton. The number of persons of unsound mind for whom the County of London was responsible at the commencement of the year was 13,512, an increase of 659 in twelve months. The committee remark that to provide the necessary accommodation contingent on an increase of between 600 and 700 lunatics per annum is essentially a most difficult task. They see no reason to think that there will be any appreciable diminution in this number while the population increases as at present, but the boundary line of the county may in time exercise some check as greater facilities are offered to London workers to reside out of the county. The temporary buildings at Colney Hatch and Banstead Asylums, accommodating respectively 300 females and 300 males, have been completed and occupied. The success of these buildings led the committee to ask for a grant of £30,000 for the erection of a building at Hanwell Asylum to accommodate 400 additional female patients. The council readily acceded to this request. The purchase of the Horton Manor Estate, near Epsom, comprising 1,060 acres, was also affected, the cost being £40,000. The County of London is now possessed of several eligible asylum sites on this one estate. On a portion of the ground the committee propose building a permanent asylum for 2,000 patients, and for the erection of this asylum the Council has granted a sum of £350,000. At the date of the report plans were also in preparation for temporary buildings adjoining the Horton Mansion House, to accommodate 700 females, and the Council was about to be asked to sanction the necessary expenditure for this purpose. The accommodation either provided or put in hand during the financial year, including temporary as well as permanent buildings, represented 5,700 beds.

The syllabus of lectures in the engineering department of the City of London College, White-street, Moorfields, conducted by Professor Henry Adams, M.Inst.C.E., F.S.I., and his assistants, has just been published in readiness for the fiftieth annual session of the college, which opens on October 1st. There are now forty professors and lecturers upon the college staff, giving instruction in upwards of fifty different subjects of science, art, language, and literature, divided into 130 classes, and the attendances for the session (seven to nine months) average 70,000. The new building, erected at a cost of £16,000, contains accommodation for 4,000 students, and is situate within two minutes' walk of Moorgate-street Station and tramway terminus. To prevent the occasional overcrowding in some of the classes, an adjoining building has now been taken on lease and fitted up for art studios and additional lecture-rooms. Classes are to be held in practical sanitary science and quantity surveying, civil and mechanical engineering and valuation, technical drawing and building construction, and numerous valuable scholarships and prizes are offered. A separate class is to be held for those students who intend sitting for honours at the May examination in building construction.

The prospectus and time-table of the Central School of Arts and Crafts, situated at 316, Regent-street, has just been issued by the Technical Education Board of the London County Council. The school was founded to provide instruction in those branches of design and manipulation which directly bear on the more artistic trades. Admission is, within certain limits, only extended to those actually in those trades, and the school makes no provision for the amateur student of drawing and painting. The instruction is adapted to the needs of those who are engaged in the different departments of building work (architects, builders, modellers and carvers, decorators, metal-workers, &c.), designers in wall-papers, textiles, furniture, workers in stained glass, bronze, lead, &c., enamellers, jewellers and gold and silver-workers, bookbinders, and embroiderers.

A trial was made in the police cells in Portsmouth Dockyard on Tuesday of the Vajen Bader patent smoke protector for firemen, which consists of a helmet-shaped head covering, fitted with mica eyepieces, and supplied with fresh air from a reservoir containing 100lb. of air. In one of the police cells, which was hermetically sealed, two fires of cotton-waste, leather, and other substances calculated to emit suffocating fumes were lighted in a bogy. Among the officials who witnessed the trial were Commander Cuddy, of the Dockyard Reserve, Mr. J. A. Yates, chief

constructor, and Mr. J. T. Corner, chief engineer of the dockyard. As soon as the cell door was opened a constable wearing the helmet entered and stirred the fires, remaining in the cell for 20 minutes, when he had to be released owing to the heat. Commander Cuddy then entered, and remained for ten minutes. It was stated that the trial was a complete success, and that the helmet would be valuable in enabling men to discover the locality of a fire in the confined spaces of a ship.

THE negotiations which have been carried on for some years, in which the local authorities have urged the Crown to make a series of short roads over the Forest of Dean, have at length been brought to a successful issue. New roads, totalling about eight miles in length and costing about £8,000, are to be made in the neighbourhood of Cinderford, Blakeney, Ruardean, Lydbrook, and Littledean. Owing to local difficulties the Lydbrook and Littledean roads will be taken last. The first length of road at Cinderford has been let, and the work is already going forward. They will be district roads, and will be handed over to the Rural District Council for maintenance on their completion. The Crown have offered to make a new road from Lydney to Lydbrook, costing £8,000, if the County Council will accept the same as a main road, and this matter is now under consideration.

SOME months ago, says a correspondent of the *Lancet*, the Board of Guardians of Mitchelstown Union appointed a Mr. Lagherty clerk of the works in connection with the erection of a dispensary residence for the medical officer at Galbally at a remuneration of £1 per cent. on the necessary outlay. The guardians subsequently brought an action against him to recover £500 for negligence and non-fulfilment of his contract. This not alone failed, but resulted in the former being condemned to pay the defendant's costs—viz., £60. During the trial it moreover transpired that the defendant at the time of his appointment was 83 years of age, and was by trade a carpenter. The Local Government Board have now notified their intention to seize the workhouse in consequence of the action of the guardians, chiefly in reference to their non-payment of this bill of costs; and the position of the union is rendered critical by the fact that the guardians have been already surcharged by the auditor of the Local Goverment Board to the amount of £123, while further heavy surcharges in connection with the dispensary house are pending. At a specially convened meeting of the guardians, held on Aug. 28th, a resolution was passed requesting the Local Government Board to permit a cheque to be passed for the amount of the bill of costs, irrespective of other matters in dispute.

THE Right Hon. Chief Justice S. J. Way, P.C., D.C.L., Chancellor of the University of Adelaide, and Lieut.-Governor of South Australia, who left Plymouth on Saturday afternoon last for Adelaide, slipped a train on his way down from London, to visit the well-known ecclesiastical art studios of Messrs. Harry Hems and Sons, in Exeter. Chief Justice Way, one of Australia's most gifted sons, although of Devonian parentage, was born in the colonies. At an early age, however, he was sent over to England to be educated, and received his education in Exeter, and as a boy used to attend the services at the old Bible Christian Chapel in Musgrave's Alley, since destroyed. Mr. Harry Hems, at the time of demolition in 1878, for business premises, purchased the carved old oak double doors, measuring 7ft. 6in. by 5ft., by which entrance to the old building was obtained. He denuded them of whitewash, and conservatively restored the old oak. On their inner side, in small, plain characters, is incised the following:—"Double doors from the ancient High School, Musgrave's Alley, Exeter, built by Richard de Braylegh, Dean of Exeter, A.D. 1343; demolished 1878. In 1778 the Wesleyans acquired it as a chapel, and John Wesley preached there in 1779. These doors were made in 1593, and renovated by Harry Hems in 1886." The Lord Chief Justice's interest at once again meeting (in Mr. Hems's studios) the old doors so vividly photographed upon his juvenile brain, can be more readily imagined than described. Three other doors, evidently the handiwork of the same clever 16th-century craftsman in wood, still exist in Exeter. One is in the entrance to the Guildhall, another may be seen in the Close (on the western side), and the third at the entrance to Morgan's-court in St. Sidwell's. Mr. Hems has a fret-saw in his collection, dated 1592 (said to be the oldest saw of its kind in existence), which, being undoubtedly of Exonian manufacture, it is possible was used in the actual construction of this quartette of grand historical old doors.

THE stuccoed walls of many of the older houses in the Province of Ontario, although really of wooden construction, appear like solid masonry, and have, says the *Engineering Record*, the advantages of cheapness, efficient protection from the rigorous climate, and economy in construction with common materials by ordinary labour. The ordinary siding of a frame house is furred out and lathed and plastered on the outside, the surface being coloured to suit, and thickly strewn with small pebbles set in the wet plaster. With proper repairs this surface can be maintained in a neat and attractive condition, and promotes the warmth of the house, while it saves the necessity of painting; but if allowed to become dilapidated, the appearance is very bad. The method of applying this rough-cast surface is to first cover the sheathing with two crossed layers of diagonal lath 3in. centre to centre, well nailed, and then plastered with two coats of rich lime mortar with plenty of cow's hair, mixed at least four days before using, and well pressed into the key-spaces. After it has well dried the first coat is thoroughly dampened, and the second coat applied, and the rough-cast immediately thrown on its surface. The rough-cast is composed of washed fine gravel mixed to a creamy consistency with pure lime. This is thrown on with a wooden float and immediately brushed with a whitewash brush. One hundred yards of rough-cast requires 1,800 laths, 12 bushels of lime, 1½ barrel best cow's hair, 1¾ yard of sand, ¾ yard of gravel mixed with ¼ yard of lime putty, and 16lb. of cut lath-nails, 1¼in. long.

CHIPS.

The Technical Education Board of the London County Council are about to appoint a head master of the new Camberwell School of Arts and Crafts, erected by Mr. J. Passmore Edwards in memory of the late Lord Leighton. Applications must be forwarded to the Chairman of the Board, 9A, St. Martin's-place, W.C., on or before Wednesday next, the 15th inst.

Messrs. Buckland and Sons, of Windsor, sold on Friday the furniture of Sandlea, Datchet, which residence has been purchased by the Crown authorities. The villa is situated upon the north bank of the Thames, opposite the Home Park, and is a picturesque feature in the river scenery. By its acquisition the Crown now controls most of the property on the Buckingham shore between the Victoria and Albert Bridges, and has to a considerable extent secured the privacy of her Majesty when driving along the Thames-side road of the Royal grounds.

Owing to the rapid growth of the parish of Willesden, it has recently been separated for poor-law purposes from the Hendon Union by order of the Local Government Board. The paupers of the parish are still, however, located at the Hendon Workhouse; but efforts are now being made by the new Willesden Board of Guardians to acquire a site near Willesden Green, and erect a workhouse there at an estimated cost of £50,000.

The Local Government Board having declined, upon second solicitation, to allow Scarborough Corporation to sell part of the Weaponness estate as a site for a proposed Wesleyan College, Mr. J. H. Moody, a member of the council, and the town clerk, have been appointed to wait upon the Local Government Board to endeavour to induce that authority to permit the sale upon the terms proposed, which are—(*a*) For the first ten years the purchasers to pay the corporation a rental of £5 per acre per annum; (*b*) from and after the expiration of that period the purchasers to pay in perpetuity a rental at the rate of £20 per acre per annum. We illustrated last week the design selected in competition for the building, by Messrs. Hall, Cooper, and Davis.

At St. Bartholomew's Hospital on Friday, Mr. Langham held an inquest respecting the death of Frederick Brown, aged 32, a carman, who was killed at the newly-erected station front at Moorgate-street Station. According to the evidence, Messrs. Allen and Son, a firm of contractors, had sent the deceased with his cart to fetch away a load of waste bricks, and after waiting about three hours he went up the scaffold to inquire of the foreman how much longer he would have to remain. In doing this he slipped and fell, fracturing his skull. In giving evidence, the foreman said the deceased had no right to go up the scaffold. Ultimately, a verdict of accidental death was returned.

Mr. Rhind, sculptor, Torphichen-street, Edinburgh, has just completed an angel figure which is to be placed over the graves of the late Earl and Countess of Kinnoull in the old churchyard near Dupplin Castle. The winged figure, cut out of a block of Sicilian marble, is 5ft. 6in. in height. It is to stand on a rocky base, and the design of the memorial, which has been carried out under the supervision of Mr. Henry Seymour, architect, Edinburgh, includes an inclosing low balustrade of marble round the grave.

Mr. James M'Lehose, a member of the firm of M'Lehose and Sons, builders, Lanark, died on Friday from the result of an accident. On the previous Tuesday afternoon he was assisting to remove a scaffold at the top of a three-story building, when a trace swung round, and pushed him off the plank on which he was sitting. He fell to the ground among small stones and scaffolding. Mr. M'Lehose, who was about thirty years of age, was well known all over the Upper Ward of Lanarkshire.

The will and codicil of Mr. George Elkington, F.R.I.B.A., for many years surveyor to the Bermondsey Vestry, and a past master of the Coopers' Company, of Oakdene, Victoria-road, Worthing, and formerly of Briarford, Anerley, who died on July 23, have been proved by the executors, the value of the personal estate being £6,833 18s. 4d. The testator bequeaths £1,600 to his son George (who for many years has been in partnership with him), and also all his office furniture, fixtures, plant, &c.; £1,600 to his son Harold; £1,500 upon sundry trusts for his daughters, Clara, Edith, and Emily Anne; and £25 each to his executors. The residue of his property he leaves to his daughters.

The Treasury decree took effect on Friday for the sale of the "Brompton boilers," whose unsightly buildings, together with a quantity of old stores, were disposed of on that day by auction. The sale took place in front of the South Kensington Museum. The removal of the "boilers," which formerly contained the patent collections, and have latterly been used as storerooms, only accentuates the doleful aspect of the buildings from the road, and the happily small fire in a corner of the science library on Tuesday evening shows the dangers involved by the insanely reckless policy of huddling priceless works of art in combustible structures surrounded by official residences.

A chapel has been built by the Christian Brethren in Duke of York-street, Wakefield. It is of red brick with stone dressings, and is seated in pitch pine for 200 persons, the measurements being 39ft. by 26ft. Mr. H. Crutchley, of King-street, Wakefield, prepared the plans, and Mr. S. C. Denison, of Thornes-lane, was the builder. The cost was £805.

The parish council of Northfield, Worcestershire, have accepted with thanks the free gift from Mrs. Gibbins of 11½ acres of land on the Wesley Park estate, as a recreation ground for the populous district of Selly Oak.

The Coatbridge Dean of Guild Court have passed the plans of a new Roman Catholic Church, to be erected at the corner of Buchanan-street and Dundryan-road, for St. Augustine's congregation. The church will accommodate 1,000 worshippers, and is to cost £10,000. There will be a nave, sacristy, and chancel. The building has been designed by Messrs. Pugin and Pugin, London, and will be built of Locherbridge stone.

The first section of the light railway to Benwick, which is being made by the Great Eastern Railway Co., through the Cambridgeshire Fens, was opened on Wednesday week. The new branch line begins with a junction with the main line of the G.E.R. system, at the Three Horse Shoe sidings, between Whittlesey and March, and at present is open to Burnt House, a distance of three miles. It will eventually be carried 1½ miles further south, ending at docks on the river Nene at Benwick. The purchase of land has cost the company £4,200, and another £17,000 is being spent on construction.

Mr. F. J. Williamson, of Esher, has just executed in marble a recumbent statue of the late Bishop Harper, the first Bishop of Christchurch, New Zealand, which is to be placed in Christchurch Cathedral. The deceased prelate is represented with his pastoral staff, and wearing his episcopal robes.

An aisle and chapel are being added to the Matlock Parish Church, in commemoration of the sixtieth year of the Queen's reign. The foundation-stone of the additions, which are estimated to cost over £1,000, has just been laid by the Archdeacon of Derby.

The Earl of Crewe opened on Saturday the Liberal Club at Knottingley. The building is situated in Aire-street, opposite the Flatts. Below are two shops, while on the first floor is a reading-room, 14ft. long by 21ft. wide. On the story above this are the billiard and reading rooms, the former being 32ft. by 27ft., with accommodation for two tables. The architects were Messrs. Tennant and Bagley, of Pontefract.

Trade News.

WAGES MOVEMENTS.

THE ENGINEERING STRIKE.—The Joint Committee of the Allied Engineering Trades received on Saturday the first sum from the Amalgamated Society of Carpenters and Joiners as the result of the levy upon the members, which it is estimated will produce £560 weekly while the strike lasts. During this week a ballot is being taken of the members of a number of London trade societies as to whether a levy shall be made in favour of the engineers' strike fund. More than a dozen unions in the Metropolis have already decided in favour of supporting the engineers during the dispute.

LIVERPOOL.—A dispute has arisen between the cabinet-makers and the carpenter and joiners engaged upon the new White Star Offices, at the foot of James-street, as the result of which the latter have come out on strike. The cabinet-making contract was placed in the hands of S. J. Waring and Sons, Limited, and the employés of the firm, having been engaged for some time upon work of this character, are at present engaged in fixing it. It would seem that the dividing line between the work of the cabinet-maker and that of the joiner is difficult of definition, and in the present instance the joiners are aggrieved because they hold that the cabinet-makers have undertaken employment which does not legitimately belong to their trade. The joiners, numbering about 20, came out last Friday, and ten more of their trade withdrew at the same time from the employ of Messrs. Waring. Had the difficulty occurred earlier in the construction of the White Star offices, its effect would have been much more serious, for the operations of the carpenters and joiners have now arrived at an advanced stage, whereas formerly several hundred men were employed upon work of this class. Messrs. Waring, who employ both cabinet-makers and joiners, but are primarily dependent upon the former, are preserving a neutral attitude in the matter.

CHIPS.

Mr. Frank W. Lombard, a young architect, formerly of Boston, Mass., committed suicide at East Wilton, Me., August 24.

The preparation of the stained-glass windows which have been presented to St. Paul's Cathedral by the Duke of Westminster has been somewhat delayed by necessary structural alterations, and also by the absence of the artist, Sir W. B. Richmond, K.C.B., R.A., on the Continent. The windows are to be placed in the north and south transepts, and one of them is now complete at the works of the makers, Messrs. Powell, of the Whitefriars Glassworks. The design for the other window is finished.

The Castlecroft Congregational Sunday-school at Bury, Lancs., which was erected in 1892 (from designs of Mr. J. D. Mould, of Manchester and Bury) has just been decorated throughout by Mr. A. V. Tarpey, painter and decorator, Union-square, Bury.

Work on the main sewer from the Capitol grounds to Second-street, Washington, D.C., has just been begun by the contractors, Messrs. Murphy Bros., who have taken the contract at 300,000dol. They began with a 43ft. excavation, and will install advanced machinery for excavating and transporting the potters' clay, gravel, and red earth, which they expect chiefly to encounter in the 6,000ft. of line. Nearly the whole length of the sewer will be submerged at high tide.

The resolution of H.M. Board of Works, plus the Chancellor of the Exchequer, to proceed with Sir Edward Poynter's second mosaic in the outer lobby of the House of Commons, is gratifying news for all who are interested in the artistic adornment of our chief public buildings.

The Holywell Rural District Council have engaged Messrs. Goodison, Atkinson, and Ford, of Liverpool, to prepare water and drainage schemes for Bagillt, at a remuneration for the water scheme, 5 per cent. on the cost of the works, with a minimum outlay of £1,000; and for the sewerage scheme, making report and estimate, £25.

The plans and works committee of the Edinburgh Town Council have adopted sketch plans for a new swimming-bath for the north side, which it is proposed to erect at Saxe-Coburg-place, Glenogle-road. They are on the lines of the bath at Dalry, with modifications to suit the ground. The estimated cost is between £10,000 and £12,000.

The church of All Hallows, Kea, Truro, has now been completed by the erection of a porch, which has been opened by the Bishop of Truro. The church has cost, from first to last, over £5,000. It has been built throughout by Mr. Carkeek, of Redruth, Mr. G. H. Fellowes Prynne, of London, being the architect.

Mr. Archibald Campbell Carlyle, late of the Archæological Survey of India, died on the 30th ult. at his residence, 25, Gratton-road, West Kensington Park, W., aged 68 years.

The Stow Board of Guardians have adopted plans prepared for them by Mr. J. Shewell Corder, of Ipswich, for additions and alterations to the workhouse at Stowmarket, estimated to cost £2,000.

Good progress is being made with the Marlborough and Grafton Railway, and the line is expected to be opened next spring. About 2¾ miles of permanent way and line have been completed, nine bridges have been built, the only tunnel nearly pierced, and the widening of the existing line between Wolfhall and Grafton is finished. Mr. R. St. George Moore is the engineer, and Messrs. Aird and Co. are the contractors.

A commencement will be made at once with the chancel of the new church of St. Ambrose, Westbourne, near Bournemouth. It will be erected from designs by Mr. C. Hodgson Fowler, F.S.A., of Durham.

The lecture-hall at Woodbridge, East Suffolk, will be reopened on Tuesday next, after having been renovated, re-roofed, and decorated. A new balcony with iron panelled front, 15ft. deep, and extending the whole width of the building, has been erected over the entrance-lobby. The erection of the balcony and other carpentry work has been satisfactorily carried out by Mr. W. I. Smith, the distempering and gas-fitting by Mr. W. Woodruffe, and the brickwork and ceiling decoration by Mr. Geo. Barrell.

Extensive additions have recently been made to the workhouse buildings at Elham, near Folkestone, from plans by Mr. John Ladd, of London.

It is understood that Mr. T. Armstrong, the director of the art division of the Science and Art Department, will retire from the service under the operation of the age regulation within the next few months. The vacancy was expected to occur next month, but Mr. Armstrong has been authorised to continue in office for a short time longer, and he will probably not leave until the preparation of the art estimates for the next financial year is completed.

Memorial bricks of a new mission-hall, in connection with St. James's Church, Bermondsey, were laid in Alexis-street, Southwark Park-road, last week. The builder is Mr. Chalkley, and the hall will be seated for 300 persons.

Mr. H. H. Law, C.E., an inspector under the Local Government Board, held an inquiry at Acomb, near Hexham, on Friday, into the proposal of the Hexham Rural District Council to borrow £950 for works of water supply in Acomb village. The proposal is to gather the water from the Salmon's Well and Silver Hill springs to the north of the village, into a storage tank on the waste land above the schoolhouse, and hence supply the whole of the village, including the terraces at the low end, from stand pipes. Mr. W. Dixon, C.E., of Newcastle, explained the scheme.

The results of the Glasgow High (evening) School Building Construction Classes have turned out very satisfactorily. All the 26 elementary and nine out of 10 advanced students who were presented, have completely passed the respective stages in the recent science and art examinations. In addition to certificates resulting therefrom, the Glasgow School Board have granted class certificates of proficiency to 26 elementary, 10 advanced, and four honours students. The opening lecture of the new session was delivered on Tuesday, the 6th inst.

In the case of Charles Samuel Proctor, of Bradford, builder and contractor, the order of discharge from bankruptcy has been suspended for three years ending August 10, 1900.

The will of Mr. James Stiff, of Suffolk House, 197, Clapham-road, and of the London Pottery, Lambeth, was proved on August 21, the value of the personal estate being £19,843.

The Halifax Town Council decided on Friday to apply to Parliament during the next session to revive the powers for the construction of the Walshaw Dean Reservoir. It was explained that the proposed source of supply will be the cheapest owned by the corporation, and it will give 2½ million gallons per day for £150,000. The corporation have already provided the roadway along which to bring the water.

A deputation which was appointed some months ago by the town council of Douglas, Isle of Man, to visit Paris, Dresden, Berlin, Brussels, and other Continental cities, and inspect the various systems of electric and other traction in use, have issued their report, which is drawn up by the town clerk of Douglas. The deputation sums up in favour of the overhead electric trolley system for the Douglas Promenade. A strong reason advanced in favour of the adoption of that system is that poles carrying overhead wires can also be used for the electric-lighting of the town.

The urban district council of Dawlish propose to seek powers, by a provisional order, to build a pier, and have resolved to obtain estimates and plans from three firms who in April last forwarded approximate estimates. The firms and estimates then were:—G. Webb and Co., Westminster, £4,750; R. J. G. Read, Westminster, £5,800; and Morgan Davies, Swansea, £6,300.

To the small permanent collection of pictures at the corporation art gallery in the mansion of Christchurch Park, Ipswich, nine additions have lately been made by donors resident in the borough. They comprise four presented by the mayor, viz.:—oil painting, Minsmere Cliff, Dunwich, by W. D. Batley; oil painting, Halstead Hall, Cumberland; water-colour drawing, Old Market Cross; ditto, Old Town Hall, Ipswich; an oil painting of Corfe Castle, painted and presented by Mr. F. G. Cotman; and the other gifts are three oil paintings—Portrait of Lord Nelson; "Birth of the Conway," by E. R. Smyth; "Meditation," by Feti; and a water-colour drawing by B. Galofre.

The Works Committee of the Edinburgh and Leith Water Trust have adopted a report by the engineer recommending them to lay a new pipe to bring in an additional supply of three or four million gallons of water per day during the summer season from Gladhouse. The engineer stated that three million gallons per day additional for 100 days can be obtained from Gladhouse during the summer season at a cost, including way-leave, of £23,500.

The dismantled shell of St. Michael's Church, Wood-street, will be shortly demolished, and a pile of buildings, forming a branch of the London Joint Stock Bank (Limited) erected in its place. The freehold site was offered at the Mart a short time back by Messrs. Edwin Fox and Bousfield, and changed hands for £31,500 to Messrs. Davis and Emanuel, of Finsbury-circus. This firm of architects were acting as agents for the bank, and they are now preparing plans for the erection of the new edifice. The site occupies an area of 3,700 superficial feet.

The General Purposes Committee of the Leamington Corporation have rejected by a large majority a proposition that the corporation should buy the gasworks at the cost of £123,000.

A London County Council report just issued shows that a considerable profit has been made in the year ending the 31st of March last in connection with the working and maintenance of the Council's lodging-house in Parker-street, Drury-lane. The charge made here for accommodation is 6d. per bed per night, while at the commonest lodging-house for poor "dossers" a charge of at least 4d. is exacted. In the case of the Parker-street institution the arrangements made for the comfort and cleanliness of the lodgers are said to be highly appreciated.

A stained-glass window by Messrs. Ward and Hughes, of London, is to be placed in St. Guthlac's Church, Market Deeping, as a Diamond Jubilee memorial.

The East Kent magistrates granted on Saturday a provisional license for the pavilion now in course of erection at the end of the pier at Herne Bay. The pier is being lengthened and extended at a cost of over £30,000, and is expected to be finished by May 31 of next year.

The directors of the Isle of Man Tramways have obtained from the Manx Legislature power to extend their line of electric tramway from Laxey to Ramsey, and arrangements have been made to construct an extension which, when completed, will result in an electric tramway line, mainly along the sea coast, from Douglas to Ramsey, a distance of 19 miles.

The foundation-stone of the new Roman Catholic Church for Loughrea will be laid by the Bishop of Clonfert during October. The church will be built by Mr. P. Glynn, whose tender has been accepted at about £13,000.

A Jubilee drinking-fountain at the corner of Manor Farm-road and Wood Mill-lane, Swathbury, at the eastern boundary of Southampton, was formally presented to the corporation of that borough last week by the donor, Sir Samuel Montague, M.P. The fountain was designed by Mr. Percy McQuoid, and was erected by Messrs. Garret and Haysom, of East-street, Southampton.

An inquiry was held in the town hall, Gorton, near Manchester, on Tuesday week, by Colonel W. Langton Coke, M.Inst.CE., with reference to applications by the Gorton Urban District Council for permission to borrow a sum of £10,850 for a cemetery, and £20,196 for works of private street improvement.

The foundation stones of a new Primitive Methodist Sunday School, which is in course of erection in the Hamil-road, Burslem, were laid on Monday week. The school will afford accommodation for 420 children, and is being built at a cost of £350, exclusive of the land. The contractor is Mr. John Henry Broadhurst, builder, Burslem.

CHIPS.

The Earl of Crewe is to be asked to open the Art School at Hightown, Crewe, about the middle of next month, and the sanatorium is to be opened on the same day.

At the meeting of the Spalding Urban District Council, on Wednesday week, it was decided to build a new retort house for the gasworks, at an estimated cost of £2,000. The house is to accommodate twelve retorts, of which it is proposed at first to put in six, and a bathroom for the stokers is also to be provided.

On Saturday the memorial-stones of a Methodist New Connexion chapel were laid in Ombersley-road, Balsall Heath. The building is to be Gothic in style, with a main entrance from Ombersley-road, and the plan is based on the nave and aisle model, with a small gallery over the entrance lobby, and a choir gallery and organ-loft at the rear of the rostrum. The chapel will afford accommodation for 500 persons. The contractor is Mr. George Webb, of Handsworth; and the architect Mr. A. H. Goodall, of Nottingham.

A new academy, which has just been erected by the Dumfries School Board on the site of the old one, was formally opened on Friday by Sir Robert T. Reid, Q.C., M.P. The main building is of Classical design, of two storeys in height, containing, besides the ordinary class-rooms for the upper and preparatory school, a suite of four apartments for art teaching, and three for the teaching of science. In a detached block there are workrooms for technical instruction in wood and metal work, and a gymnasium. The central hall, off which all the class-rooms open, has a floor area measuring 60ft. by 45ft., and is 38ft. in height. The total cost has been about £15,000. The plans were supplied by Mr. Frank Carruthers, of Lockerbie and Dumfries, and were chosen in competition.

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IRON, &c.

	Per ton.			Per ton.
Rolled-Iron Joists, Belgian	£5 15 0	to		£6 0 0
Rolled-Steel Joists, English	6 0 0	,,		6 10 0
Wrought-Iron Girder Plates	5 15 0	,,		6 10 0
Bar Iron, good Staffs	7 0 0	,,		8 0 0
Do., Lowmoor, Flat, Round, or Square	17 0 0	,,		17 0 0
Do., Welsh	5 15 0	,,		5 17 6
Boiler Plates, Iron—				
South Staffs	7 17 6	,		8 5 0
Best Snedshill	10 0 0	,,		10 10 0

Angles 10s., Tees 20s. per ton extra.

Builders' Hoop Iron, for bonding, &c., £6 15s. 0d. per ton.

Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.

Galvanised Corrugated Sheet Iron—

	No. 18 to 20. Per ton.			No. 22 to 24. Per ton.
6ft. to 8ft. long, inclusive gauge	£10 15 0	...		£11 0 0
Best ditto	11 5 0	...		11 10 0

	Per ton.			Per ton.
Cast-Iron Columns	£6 0 0	to		£8 10 0
Cast-Iron Stanchions	6 0 0	,,		8 10 0
Cast-Iron Sash Weights	—	,,		4 2 6
Cast-Iron Socket Pipes—				
3in. diameter	5 10 0	,,		5 15 0
4in. to 6in.	5 5 0	,,		5 10 0
7in. to 24in. (all sizes)	4 15 0	,,		5 5 0

[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]

Pig Iron—	Per ton.
Cold Blast, Lilleshall	105s. to 110s.
Hot Blast, ditto	57s. 6d. to 62s. 6d.

Wrought-Iron Tubes—Discount off Standard Lists f.o.b.

Gas-Tubes	75p.c.	Fittings	77½p.c.
Water-Tubes	70	,,	72½
Steam-Tubes	62½	,,	65
Galvanised Gas-Tubes	60	,,	62½
Galvanised Water-Tubes	55	,,	57½
Galvanised Steam-Tubes	45	,,	47½

	10cwt. casks. Per ton.			5cwt. casks. Per ton.
Sheet Zinc, for roofing and working up	£20 10 0	to		£20 15 0
Sheet Lead, 3lb. per sq. ft. super.	14 15 0	,,		15 15 0
Pig Lead, in 1cwt. pigs	14 5 0	,,		15 5 0
Lead Shot, in 28lb. bags	17 5 0	,,		18 5 0
Copper Sheets, sheathing and rods	60 0 0	,,		61 0 0
Copper, British Cake and Ingot	51 5 0	,,		51 10 0
Tin, Straits	61 3 9	,,		61 13 9
Do., English Ingots	64 10 0	,,		64 12 6
Spelter, Silesian	17 2 6	,,		17 12 6
	Per ton.			Per ton.
Cut Clasp Nails, 3in. to 6in.	£8 15 0	,,		£9 15 0
Cut Floor Brads	8 10 0	,,		9 10 0

Wire Nails (Points de Paris)—

0 to 7	8	9	10	11	12	13	14	15	B.W.G.
8/6	9/0	9/6	10/3	11/0	12/0	13/0	14/9	16/9	per cwt.

TIMBER.

Teak, Burmah	per load	£14 5 0	to	£15 10 0
,, Bangkok	,, ...	10 10 0	,,	15 0 0
Quebec pine, pitch	,, ...	—	,,	—
,, yellow	,, ...	2 0 0	,,	4 0 0
,, Oak	,, ...	5 10 0	,,	6 10 0
,, Birch	,, ...	4 5 0	,,	6 0 0
,, Elm	,, ...	4 0 0	,,	5 5 0
,, Ash	,, ...	3 5 0	,,	4 10 0
Dantsic and Memel Oak	,, ...	2 10 0	,,	3 10 0
Fir	,, ...	2 5 0	,,	4 5 0
Wainscot, Riga p. log	,, ...	1 10 0	,,	3 15 0
Lath, Dantsic, p.f.	,, ...	4 10 0	,,	5 10 0
St. Petersburg	,, ...	5 0 0	,,	6 10 0
Greenheart	,, ...	8 0 0	,,	8 10 0
Box	,, ...	4 10 0	,,	15 0 0
Sequoia, U.S.A.	per cube foot	0 1 8	,,	0 1 10
Mahogany, Cuba, per super foot 1in. thick		0 0 5	,,	0 0 6½
,, Honduras	,, ...	0 0 5	,,	0 0 6½
,, Mexican	,, ...	0 0 4	,,	0 0 5
Cedar, Cuba	,, ...	0 0 4½	,,	0 0 5
,, Honduras	,, ...	0 0 4	,,	0 0 5
Satinwood	,, ...	0 0 7	,,	0 1 0
Walnut, Italian	,, ...	0 0 3½	,,	0 0 7

Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 11in.:—

Quebec, Pine, 1st		£20 10 0	to	£26 10 0
,, 2nd		15 0 0	,,	17 10 0
,, 3rd		7 10 0	,,	11 0 0
Canada Spruce, 1st		10 10 0	,,	12 0 0
,, 2nd and 3rd		8 0 0	,,	9 0 0
New Brunswick		7 10 0	,,	8 0 0
Riga		6 10 0	,,	7 10 0
St. Petersburg		8 10 0	,,	12 10 0
Swedish		9 0 0	,,	15 10 0
Finland		8 0 0	,,	8 10 0
White Sea		9 10 0	,,	16 0 0
Battens, all sorts		5 0 0	,,	20 0 0
Flooring Boards, per square of 1in.:—				
1st prepared		0 8 6	,,	0 15 6
2nd ditto		0 7 0	,,	0 12 0
Other qualities		0 5 0	,,	0 6 6
Staves, per standard M:—				
Quebec pipe		—		—
U.S. ditto		35 0 0	,,	42 10 0
Memel, cr. pipe		230 0 0	,,	240 0 0
Memel, brack		200 0 0	,,	210 0 0

OILS.

Linseed	per ton	£16 0 0	to	£16 10 0
Rapeseed, English pale	,, ...	28 0 0	,,	28 5 0
Do., brown	,, ...	26 10 0	,,	26 15 0
Cottonseed, refined	,, ...	16 0 0	,,	17 0 0
Olive, Spanish	,, ...	28 0 0	,,	30 0 0
Seal, pale	,, ...	23 10 0	,,	24 0 0
Cocoanut, Cochin	,, ...	27 10 0	,,	28 0 0
Do., Ceylon	,, ...	22 15 0	,,	23 0 0
Palm, Lagos	,, ...	21 15 0	,,	22 15 0
Oleine	,, ...	18 15 0	,,	19 15 0
Lubricating U.S.	per gal.	0 6 3	,,	0 7 6
Petroleum, refined	,, ...	0 0 4¾	,,	0 0 4⅞
Tar, Stockholm	per barrel	1 2 0	,,	1 5 0
Archangel	,, ...	0 12 6	,,	0 15 0
Turpentine, American	per ton	21 0 0	,,	21 10 0

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TENDERS.

***** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.**

Aberdeen.—For building three dwelling-houses on the south side of Urquhart-road. Mr. William Smith, architect:—

King, J., Aberdeen (accepted).

Bath.—For furnishing the pump-room annexe, for the corporation. Mr. J. M. Brydon, of London, architect:—

Millard (accepted) £306 0 0

Bath.—For erection of art gallery in Bridge-street, for the corporation:—

Higgs and Hill, London	£16,910 0 0
Estcourt and Son, Gloucester ...	14,891 0 0
Downs, W., Walworth	13,618 0 0
Beaven, Bristol	13,530 0 0
Hayward and Wooster, Bath ...	12,691 0 0
Cowlin and Son, Bristol	12,655 0 0
Long, J., and Sons, Bath*	11,872 0 0

* Accepted.

Beccles.—For the supply of 600 tons of broken (1½in.) granite, for the town council:—

Manuelle, A. and F., London (accepted) 12s. 6d. per ton.

Beccles.—For making up Denmark-row, for the town council:—

Glenny, B. W. (accepted) £470 0 0

Beccles.—For laying 500 yards of cement pavement, for the town council:—

Betts (accepted) 1s. 10½d per square yard.

Brixham.—For erection of new National Provincial Bank of England premises at Fore-street, and painters' and glaziers' work in connection with same. Messrs. Norman G. Bridgman, A.R.I.B.A., and Walter H. Bridgman, M.S.A., Torquay, Paignton, and Teignmouth, architects. Quantities by Mr. Vincent Cattermole Brown, of Paignton:—

For building works:—

Goss Bros., Torquay	£1,100 0 0
Dovey, E. P., Torquay	1,044 0 0
Webber, G., & Maunder, Paignton	933 0 0
Hazelwood Bros., Brixham... ...	922 0 0
Webber, H., and Sons, Paignton*...	998 0 0

For painting works:—

Goss Bros., Torquay	£78 0 0
Webber, H., and Sons, Paignton ...	49 0 0
Hookings, Brixham	46 10 0
Persee, Brixham	42 18 10
May, E., Brixham	30 10 0

* Accepted, with amendments.

Carnarvon.—For painting the council chamber, for the town council:—

Williams, W. O. (accepted)

Congham.—For the restoration of St. Andrew's Church, Congham, Norfolk (first contract). Mr. Herbert J. Green, Norwich, architect and surveyor:—

Cornish & Gaymer, North Walsham	£612 4 2
Larner, W. J., East Dereham ...	507 4 6
Boddy, J., Harpley, Swaffham* ...	503 0 0

* Accepted conditionally.

Cricklewood.—For alterations to shop and premises at No. 23, The Parade, High-road, Cricklewood. Mr. John Spink, 61, Holborn Viaduct, E.C., architect:—

Sage and Co.	£516 0 0
Neal	323 0 0
Wheeler, E.	314 0 0
Sumner and Co. (accepted) ...	295 0 0

(Architect's estimate, £276.)

Dawlish.—For erection of cattle shed at Longden Farm, for Mr. G. Ermen. Messrs. Norman G. Bridgman, A.R.I.B.A., and Walter H. Bridgman, M.S.A., Torquay, Paignton, and Teignmouth, architects:—

Brickwork: Reynolds, Starcross (accepted).

Carpentry: Blackmore, Dawlish (accepted).

Exmouth.—For alterations and repairs at the Criterion Inn, Exmouth, for Messrs. Ross and Pidsley, Well Park Brewery, Exeter. Messrs. Kerley and Ellis, architects:—

Letten, H., Exmouth (accepted)

Exmouth.—For the rebuilding of the Railway Hotel, for Messrs. Norman and Pring, City Brewery, Exeter. Messrs. Kerley and Ellis, Exmouth and Salterton, architects:—

Gibson, Exeter	£1,400 0 0
Skinner, Sidmouth	1,330 0 0
Abell, Exmouth	1,325 0 0
Hayman, Exmouth...	1,237 3 0
Perry, Exmouth	1,159 0 0
Dart, Exmouth	1,050 0 0

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INTERMEDDLING OF ARCHITECTS.

IN deciding a recent case, in which a number of architects were ranged on opposite sides, the late Mr. Justice Cave declared, "There were no such unsatisfactory men as architects"—a remark which may not go for much, except that it shows that architects are not quite so keen about professional honour and etiquette as they sometimes imagine themselves to be. "All is fair in love and war" is a maxim which holds good in matters of business as well. There are certain modes of conduct, however, which cannot be regarded in the same light—we mean the intermeddling of architects with each other's work, trying to obtain commissions by means damaging to others in the profession, and so on, and these are proceedings which cannot be excused by rules of fair competition.

Professional interferences are of many kinds. No one resents intermeddling more than the artist, for although the fine arts have been described as "non-monopolistic pleasures," those that are engaged in works of the kind are particularly jealous and exclusive, and will suffer little interference with their special craft. What would a painter or decorative artist say if his employer suggested any improvement in the composition, colour, or scheme of his work? In fact, we can hardly imagine any artistic design being produced under any restraint, or a designer carrying on his work assailed by continual prescriptions and suggestions. These interruptions to his ideas would be fatal to any success, as they would be to any literary or poetical effort. The architect, although more handicapped by commands, injunctions, and suggestions, should also refuse to compromise himself or his work. He has to put up with many of those interruptions and interferences in his ordinary daily practice. When his building is just about to be completed, some difference may arise between himself and the contractor as to the meaning of a specification clause; his certificate is disputed because a sufficient allowance has not been made for the execution of an extra. The contractor employs an outside architect or surveyor to inspect or measure his work. This kind of interference with the functions and duties of the responsible architect cannot be quietly submitted to, especially when there is an arbitration clause. To be told by an outsider that such-and-such a clause means so-and-so is really the same as being told that Mr. A. knows less of his own business than Mr. B. The dispute may be about the joists. They are specified to be of Baltic timber or red and yellow fir: the contractor has substituted, perhaps, almost as good timber of less reputable name. A.'s opinion is challenged by B. There are even more galling interferences. An architect prepares a design, say, for a homestead. The employer shows it to another farming friend, who finds several faults with the plan of the buildings. Alterations have to be made, or a large hotel is to be built in a provincial town. The promoters or manager desire the latest arrangements and appliances seen in the best London and Continental hotels. After much study the plans are prepared; but a member of the committee who has a friend an architect in London submits the plans to him. A new set of plans are prepared which, while incorporating all that is good in A.'s design, comprises several modern ideas and experiences. These plans are submitted to the committee, who approve of them, and architect A. is instructed to revise his plans on B.'s model. Of course, Mr. A. highly resents B.'s interference; and, to say the least, it is very unprofessional. B.'s friends on the committee do everything to get him employed. This is no unusual instance of what happens every day. The intermeddler steps in just when the design has been completed, and the company are about to issue their prospectuses to the public. Till then he remains in the background. There are plenty of these interlopers in every profession, but the architectural calling is full of them. Every competing architect can remember the after-competition "freebooter" who comes in to gather up the spoils of his competing brethren by appropriating their ideas, and finally submitting plans which combine the good points of the premiated "first" and "second," comes in for the commission after the premiums have been awarded. The non-competing buccaneer is an "artful dodger," and knows a thing or two better than competition. Many municipal surveyors have been credited with this doubtful pre-eminence. But, after all, the man who tries to supplant another by submitting a design after the original conception has been finished, is the most offensive interloper, defying alike all considerations of professional etiquette and conduct. A few members of that august body which have their headquarters in Conduit-street have not been altogether reproachless in this respect, though as a body they hold such conduct up to deserved censure; but then, of course, we cannot blame a society for the individual delinquencies of its members. The practice of which we speak is common enough, and there may be palliating circumstances in certain cases. For example, an architect who has a good ordinary practice, a parishioner and a church-goer, is requested by the vicar to prepare a design for a new chancel and fittings. This he does according to his lights, which may not be particularly ecclesiastical or correct; in due course he submits it to his client and churchwardens. A wealthy parishioner promises to subscribe to the building fund only on the understanding that a design by an expert ecclesiastical architect is carried out, and the committee are obliged to accede to the request. They are compelled to make a clean breast of it to the original architect. His rival is consulted by the committee, and he agrees to prepare designs without inquiring whether any other plans have been accepted. The committee gets out of their arrangement with No. 1 as well as they can. His plans will not pass the requirements of the ecclesiastical authorities. A sensitive man may well feel offended on being told his design is not quite up to the recognised standard, and he may also be indignant that another architect has submitted plans. But really the second architect has not done so surreptitiously: he is unaware that anyone else has been asked to act professionally. If anyone is to blame, it is the vicar, for not having arranged with his parishioner friend conditionally, or the committee who give instructions to prepare a design through their chairman, the proceedings being entered in the minute book. Of course, the man who is superseded by another in the same work is naturally resentful. However superior the design of his rival may be, he is not readily disposed to acknowledge such superiority: he thinks rather of the disappointment and the rebuff of being supplanted by another. These interferences, unpleasant as they are, generally arise through some ill-advised appointment. Friends and committees are apt to consider that if a church, or a building of a special kind, is to be built, Mr. Brown will do as well as anybody else, without making the slightest inquiry as to his fitness or the class of practice he is in. If they were going to a medical man they would probably be more careful. In this way we often see a specialist ousting a general practitioner, and we may point to it as a warning to those who engage architects for kinds of work they have little experience of. All this is very different to thrusting one's self into the notice of a client who has had plans prepared by another, offering to design and carry out a house at less cost, &c., which nothing but a sense of professional honour or proper etiquette would prevent. Much has yet to be done by the leading bodies of the profession to inculcate this discipline, and it is generally the more blatant and arrogant that are found the greatest transgressors in this respect. The professional touter is always most indifferent to the disciplinary rules of his own class. Perhaps the most obnoxious kind of intermeddlers are those who are ready to give evidence of the most contradictory and conflicting character in courts of law, who for a small fee are prepared to swear to almost anything on the slenderest of evidence. In this direction, too, much has yet to be done by public and professional opinion. How can a man actually say, for instance, that in precisely similar circumstances he would have done something quite contrary to avert any failure of foundation, or that Mr. Smith's charges are twice as much as they ought to be? Cases are common in which the witnesses on one side swear exactly the opposite of the other side; that some material is bad, like mortar which is approved by the other; and this sort of thing is so common that the late Mr. Justice Cave the other day, in a case decided at Nottingham, remarked: "There were no such unsatisfactory men as architects, for they were always at the opposite poles to one another." They were always contradicting one another on the simplest issues.

Intermeddling with buildings erected from the designs of others is another kind of interference which is worth attention. One of the questions put down for consideration at the recent congress at Brussels was whether it is right for an architect to finish portions of an old building that is left incomplete, and it is one that opens a large field of inquiry. For instance, Truro Cathedral was left unfinished, though it is happily now being completed by the same architect. Suppose another architect had been employed to complete the design: would it be justifiable for him to finish the fabric when its designer was still living? And scores of churches, mansions, municipal, and other buildings are in the same condition of incompleteness. Years or months elapse, and another architect is employed to carry out the design in the lifetime of the original architect. Is it professional for Mr. B. to step in and receive instructions for the completion of a building designed by Mr. A., supposing the work to be of an elaborate and highly-artistic description? We think the consentient voice of the profession would be, "No." The man who conceives the design of a building, or who begins a book or a play, should be employed to finish it. It would be unjust to him to give it to another to complete who might not have the appreciative faculty to carry it out in the same spirit. We are speaking only of designs of a special character in which the art qualities are conspicuous. If it was merely adding a bay or two to a church nave, or the lengthening of a factory or railway station, Mr. B. might do it as well as Mr. A., who was not accessible. Other questions arise. Suppose an architect is engaged to complete the design of someone else. Ought he to follow the original as closely as possible, or add something that is entirely fresh? Suppose it is the completion of, say, the Government Offices at Whitehall. For the sake of unity, the blocks should be repeated as nearly as possible, or, at least, the same

style ought to be maintained, especially if the buildings complete a great quadrangle, or front a main street. What would have been the effect if the Louvre had been completed in different styles, we can imagine; though that group of buildings shows various alterations and additions from the time of Francis I. to Napoleon III., which can be noticed in contrasting the work of Lescot with the later angle pavilion of Place Louis Napoleon by Visconti. Again, no one could complete Inigo Jones's fragment of a palace at Whitehall in any other style. But it is not always desirable to follow the original closely; it is more independent and honest to add a new portion intended for a different purpose in a style that is really modern, even if by so doing the unity of the design is weakened. But this is a large question, and there are so many governing circumstances that it is impossible to lay down a general rule as to whether an architect is justified in repeating or altering the design of his predecessor. The tradesman, too, interferes with the architect's work. Does he not introduce to the employer a chimneypiece of nondescript design, elaborately overwrought with coarse mouldings; or a new pattern electric chandelier or bracket, in a style completely at variance with the building? If the architect remonstrates, he is told by the employer that as he "has to find the money, he wishes to have his own taste gratified, or that of his wife," so the very offensive manufacturers' design finds its way into the best room of the house. The intermeddling maker of cheap fittings and furniture will sometimes frustrate the intention of the designer. Such things as cast-iron verandahs, overmantels, and the like may dispense with the architect's help entirely; the clergyman of a new church may much interfere with the architect by selecting the pattern-in-stock reading-desk, pulpit, font, and reredos from a church-furnisher's catalogue, and the so-called "art furnisher" will often use his influence to procure for himself the furnishing and decoration of a large residence. And how many persuasive arguments may be used to enlist the patronage of such men as Mr. Midas, a millionaire, who wishes to build a residence free of all trouble. The "universal provider" firm or company will undertake the design and furnishing of a complete residence in the "latest style," taking all responsibilities of contract and the trouble of selecting an architect and builder for a given sum. All personal trouble and extras are saved. To the matter-of-fact business man who does not trouble about peccadilloes of art, but wants "something up to date," this plan of agency is much more attractive than the employment of an architect: he can have exactly what he wants. The ready-built dwelling has a charm for him despite its crudeness and want of design. These are some of the influences against which the architect has to contend. His work is beset by a host of tradesmen and agents, contractors and others who endeavour to dissuade the employer from obtaining designs, or who, if they should fail, seek to interfere with his design by various pretexts: that of accomplishing the same result by cheaper means, making more display, and catering for fashion and novelty.

CLASSES AND LECTURES.

THE educational bodies are busy preparing their programmes for the coming season, and the younger members of the profession will naturally turn their attention to them after a period of touring and rest. The very natural question with the young student who has been serving his apprenticeship is "How can I obtain that amount of general and practical knowledge which is necessary for me to acquire? I have learned all an architect in practice can teach me: can draw, trace, copy specifications, make estimates, help to take out quantities, assist in making working drawings, and have seen buildings in progress; but there are numberless things I know nothing about, except from desultory reading and hearsay." He turns to the prospectus and syllabus of one of the several colleges—like King's or the City of London College;—but probably only to find that it gives a number of courses of subjects of rather bewildering complexity, which he thinks he can learn just as well from good treatises, and for much of the rest, as the exercises in building construction, he believes he knows it all sufficiently well for ordinary business. Whether he does or not, we do not presume to say. But one thing is clear: a pupil of intelligence who has been industrious and has served his term of articleship in the office of a general practitioner, has acquired in the only way possible all the instrumental means or methods for carrying on the business. We do not say he has learned the *rationale* or the reasons for doing this or the other, or that he knows any branch theoretically; but he has learned just so much of the *modus operandi* of his craft as will enable him to carry out a building of an ordinary kind—say a house. And this is what he cannot learn so completely by attending classes, however excellent. As a matter of fact, they are theoretical and disconnected, and the practical workshop practice is of much the same character; the applications are not real, but assumed. It is one bay of a vault without reference to other parts of the structure. It is one roof-truss, or partition, but not intended for any particular building; and so of examples of masonry or joinery and ironwork. They are separate and disjointed studies—useful, but without connection with the building. What the student wants is a knowledge of principles that will enable him to apply his practical routine learned in the office to the best account, and these principles are best acquired in the college or school before he goes into the architect's or engineer's office; but if he does not learn them at this early stage, he should be taught them in the lecture or classroom which may be attended during his term of apprenticeship or afterwards. And what Mr. Deacon has said about the education of engineers is equally true of the training of architects. There is danger in the limitation of compulsory subjects in the examinations for certificates or degrees. The student is coached up in one or two subjects to the neglect of other equally important matters. We know, for example, that in some of the colleges mathematics is made one of the main subjects, and if the student is at all an adept in it, he spends the larger portion of his time on studies of this class, to the neglect of other subjects of more practical importance. We are glad to see that the City of London College provides for classes and art studios. The former include practical sanitary science, quantity surveying, civil and mechanical engineering, valuation, technical drawing, and building construction. Too much attention also is given to the copying old buildings, dates, and styles instead of trying to encourage the student to design for special purposes. Mere draughtmanship is accepted as a proof of art qualification, instead of being looked upon as the mere instrumental means. We published last week some particulars of the Central School of Arts and Crafts in Regent street, and we recommend to the notice of our younger readers the prospectus issued by the Technical Education Board of the London County Council. The instruction given by this school is mainly confined to branches of design and technical craftsmanship which bear on the artistic trades, and those who are admitted are mainly carrying on those trades. To those engaged in the building crafts, including architects, builders, and decorators, as well as the designers in various branches, modellers, &c., the school is open, and offers decided advantages over the ordinary art and technical schools, which only cultivate the amateur element of art, drawing, painting, and manipulation, while they afford no help to the young architectural student or designer who wishes to acquire a workmanship standard instead of the mere copybook and example ideal of his art. The first school is devoted to teaching professional branches on received academical and theoretical methods, but applied to architecture and building; and the other inculcates by another and more logical process, the methods of design as applied to certain distinct objects and materials. Both have their sphere. It will be a long time, if ever, we can hope to revert to the methods of our ancestors, when art was spontaneous and growing, before the modern student will turn from his scholarship and textbook mode of learning to the methods of the old craftsmen; but we hope a large number of our leading students will avail themselves of the teaching of the School of Arts and Crafts.

Comparing the facilities now offered to the youthful apprentice and student to those which existed in the forties, we can only say the student of to-day has only himself to blame if he neglects his opportunities, which are infinitely more easy and inexpensive. The architect's pupil of fifty years ago had to acquire all the elementary and theoretical principles of his art to a large extent by personal study and reading, at least as regards the application of mathematics or science to building art. There were no art and technical schools in the provincial towns, and even the books at his command were few, inadequate, and expensive. Not that we mean to infer that these modern facilities make men better architects or artists. They cannot do this. They may even be prejudicial in some respects, by distracting the student's mind with a multiplicity of subjects and methods, and by leading him to bestow less concentrated study and attention on important branches and principles. We fear, indeed, as we here suggest, that this has been the case. "Cramming" and "coaching" have interfered with a natural order of study and intellectual digestion and assimilation. These drawbacks, however, need not be: they are only part of the price the modern student has to pay for the abundance of facilities and opportunities which an advanced age has placed within his reach. And competition is another of these drawbacks—really the cause of all that is objectionable in the methods that are now in use. Cramming has been practised to pass students who have not the time or talent to devote themselves to study; an attempt to squeeze through a man of slenderest attainments. Lectures and classes and studios are valuable means of teaching and acquiring things which no member of the profession can despise; but let them be naturally resorted to, instead of being made irksome, or a trial of mental acumen in answering a number of questions of no practical consequence.

SAINT MICHAEL'S PARISH CHURCH, SITTINGBOURNE, KENT.

[WITH PHOTOLITHOGRAPHIC ILLUSTRATIONS.]

FEW parish churches have survived without curtailment, which at one time seemed imminent, or possibly even total rebuilding in an unsympathetic style, an ordeal which, it will be noticed in course of this paper, this fine and thoroughly Kentish example has at various times undergone. The existing building is to be traced from a smaller Romanesque beginning, the only portions of which, however, now standing above ground are the eastern and western walls of the transepts and parts of the pier masses in its vicinity. Externally, you will not fail to observe the contrast between the admirably-dressed flint-work of the Early 14th-Century period, referred to in the "Glossary of Architecture" under

"Masonry," and the rough flint construction of the earlier builders. The original outer walls followed the lines of the present pillars and arches in the nave and Archbishop's chancel, and their foundations are occasionally exposed. The first enlargement of the earlier church took place in the 13th century, when those portions of the central chancel which include the recessed mural arcade and plain lancet windows were added. Some time afterwards the present nave and aisles and the basement of the tower, as high as the graceful western arch, were developed and completed by the early years of the 14th century. The old outer nave walls were, in this instance, thrown down gradually as the works proceeded, and not pierced with arches, as was usual in this county. The smaller church did not extend further than the west end of the present nave. The arches in the body of the church are set upon alternate round and octagonal pillars, including the responds of the chancel arch; there is no hood-moulding on the aisle side. Making allowance for a vandalism committed on the Eastern responds in the 15th century, the whole building west of the chancel arch is a well-designed composition, the work of one mind. It is illustrated in Bland's "Arches, Piers, and Buttresses," but without the deformity to be presently referred to. The Lady-chapel was erected by Simon of Chilton early in the 14th century. In the south wall of the chapel there is an elaborate Geometrical window—once of five lights, now of three only. This design, evidently by the same hand, was repeated at the west end of Brecon Priory church in harder stone, and therefore with less ornament. In the interval between the well-directed works of the 14th century and those of the next, the eastern wall of the central chancel was set a little further back, the triplet of lancets removed, and a smaller window than that still remaining in the Lady-chapel, of similar design, was inserted, which remained till 1859. Externally, beneath the modern central window, the masonry is mere rubble, and the north-east buttress was placed diagonally to resist thrust. The sacristy chapel was then no higher than the sills of the lancet-windows, which were open, or intended to be, to admit light. During the 14th century, also, the tower was increased in height from a well-marked line, and the shaftings, &c., of the first east chancel window can be seen built in on the north and south walls. The external niche in the buttress of the Lady-chapel, formed of a beautiful shelly oolite, is referred to as "St. Marie of the Boterasse." Old inhabitants remember a portion of the statuette *in situ*. Coming to the 15th century, the most important work was lengthening the old Romanesque transept towards the street, and the introduction of the grand Rectilinear window. Later on, Robert Wy Barn, bequeathed a sum of money to improve the rood-loft. It is still easy to see what was then done, although the screen and loft are left, and the stairs remain as reopened in 1872 by Mr. Payne; the eastern responds of the nave arches were on each side removed, and the arches above were rendered rampant by larger fresh voussoirs cut to a different sweep. The blemish caused is apparent in some of the diagonal views, in one of which six arches, whole, or in part, appear. At East-church you will see the screen uninterrupted by the piers as was effected here. In order to light the "jube" thus developed, two larger windows, in the style of the time, were inserted in each nave aisle; the case of one still remains. Minor alterations, such as heightening the sacristy till its former lean-to roof was continuous with that on the north nave and Bayford aisles, also took place. At the end of the century, the tower was finished off by a battlement and a stringcourse. It had been designed to be higher. During the work, one-half of its northern wall was rebuilt in ragstone, and also a vertical half of the eastern wall. In each face so renewed, the Transition single-light openings in the ringing-room and a two-light traceried window in the bell-loft were reinserted; the north-east tower buttress was then altered from the Early English character of the rest. The inner door of the porch, the vaulting, and two little Transitional windows are of this period. In July, 1762, a great calamity happened. The whole roofing was destroyed in an hour by a plumbers' fire during a high wind, and this stately building, hitherto uninjured by fanatical violence, with all its ornaments and part of its furniture, was destroyed, and stood in ruins for over two years, in consequence of delay respecting the four chancels. The old clock was preserved. In the following December, the parochial committee that had been appointed immediately after the fire, and empowered by the parishioners to "speedily rebuild and ornament the church," sent for George Dance, the celebrated architect of the day. After his visit on the 21st, he reported at the George Hotel, that, in his opinion, "the walls, pillars, and arches were strong and good, and, with little repair, fit to be built upon." The walls had been previously covered by straw—16 tons of lead being saved—and, after further delay, the nave and aisles were reroofed under the direction of one John Boykett, of Milton, at a cost of £488 2s. 3½d. The nave was provided with a semicircular ceiling, and Italian cornices ran in all directions along the walls, and also into impossible places at the return ends. All the chancels, after narrow escapes from demolition, were ultimately roofed over by a pack of hedge carpenters. Archbishop Secker exercised a very helpful influence in all matters submitted to him. The large Pointed window-heads, including the great Perpendicular one, were all cut off by the ceilings, and, with the exception of this and the Geometrical example before referred to, all others within the building were deprived of their traceries, mullions of Portland stone, where necessary, being substituted. This mode of treating church windows did not even then give entire satisfaction, for, in the vestry book, I find the following question raised, "Whether the Gothick work should be removed from the east window?" All the painted glass, remarkable for its heraldry, was thrown away. Five years after the fire, the church was reopened. Nothing much, but further examples of vandalism, was done to this patched-up temple till 1844, when, at the instruction of Mr. Vallance, Mr. Willement restored the south aisle west window. This work was followed, in 1859, by another member of the same family, who presented the chancel window. Under the advice and direction of the late Mr. Slater, the second east window was then removed. The present and third design is an acknowledged mistake. It would not be difficult to effect a good restoration on 13th-century lines also of the mural arcade. In 1862 Mr. Slater restored the transepts and the large window, then in a most revolting condition. During 1868, the south-east window in the aisle was replaced by an exceedingly bad design. It is but fair to mention that Patten, of Rochester, was paid an extra sum above his contract, so dilapidated was this opening at the time (1765), and when finally removed, whole pieces of the arch had fallen out; still, it ought to have been restored. In 1873 the late Mr. R. H. Carpenter entirely reroofed the nave, and raised it to the old mark against the tower. But, in consequence of his never having been told that the church had been burnt, he formulated his plan on Boykett's works, and reproduced the semicircular ceiling, this time tricked out in fancy-dressed Gothic versus block cornice, the whole being done at great expense. Shortly afterwards the church began to spread, and extensive centrings and shoring were promptly erected. In this way Mr. Alcock gradually reconstructed all the great piers. The restoration of the traceries has since been a gradual work.

Mr. Grant, the present warden, has been very conservative on the north aisle. The exterior of the plain chancel blocked lancets shows each to have two deep jambs divided by slightly sunk chamfers; there may have existed shaftings, as in the Roman-cemented western doorway. Traces of half-figures in frescoes are seen upon the round pillar in the north aisle, and are similar to the faces observable in old glass at the end of the 14th century. The compound pillar between the central and south chancels differs from all the rest in being built in ragstone—not fire-withstanding like those opposite. The remainder are of Reigate firestone. The ragstone pier, not only lost one of its shaftings, but became scaled during the conflagration. The only repair at the time was effected with brick rubbish, and the work was also subjected to occasional patchings with Bath stone. Quite lately a gentleman from London has inserted a sham base to a portion of wall which was, till 1878, part of the crypt, a small portion of which was then cut off in altering the steps; further casing has also been effected. In the prosecution of these works the stability of the column has been rendered uncertain. The whole church within the past twelve months has been entirely renovated and restored at a cost of about £3,800, under the direction of Mr. W. L. Grant, architect, Sittingbourne, Kent.

C. S. F. Palmer, A.R.I.B.A.

CHURCH OF ST. MARY THE VIRGIN, OXFORD.*

[WITH LITHOGRAPHIC ILLUSTRATIONS.]

THE Clarendon Press is to be warmly congratulated on the excellent manner in which Mr. Jackson's admirable and long-expected book has been printed and produced. The author, as might be expected, has made a worthily conspicuous addition to the University library, once more confirming his well-merited reputation as a scholar and accomplished artist. There is, however, something in this instance, quite apart from the binding and printing of the volume, quite beyond its literary matter and its accompanying illustrations, which inspires the reader with a special interest. It is the reason why the book was undertaken, and how it came about that the particular opportunity occurred which afforded so busy a worker as Mr. T. G. Jackson, R.A., a sufficient motive to engage upon so serious an enterprise. Everybody who takes an interest in such affairs well remembers, of course, about the controversy concerning the restoration of the famous spire of this notable church three or four years ago, and few will have forgotten the exceedingly unfair way in which Mr. Jackson, the architect engaged to repair the building, was treated by some so-called antiquarians in the daily newspaper press. Of course, as all were aware who had any acquaintance with Mr. Jackson or his work, the ultimate result of his plans for mending this building would amply justify the anticipations of the authorities responsible for the maintenance of the church. The detailed drawings of St. Mary's had to be made for the purpose of these repairs, and, in order that the architect might accomplish his task in every sense satisfactorily, he made researches into the history of the fabric. Thus a very extensive subject was opened up, and to those who are not intimately acquainted with the early history of Oxford, the account of the large part played by the familiar church of St. Mary the Virgin in the academic history of the city, as recorded in Mr. Jackson's pages, will place the relation of its record in quite a new light, as the story is unfolded in the brief sketch of the beginnings of the University, interwoven as it is with the history of this church. "The history of St. Mary's during the Middle Ages, is, in fact, the history of the University of Oxford. Scarcely any event of importance occurred of which it was not the scene, scarcely any movement towards the development of University life which did not originate within its walls. Here the parliament of the University met in Convocation, disputations were held, and degrees conferred. Here hung the bell which summoned the clerks to arms, when the tocsin of St. Martin's at Carfax pealed forth to rally the citizens for a fray. Hither were the mayor and burgesses forced to come in penetential guise yearly on St. Scholastica's Day to attend a solemn mass and make offerings for the souls of the clerks who had been slain on the fatal 10th of February, 1354. Here, too, was begun the formation of a public library, and, from the few parchments which were here chained to desks, or locked up in chests, has grown one of the greatest libraries of the world." In St. Mary's were housed the slender worldly goods of the University, and during the Middle Ages it was the official church of the University, its senate house, its divinity school, its library, its court-house, and its treasury. "Architecturally, St. Mary's is not unworthy of its history. In spite of frequent repairs and renovations, it still retains much of the charm of antiquity and the beauty of its Mediæval design. The great steeple, unrivalled in its way, solid and severe below, glorious above with pinnacle, gablet, and statue, is like no other: it has an individual, distinctive character that well suits the unique historical position which St. Mary's occupies."

Mr. Jackson carefully, and in a spiritedly-graphic manner, traces the doings which have been done, and the several leading incidents which occurred at Oxford during the several centuries since St. Mary's merged from the obscurity which surrounds its immediate origin. When we consider how prominently Oxford figures in the history of our Church and Constitution, it hardly needs a second thought to realise how many distinguished personages pass before the reader, as the author leads him on from scene to scene, each replete with interest, and all affording the writer opportunities for the display of impartial

* The Church of St. Mary the Virgin, Oxford. By T. G. Jackson, R.A., Architect. Oxford: at the Clarendon Press. 1897. 36s. net.

judgment and a power of selection, qualities generally conspicuous by their absence in works of an antiquarian character such as this. Moreover, there is an absence of the merely "dry-as-dust" quality in Mr. Jackson's graceful pages, as he imparts a living force to many a forgotten event, or depicts an existing remnant of a bygone age with an artistic touch as tender as it is truthful. The plan of the church is so drawn as to display its different dates, the Lady Chapel, by Adam de Brome, and the old Congregation House, located on either side of the tower to the north of the church, and both subsequent additions to the plan. The tower thus placed at the end of a sort of short transept at the east termination of the aisle is very uncommon. A painstaking elevation by Mr. Peers illustrates its entire exterior very clearly. No clue exists as to the identity of the architect of this exquisite steeple, which stands alone in individuality of interest and grace of design, without a predecessor and with no successor. The design of the pinnacles is so unusual and complicated that, without the help of scaffolding, no correct drawing is possible, and without a plan the design is unintelligible, so that an excuse for the inaccuracy of hitherto published drawings is granted, though for the mistake made in Pugin's "Specimens," of showing the triangular, and also the oblong pinnacles as if they were square, there is no explanation. The irregularity of the angle piers is remarkable: no two are alike in width or in projection; some even overhang the buttress piers below without any apparent reason; some of the niches are half as wide again as others; some contain figures, and some were evidently never intended to do so. The statues were partly modern, made by Mr. Dunbar, a sculptor of Edinburgh, in 1850, under the direction of Messrs. J. C. and C. Buckler, the architects of the restorations, then done when about 40ft. of the upper part of the spire was rebuilt. Sir Gilbert Scott was called in to report on the dangerous condition of the spire in 1856, only three years after Mr. Buckler's work was completed. The cracks were cut out, and, by a scheme of iron rods, the structure was tied together in so admirable a way that it is difficult now to trace any of the fissures or settlements named in Scott's report. In 1861 the same architect restored the exterior so drastically as to render the work almost like a new building. Fortunately, the Classic porch was saved. The church, thus refaced and patched up with Taynton stone by Buckler and afterwards by Scott, suffered from decay to such an extent that, had they used Headington stone itself, their work could not have perished more rapidly. A quarter of a century had not passed before finials and crockets began to fall from the steeple and parapet, and the heap of fragments housed in the Congregation-house was increased by every storm. In 1889 one of the statues fell and imbedded itself in the ground close by the north door. Nearly half the finials on the steeple had fallen or were ready to drop, and not a single pinnacle on the body of the church retained its top, and so it came about that in 1891, Mr. Jackson was called in, and he has restored the building. One figure only in the niches of the spire was sound enough to be retained. Eight of the old figures were falling to pieces. Mr. George Frampton, A.R.A., was the sculptor employed for the eleven new statues now erected, and the old ones are in the Congregation-house, of which we give Mr. Jackson's interior sketch. The cost of this work of repair, so well done under Mr. Jackson's personal supervision, was £11,633 3s. 10d. The stone used was the hardest bed of the Clipsham quarries in Rutland, except the capstone and first few courses of the spire, which are of Purbeck Portland—a stone as hard as marble. The restoration of the parapets and pinnacles has yet to be completed. In the volume before us there are detailed photographic illustrations of the statues which both architect and sculptor had intended to be treated as original works, made as good as Modern Art could make them, not copying the mannerism of the old work, though preserving its general feeling, and, of course, paying due consideration to the surrounding architecture. This view was, however, overruled, and where the old figures existed the University decided that the new statues should be copied from them. Thus, therefore, in the case of nine figures, the old statues served as sculptors' models, the missing portions being modelled on them in clay, and the stone pointed from them in the usual way. The other three new figures, for which no ancient authority existed, are treated with greater freedom. Two of these are illustrated in the book before us, viz., Walter de Merton and St. John the Baptist. The old decayed figures are also photographed. We close Mr. Jackson's monograph with the conclusion that he has performed a difficult and, in some respects a thankless, task both lovingly and well. A charmingly written book forms a fitting memorial and a valuable record of a restoration of which he has good reason to be proud. The renovation is a useful work artistically realised.

THE INSTITUTE OF AUCTIONEERS.

THE council of this Institute, which numbers close on 900 members, met the London and Provincial members at Cardiff on Thursday morning in last week, in the Town Hall, where they were welcomed by the mayor, Mr. E. Bevan, in the council chamber. There was a numerous attendance at this autumn meeting. Amongst those present were Messrs. J. F. Field, the President, George Brinsley, Frank Everill (Worcester), W. Rolland Peck, E. Dobson (Bradford), J. Hepper (Leeds), James Turnbull, A. Burnett (Southampton), C. F. Margerson (Chesterfield), A. G. Dilly (Huntingdon), W. E. Cross (Macclesfield), G. W. Fortescue (Clapham Junction), H. E. Ramsay (London), W. A. Dew (Bangor), and Charles Harris (secretary).

The mayor of Cardiff offered a hearty welcome to the members of the Institute. They would note, he trusted, the marvellous development of the great and growing town, and help them to a further growth in the future. He should ask them to look upon Cardiff as the metropolis of Wales, and as taking a place amongst the largest and finest towns of the kingdom. Their port was, he considered, not only the largest, but also the finest in the country, and, he thought, in the civilised world. Their exports of coal alone had risen in the last few years from three, four, and five millions of tons annually to sixteen millions of tons last year. They had no desire to stop this growth. Again, the population had increased from 1,018 at the beginning of the century to 170,000 at the present time. Mr. Field, the President of the Institute, thanked the mayor for his gracious welcome, and expressed the pleasure of the members at their first peep of Cardiff—the wide streets, the spacious houses, and the handsome official buildings which graced the town.

After a champagne lunch, Mr. Field took the chair as President, and Mr. Alexander introduced a deputation of auctioneers from the South Wales district, who desired to form a branch in connection with the Institute. They desired affiliation, but to be under the direction of a local council, because of the method of business peculiar to the district. Business was conducted upon a credit system, which was probably unknown in other districts. The deputation represented the whole of South Wales. Mr. T. Parry, J.P., Newport, and Mr. S. Hern, of Cardiff, supported the application. The president, in reply, expressed his gratification at receiving the deputation, and assured them that the question would receive the most careful consideration at the hands of the Council.

Following the reception by the Mayor, a meeting of the Council was held, under the presidency of Mr. Field, at which gentlemen were present from all parts of the country. The financial statement, read by Mr. Harris, showed that there was a surplus in hand, after paying off all liabilities, to the amount of £360. With regard to the library which is being formed at the London office, report was made that donations continued to be received, and that quite lately £40 had been received. A large number of new members were elected, bringing up the total to 940. A discussion ensued with regard to an increase in the number of members of the Council—from 27 to 29, and this was generally approved, while it was recommended that the new councillors should be chosen as representatives for South Wales with Monmouthshire and the Birmingham district. Finally, it was resolved that the next quarterly meeting of the Council should be held in London on Dec. 10.

In the evening the Council and members of the Institute were entertained by the local committee at a smoking concert, held at the Royal Hotel. Mr. James E. Gunn, of Cardiff, was in the chair, and in addition to those already named, the following were present:—Messrs. J. H. Townend Green (London), R. Buckell (Oxford), C. Appleton (Leeds), E. Dobson (Bradford), J. Catling (Cambridge), J. A. Taylor (Huddersfield), Douglas Young (London), M. Morgan (Cardiff), T. Parry (Newport); and the following belonging to Cardiff:—Messrs. G. S. Giller (secretary), S. Hern, C. Clarke, C. E. Dovey, J. Thomas, S. M. Wilkinson, and H. Williams.

On Friday morning the members of the Institute, to the number of one hundred gentlemen, proceeded by special train, provided by the Barry Railway Company, to the Barry Docks. The visitors were taken round the docks in steam launches, and Mr. D. T. Alexander informed them that, whereas there were no horses employed about the docks, the number of their engines had increased from 20 to 100. After completing the round of the docks, the party were taken to Whitmore Bay, on Barry Island, thence to Dinas Powis, the residence of Mr. Alexander, in whose grounds he entertained the visitors, who afterwards proceeded to the Bute Docks and the Dowlais Works. In the evening the council and members dined together in the Lesser Park Hall under the chairmanship of Mr. James F. Field, the president of the Institute. There were 150 gentlemen present.

The Mayor of Cardiff proposed "Success to the Auctioneers' Institute." He said success in the present day could only be obtained by an institute having a good cause and great enterprise. They were justly proud in seeing such an Institute amongst them, and under such a president as they had. The Institute must progress and grow rapidly. They were banded together with one firm and determined purpose, to make their Institute a success. In numerical strength they were nearly a thousand strong, and their object was an honourable and legitimate one. He wished the Institute every success in the future. The chairman, in responding to the toast, said with regard to the profession in which they were all interested, as they had received benefits, so they desired to secure them for those who would come after them. They were not going to degenerate into a mere trades union, and to try and put every man on the same level; but they were desirous of giving every man the opportunity of developing the ability which was in him for the benefit of himself, his family, and those who employed him. These were legitimate interests which they were banded together to promote. He hoped that those present would believe that they had come to give their hearts in exchange for the hearts of those they had come to visit, and that for the future they would be banded together in one common band of friendship. The Welsh National Anthem was then sung by a native choir amid much enthusiasm. Mr. John Heppes proposed "The Trade and Commerce of Cardiff," and Mr. J. Duncan responded. The last toast was that of "Our Guests and Visitors," to which the Mayor of Oxford (Mr. W. R. Dew) and Mr. H. Forrest responded.

The very successful proceedings were brought to a close on Saturday morning by a visit to Cardiff Castle, the seat of the Marquis of Bute.

THE SANITARY CONGRESS AT LEEDS.

THE sixteenth annual congress of the Sanitary Congress is being held this week at Leeds, and is being attended by between 800 and 900 delegates from all part of the kingdom.

The proceedings were opened at noon on Tuesday, when a reception of the members was held in the Council Chamber of the Town Hall at which the Lord Mayor (Sir James Kitson, Bart., M.P.) offered a hearty welcome to the visitors. Afterwards the members attended a public luncheon at the Yorkshire College. Mr. B. Womersley (chairman of the Leeds Sanitary Committee) presided, and there was a very large attendance.

The President (Dr. Robert Farquharson, M.P.), in the course of his address, said that the work of the institute had now passed through three distinct stages. Having at first been ridiculed and afterwards opposed, it had finally come to be accepted by public opinion. Ventilators were no longer stuffed up; the working classes, no less than their employers, were beginning to be connoisseurs in the quality of their atmospheric conditions, enjoyed a good wash as much as a University graduate, and were fully prepared to appreciate the advantages of hygienic house accommodation at other people's expense; so that the institute had reached the stage of enthusiastic acceptance and universal approval, and the sanitary reformer was as much petted and caressed as he was once scouted and despised.

No properly-instructed person, in these enlightened days, would dream of taking a house without a thorough inspection of, and report upon, its sanitary arrangements; while water analysis and food analysis kept us fairly free from adulteration, and most of us knew pretty well the amount of help given us by the law in keeping our health fairly sound. Quoting from Herbert Spencer that "the first requisite of life is to be a good animal, and to be a nation of good animals is the first condition of national prosperity," Dr. Farquharson went on to protest against the monotony of much modern labour, arising from the specialisation and minute subdivision of employments. It interfered with the full and harmonious development of the bodily organs and faculties, and was hopelessly at variance with the common-sense laws of health. If they took away the stimulus of ambition and the wish to excel in any pursuit or work, so much more did the work become flat and stale, if not unprofitable; and if a man knew that by showing a superior capacity and superior zeal and energy he could not get ahead of the dull drone who worked by his side, then he became a mere machine. During the last quarter of a century, the English death-rate had been reduced from 22 to 18 per annum, by the joint labours of sanitarians in the prevention of disease, and of doctors in curing it. He quoted Professor Matthew Hay, of Aberdeen, to the effect that no great further reduction could reasonably be expected. A death-rate of only ten per 1,000 would mean that everybody born would live to be 100 years old. Probably it would be found that the natural elements of decay in men, as in all living things, which made eventually for death, independently of environment, would not permit of a lower general death-rate than about 14 to 15, even under the most favourable hygienic conditions being reasonably attainable. So that by the time we had gone as far in reducing the death-rate as we had come in the past quarter of a century, we should have reached the ultimate minimum. But it would certainly not be in another quarter of a century. After a glance at the excellent sanitary work done by the officials of the Local Government Board, under the direction successively of Sir John Simon, Sir George Buchanan, and Sir Richard Thorne-Thorne, as well as at the writings of Mr. T. Pridgin Teale and Professor W. H. Corfield, Dr. Farquharson spoke of the improvement which had been effected in the health and comfort of the members of the House of Commons by the exclusion of sewer-gas from the building some 10 or 12 years ago. This sanitary operation had been of national importance in improving the health and temper of our senators, and enhancing the quality of their work. Dr. Farquharson next sketched some of the dangers to health which seem to be inseparable from the crowding together of great populations in towns, and discussed the means by which these dangers might be diminished. Among those dangers he made special mention of diphtheria, and explained its increase, in the words of a private communication from Sir R. Thorne Thorne, as being due to the herding of our child population in elementary schools at the very age at which they are most susceptible to the disease. The increase in diseases of the nervous system, and especially insanity, was referred to, and attributed to the increasing stress of modern life; and the most pressing sanitary questions of the day, such as the provision, wherever possible, of extra-urban dwellings for the working-classes, were briefly considered. The president entertained a very poor opinion of the House of Commons in its dealings with public health. Both sides, he declared, were bad; but that to which he belonged was the worst, for a deep-rooted suspicion of scientific methods and of progressive sanitation existed in certain Radical quarters, and abstract views of personal liberty and distrust of the so-called tyranny of doctors swayed a kind of plausible sentiment which was usually irresistible in its paralysing effects upon hygienic legislation. In such a state of feeling, a private member could do nothing until sanitary questions were taken up by the Government of the day. He looked forward to the appointment of a Minister of Public Health as the means, eventually, of obtaining for these questions the considerations which their importance demanded.

During the evening an exhibition devoted to sanitary purposes was opened in a building in Camp-road. The exhibition, which will remain open till October 9, is divided into four sections. The first comprises appliances of a domestic character; the second includes articles of food, and also disinfectants; the third is representative of house sanitation; and the fourth is mainly occupied by heating and lighting apparatus. A lecture-hall is located at the top corner of the building, where popular demonstrations of the utility of sanitary science, made clear by the aid of a magic lantern, are given. The judges of the exhibits are: Mr. T. W. Cuttler, F.R.I.B.A., Mr. Rogers Field, Professor A. Bostock Hill, Mr. H. Law, C.E. (Newcastle), Dr. A. Newsholme, Professor J. Lane Notter, Dr. Lewis C. Parkes, Dr. Reid, Mr. J. Osborne Smith, F.R.I.B.A., and Mr. W. C. Tyndale.

On Wednesday all the six sections of the Congress met in the Town Hall, Municipal Buildings, School Board Offices, and other public buildings.

In the section for Medical Officers of Health Dr. Edward Seaton presided, and in his opening address said that among the chief glories of the Victorian era it might be claimed that enormous advance had been made in sanitation, and yet he contended that the rural populations of England were not protected, especially in the matter of house sanitation. There was much to be accomplished, and the remedy would mainly be found in endowing representatives of wide areas with greatly-increased powers of control. In this section a paper was read by Dr. J. Brown on "Poisoning from Canned Foods," in which it was urged that in view of the number of deaths from the use of these foods, some immediate legislation was absolutely necessary. He suggested that glass should be used instead of metal for the purposes in question. The great difficulty would be, he admitted, the increased cost this substitution would necessarily involve.

The Sanitary Inspectors' Section was presided over by Mr. T. Fyfe, Chief Sanitary Inspector of Glasgow, and in his address he dealt more particularly with the ventilation of workshops and factories. He argued that at the present time there were three outstanding needs so far as sanitary inspectors were concerned. The first was systematic and high-class instruction and examinations recognised by the laws of the three kingdoms. The second, an equitable scheme of union, close and indissoluble, between every sanitary inspectors' association. The third, a legalised basis upon which every inspector might feel absolutely secure, both as to the tenure of his office and the comfort of his old age.

Major Laverock Flower, engineer to the Lea Conservancy Board, who presided at the Conference on River Pollution, said that years of experience had confirmed the opinion he held in 1876, that, if we were to have our rivers purified, the whole country should be mapped out into districts, each under a competent sanitary officer, who should have large powers under conservancy boards formed to legalise his acts. There was not a single pollution in which there was not a remedy that in many cases would benefit the manufacturers. Chemical science was sure to find some means of purifying or cleaning effluents from factories which would be effective and remunerative; and, if manufacturers ceased to discharge refuse into the sewers, the treatment of sewage at the outfall would be rendered less difficult. At present sewage, to use the words of the late Dr. Tidy, was a very complex fluid. Legislation on the subject was inefficient. He held that the remedies were mainly improved legislation, the abolition of all special clauses, and making the fouling of streams a penal offence. Much might be done by individual action; but with respect to river pollution, no half-measure should be adopted. What the country required was a firm and sound Act of Parliament conferring compulsory, and not permissive, powers upon competent men in each watershed, who, by personal influence, could induce pollutors to abate their nuisance. The thing which lay at the root of the matter was waste, and he advocated that the sewage of a country should be returned to the land to produce a fresh supply of food. They should try to get rid of the sewage at a reasonable cost; but, if at a loss, still the preservation of springs, streams, and rivers from poisonous contamination was of infinitely greater importance. There was an enormous amount of waste in the discharge of trade refuse into streams; but these products might be turned to value for the good of the manufacturer, as well as for the good of the country. In conclusion, he asked, looking to the question from all points of view, and well-nigh in despair of obtaining such an enactment as would coincide with the views of all persons interested, why should they not combine in a guild, and endeavour to bring co-operative principles to their aid? Let the members of such a league act upon the principles which had governed the Fisheries Preservation Association. He submitted that such an association was quite possible, and, if properly organised, might meet with the success which had been remarkable in other societies with different objects.

Dr. G. Sims Woodhead followed with an address on the various processes taking place in tidal estuaries which had for so long been regarded as receptacles for sewage. It was essential that these estuaries should be relieved of the sewage matter usually deposited there, and he thought that in the near future they would work hard to keep out of such estuaries all sewage matter whatever.

Mr. R. E. Middleton, in a paper on "River Pollution from an Engineer's Point of View," said no chemical treatment of sewage was sufficient to produce an effluent of satisfactory purity. All sewage matter might be efficiently treated by filtration through sand and gravel, in the same way as water was filtered, though at a slower rate and with more frequent periods of intermission. The Local Government Board were opposed to this system unless it was supplemented by an area of land sufficient to purify the sewage should the filter break down. This, although apparently a short-sighted policy, was not really so, owing to the want of care and attention in connection with many sewage-disposal works.

A novel feature in the day's proceedings was a conference of ladies upon the health work of women, at which Mrs. Fawkes, of Farnley Hall, Leeds, presided. She congratulated the many ladies present upon the official recognition they had received from public sanitary authorities. The first woman inspector was appointed by the Nottingham Corporation in 1892. Since that date, 18 others had been appointed in various localities. A resolution calling attention to the good work that had been done in Manchester and other large cities by women inspectors, and urging the desirability of one or more women being appointed in Leeds, was passed. Mrs. R. W. Eddison gave a verbal sketch of the health department of the Yorkshire Ladies' Council of Education, and Miss Ravenhill delivered an address upon "Women as Teachers of Hygiene."

Yesterday (Thursday) was devoted to the delivery of Presidents' addresses, followed by the reading of papers and discussions thereon in each of the three sections into which the work of the conference is sub-divided. Section I., "Sanitary Science and Preventive Medicine," was held in the Town Hall, and was opened by an address by Dr. T. Pridgin Teale, F.R.S. In Section II., "Engineering and Architecture," held in the adjoining Municipal Buildings, Mr. Lewis Angell, F.R.I.B.A., M.Inst.C.E., the veteran borough engineer and architect of West Ham, gave his inaugural address as president; while the president of Section III., "Chemistry, Meteorology, and Geology," Mr. William Whitaker, F.R.S., introduced the subjects to be considered in a speech delivered at the Town Hall. In the afternoon a garden party was given at Manston Hall, by invitation of the Sanitary Committee of the Leeds City Council, and in the evening a popular lecture was given to the Congress at the Albert Hall, by Mr. H. Percy Boulnois, M.Inst.C.E., the city engineer of Liverpool.

The programme for to-day (Friday) provides for the reading and discussion of papers in all three sections, and for a conference of bodies on matters of domestic hygiene. In the afternoon visits will be paid by the members to the refuse destructors, the electric tramway, the new corporation baths, and to Roundhay Park; and in the evening a lecture will be given at the Albert Hall by Dr. Philip Boobbyer, medical officer of health for Nottingham.

The proceedings, which thus far have been very successfully carried out and numerously attended, will be closed to-morrow (Saturday) by visits to various works and an afternoon excursion to the new Royal Baths at Harrogate.

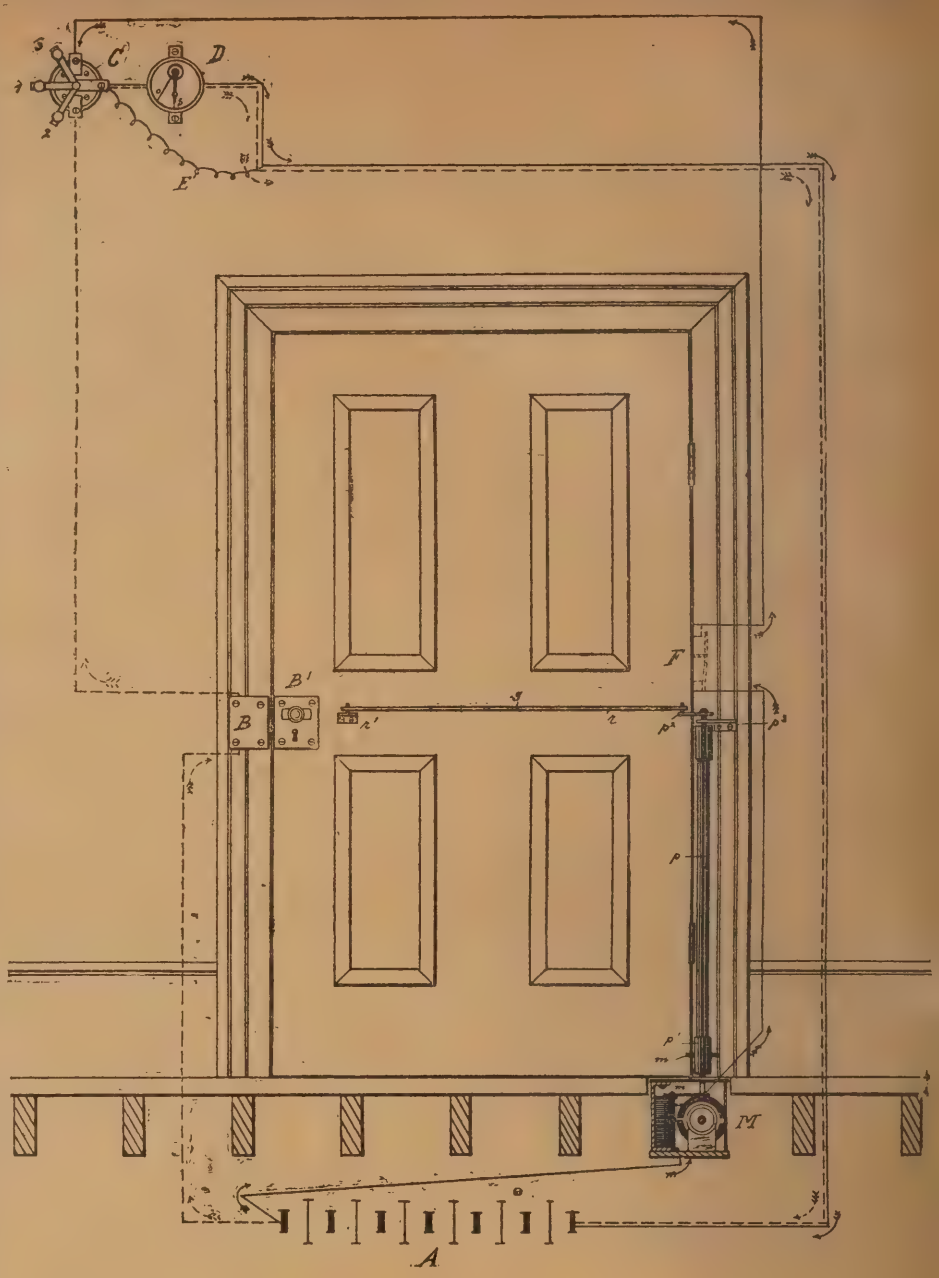
A NEW TRAVELLING CRADLE.

In the repair and painting of buildings of considerable height, the ordinary suspended cradle and tackle apparatus have many disadvantages: they are cumbrous and costly, and

can be adjusted only with difficulty. Mr. Edwin Palmer, builder and decorator, and contractor for lofty cradle work, of 250, Westminster Bridge-road, has patented a travelling cradle that is much safer and simpler in its operation than the large boats or cradles used by painters. Mr. Palmer's apparatus does not interfere with the pavement; it is easily fixed and worked, being simply moved over the front of the building by the men in the cradle. We have seen the application of Mr. Palmer's travelling apparatus, which is now at work on the repainting of Southwark Bridge, and we have no hesitation in saying that it is extremely simple and easily worked. The suspended cradle or platform for the men is hung by blocks or runners of special design on a steel wire rope about ⅝in. diameter, stretched across one archway of the bridge, 216ft. span, which will enable the painters to complete their work without further shifting the tackle, which thus saves the scaffolding, extra labour, and time employed upon it. This steel rope is tested to carry eight tons, which is ample strength for two men in the cradle. It can be easily fixed on a building with high roof by means of short poles, or cantilevers. The suspended cradle, which is easily raised or lowered by simple blocks-and-fall tackle, can be moved laterally along the steel rope by the men in the cradle. The latter is only of 6ft. length, and much lighter than the ordinary boat. The apparatus may now be seen at work at Messrs. Clutton's, Whitehall-place, and was used at a very short notice in lighting several hundred lamps to a front on the eve of Jubilee Day, where ladders were not allowed. Mr. Palmer thus claims by his invention the principle of working by side guy-ropes, and a stretched head wire-rope. The tackle is easily adjusted to any building, and the extreme lightness of the apparatus is the main thing in its favour. The patent running-gear of this invention saves much expense, the use of travelling cranes and other appliances, and a large percentage may be saved by its use in plant and labour. We recommend it to the attention of all architects, building contractors, and the authorities of our public buildings.

AN IMPROVED MEANS FOR OPENING AND CLOSING DOORS BY ELECTRICITY.

THIS invention, which is patented by Mr. S. L. Cambie, 456, King's-road, Chelsea, relates to a new and improved means for opening and closing doors by electricity, for use in offices, flats, and warehouses, where automatic opening and closing of doors would be a great saving of time and trouble to the occupants. It is very simple, and is a great improvement on the old lever-and-chain arrangement, which was constantly getting out of order, and which required great force to operate even when worked at a short distance. Moreover, the door was only opened, there being no means for shutting it again, and, as seven out of ten will come in without thinking of closing the door after them, the house is often left in a very unprotected state. This invention provides a simple and efficient means for opening and closing doors by electricity. It consists of a bolt-releaser, motor or turning mechanism, switch, and indicator. These parts can be seen in their proper positions by looking at the illustration, where B is the bolt releaser, M the motor, C the switch, and D the indicator. The switch and indicator are placed close to one another, convenient to the apartment from which the door is required to be opened. The method of working is as follows:—The switch hand, normally in the position marked 1, is turned to position 2, whereby the current passes from the positive pole of the battery through, and operates the bolt-releaser B, the switch C, and partially the indicator D, and shunt E back again to the battery, as shown by the dotted lines. The bolt releasing is thus accomplished, and the hand of the indicator caused to point to the word "open." The hand of the switch is now turned to the position 3, whereby the current passes, as shown by the continuous lines and arrows through the motor M, spring contact-piece F, indicator, and shunt back to the battery. By this last motion of the switch, the motor is set going, and its motion is transmitted by means of the vertical rod p to the crank p^2, which is rigidly connected to p. The crank p^2 is connected by means of its pin to one end of the rod r, the other end of which is hinged to the door near the lock at r^1. The rod r, actuated by the crank p^2, exercises a pulling motion on the door until



the said crank has made a half-revolution, the door being then at right angles to the position it occupies when closed. Continuing its rotation, the crank will, through r, effect the closing of the door. The current is then automatically shut off by means of the spring contact-piece F, and the hand of the indicator falls to the word "shut."

The motor or turning mechanism is very simple. It consists of two Siemens armatures mounted at right angles to each other on a common spindle, and they revolve between two field-magnets. Each field-magnet and armature is wound as a separate shunt machine, and the two connected in series. The bolt-releaser is also very simple. It is affixed, as shown in the illustration, to the door-post or jamb in juxtaposition to the lock. It consists of a vertical cylinder having in its periphery six equidistant vertical recesses, which are sufficiently wide enough to receive both the key-bolt and the spring bolt of the lock. It is also further provided with six equidistant ratchet teeth on its upper end, which engage with a lever suitably pawl-shaped at one end, pressed against them by a spring. The other end of the lever is provided with an armature, which is attracted by a vertical electro-magnet when the switch is turned to position 2, whereby the pawl is lifted free from teeth of the vertical cylinder, which is then free to rotate, and the spring-bolt and key-bolt, if the latter is engaged, are liberated from the notch. When the door is being closed, the bolt, or bolts, re-entering the same notch from which they have just been liberated, cause the cylinder to rotate back to its original position, where it is firmly fixed by the pawl. The indicator is a very useful adjunct, for by its means the person operating the switch is always certain that the door is shut or open.

If a bolt-releaser is all that is required, the device B can, of course, be used by itself, and the turning device dispensed with. Nor is the indicator necessary; but as it does not add much to the expense, it is always well to use it. It is evident that by the use of this device the release of a bolt is easily accomplished, and, as the bolt glides readily into the recesses in the cylinder, no slamming of the door is necessary in order to shut it, and consequently the life of the lock is considerably lengthened.

IRON AND STEEL TANKS.

WE have received a revised and illustrated list of Messrs. Burney and Co., of the Iron and Steel Tank and Barrow Works, West-ferry-road, Millwall, London, E. The list contains the net prices and sizes of galvanised iron cisterns, tanks, cylinders, cattle troughs, corn bins, &c. Messrs. Burney and Co. keep a large stock of cisterns and tanks, and of suitable plates, &c., for other goods, and all these are tested before delivery. Several sizes of galvanised iron open-top cold-water cisterns are given which tabulate the dimensions, thickness of plate, gallons, &c., enabling a builder to select the size of cistern and price. Loose covers with handles are priced at 9d. for ⅛ plate, and for different gauges. The gauges most in demand are 16-gauge 20 to 80 gallons, 14-gauge 100 to 300

gallons, 12-gauge 350 to 400 gallons. These cisterns are made with angle iron and corner plates at top inside. We have also here galvanised iron close-top hot-water tanks, iron and steel circulating cylindrical tanks, with side manhole or riveted top only. These tanks are made to hold from 20 to 100 gallons. The list contains welded wrought-iron tubes and fittings for gas and water of various diameters and prices, galvanised or painted iron water-cart tanks, ships' tanks, &c. The galvanised wrought-iron mangers and troughs of various shapes, the wrought-iron hay-racks and corn-bins, sanitary dust-bins, are worth the attention of all builders of stables and sanitary authorities. Cast-iron goods, gutters, soil-pipes and connections, covers and frames, a large assortment of plumbers' brass-work, and of patent steel barrows for various purposes, boilers of special types, iron wire netting, and other iron goods are illustrated. The prices are fully given in every case, and the list will be found a useful addition to the office of the architect and engineer.

HYDRAULIC CEMENTS.

THE value of the admixture of puzzolanas with Portland cement for hydraulic masonry has been generally admitted. On old writer on limes and cements, Mr. Higgins, refers to the value of the mixture of these deposits. A paper read before the American Society of Civil Engineers by Mr. Andreas Lundteigen points out the discovery in Nebraska, Colorado, and other localities, of large deposits of this earth. A discussion on the paper showed that there were some who disapproved of the mixture. It has been strongly advocated, however, by others, notably Dr. Wilhelm Michaëlis, of Berlin, whose paper on the "Hardening of Hydraulic Cements containing Lime" read at Stockholm explains the chemical action. He observes that the silicic acid is the most essential component of the hydraulic mortars; the more so, the richer they are in hydraulic silica, or the hardening properties under water. Hence, he observes, there is no better puzzolana than the hydraulic silica itself, which has been condensed by strong heating, or opal and Santarin earth among the natural puzzolanas, which are richer in active silicic acid than trass; for the richer these mortars are in hydraulic silica, the more quickly do they swell under the influence of the lime, and the more closed become their joints. He also alluded to the excellent effect of Santarin earth mortar in withstanding the action of sea water, and shows that the manner of setting of hydraulic mortars explains their unfavourable behaviour in the air. The hydration and swelling of the hydraulic factors cause, under these conditions, their decomposition in the air, where the hydrates of silica and alumina lose the water of hydration. "Hence the knowledge that the hydraulic mortars are the less resisting in the air, the more water used in them, and of the diminution of the swelling by using the minimum quantity of water, by compacting during use, and by adopting the densest possible mortar, is of great importance. In works in sea water, particularly in the use of hydraulic mortar in sea water, the main protection lies in closing the pores and fixing the lime. Both are accomplished in a pre-eminent manner by the addition of hydraulic silica capable of much swelling, for this silica fixes the lime on the one hand and closes the pores to the highest degree on the other hand. The mixture of Portland cement with active puzzolanas gives, therefore, the best and cheapest mortar ingredient for maritime works."

The Hereford County Jubilee memorial, a full-length portrait of the Queen, copied from Angeli's Jubilee painting, was unveiled in the Shire Hall, Hereford, on Wednesday. Mr. R. B. Paul was the artist, and the cost was borne by public subscription.

At the Lewes County-court, on Tuesday, before his Honor Judge Martineau, Stephen Myles, formerly a builder, of Seaford, applied for his discharge. His Honour commented on the fact that debtor had paid no dividends, had kept no books, and knew he was insolvent. Ultimately his Honour suspended the discharge for four years.

The Secretary of the Admiralty states that there is no truth in the statements which have been current that the Board of Admiralty had abandoned the plan of building a Naval College at Dartmouth on the site already selected. On the contrary, the necessary action is being taken for the immediate acquisition of the land, with a view to commencing the building of the college.

OBITUARY.

THE death has taken place at Chelsea, after a very short illness, of Mr. J. MILO GRIFFITH, the Welsh sculptor. When a boy in Pembrokeshire he commenced carving heads in stone under difficulties, for his father, a stern Calvinist, broke one of them, saying he would have no carved images in his house. With his mother's cognisance, he worked, however, in an outhouse, and afterwards obtained such technical instruction as was available. He first came to the fore at the restoration of Llandaff Cathedral, where he carved many of the stone capitals; but it was in 1870 that, at an industrial exhibition, his work attracted attention, and he presented several specimens of his carving to the Cardiff Free Library. His statues of John Batchelor at Cardiff and of Sir Hugh Owen at Carnarvon increased his reputation, and the Royal Cambrian Academy subsequently employed him. In 1883 he commenced exhibiting at the Royal Academy, and ten years later he sent in six pieces, and eight to the Walker Art Gallery at Liverpool. One of his Academy pieces, "The Flower Girl," was bought by Mr. C. R. M. Talbot, the then Father of the House of Commons. In 1883 he designed the silver shield given to the Prince and Princess of Wales from South Wales, and later he went over to the Chicago Exhibition, and was for some time professor of art in a college at San Francisco. One of his most successful works was a statue of St. Brelia in marble, and he was the inventor of the Helix button. His last work was a design for the proposed national memorial to Llewellyn ap Gruffydd, which he sent for exhibition to the recent National Eisteddfod at Newport.

MR. WILLIAM GALLOWAY, who has been employed for the last twelve or thirteen years in excavating the foundations of the old cathedral at Whithorn, died on Saturday evening, after a short illness. Mr. Galloway, who was about sixty-five year of age, was born in Edinburgh, was educated at the High School, and afterwards apprenticed to Mr. Patrick Wilson, architect, Queen-street, Edinburgh. He early took to painting, and has executed some paintings which were considerably admired. He turned his mind early to ecclesiastical architeccure, and few men were better acquainted with the details of the successive styles of ecclesiastical buildings. But old monuments of all kinds had a strong attraction for him, and his skill in deciphering characters characters on ancient stones was very great and exact. He was well versed in several languages, including Hebrew and Greek. Mr. Galloway was poet of some note, one of his best known works being "Twa Auld Whinstanes," and he was an author of several volumes, amongst which are "The Battle of Drofell," and "Augustine's City of God."

THE meeting of the Dublin Master Builders' Association, convened to be held on Friday in last week at the Grosvenor Hotel in that city, was adjourned out of respect to the memory of Mr. SAMUEL H. BOLTON, J.P., and a vote of condolence was passed to the family expressing regret at the death of "a much-respected and prominent member of the association since its inception, and one so honourably connected with the building trade of Dublin for many years"

CHIPS.

An organ, built by Messrs. Blackett and Howden, of Newcastle, was opened on Friday at the Primitive Methodist church in Durham-road, Gateshead.

The interior of the large chapel at New Hall Convent, at Chelmsford, has just undergone renovation. The work has been carried out by Messrs. W. Bishop and Co., of Duke-street, Grosvenor-square, under the personal superintendence of Mr. Edwards, of that firm.

The Victoria Gardens at Chatham were publicly opened by the Mayoress on Wednesday, in commemoration of the Diamond Jubilee, the Corporation having converted a portion of Fort Pitt Fields into a pleasure ground, under an agreement with the War Department.

The admirers of the late H. H. Richardson's greatest work, Trinity Church, Boston, will be sorry to hear that plaus have been made for building a ten-story apartment-house just across the street from the church, the appearance of which cannot but be greatly injured by the new structure. Presuming that the apartment-house will be carried to the maximum height permitted by law in Boston, 125ft., its cornice will rise higher than the stonework of the central tower of the church.

COMPETITIONS.

CARDIFF TOWN HALL.—In this important competition between 70 and 80 architects have already applied for particulars, including several Swedish and German architects, and there promises to be a keen contest. It will be remembered that Mr. Alfred Waterhouse, R.A., has consented to act as assessor, and that the premiums offered are £500, £300, and £200. The time allowed for preparing designs is unusually short, the latest day for sending in being December 4th.

DARLINGTON.—The streets committee of the town council have examined the plans recieved in answer to the advertisement for compe itive designs for the proposed improvement of the High-row. It has been arranged to exhibit the same in the council-chamber for inspection, and their further consideration has been adjourned.

DESIGNS FOR FURNITURE.—The council of the Society of Arts hold a sum of £400, the balance of the subscriptions to the Owen Jones Memorial Fund, presented to them by the memorial committee on condition of their spending the interest thereof in prizes to "students of the schools of art who, in annual competition, produce the best designs for household furniture, carpets, wall-papers and hangings, damask, chintzes, &c., regulated by the principles laid down by Owen Jones." The prizes will be awarded on the results of the annual competition of the Science and Art Department. Competing designs must be marked "In Competition for the Owen Jones Prizes." No candidate who has gained one of the above prizes can again take part in the competition. The next award will be made in 1898, when six prizes are offered for competition, each prize to consist of a bound copy of Owen Jones's "Principles of Design" and the Society's Bronze Medal.

HALIFAX.—At the last meeting of the town council the mayor proposed that the council adopt the plans for the police station and county court, submitted under the motto "Victorona," with alterations as suggested by the sub-committee; that Messrs. George Buckley and Son, Halifax, the authors of the plans, be instructed to prepare working drawings, specifications, and bills of quantities, and obtain tenders for carrying out the various works required in connection with the erection of a police-station and court-house, at an estimated cost of £11,600, the buildings to be on the old infirmary site. The old infirmary buildings would be entirely swept away, and thus they would be able to widen Harrison-road. It was also proposed to have a large open area, and a covered drill-ground. The prisoners and police would enter from Carlton-street, the public from Ferguson-street, and the magistrates from Blackwall. Alderman Hodgson moved as an amendment that it be a recommendation to the council to have alternative plans prepared, and to obtain tenders for the various works necessary at an estimated cost of £9,000. Mr. Bottomley, who seconded the amendment, declared it would be a great waste of public money if the old infirmary was pulled down. Mr. J. T. Simpson said that instead of being one of the best buildings in the town, the old infirmary, he considered, was one of the worst. There voted for the resolution 29, and 14 against, and, therefore, the plans for the new scheme were adopted. The premiums in this competition were awarded some time since to designs sent in under the mottoes "Diamond Jubilee," "V.R.," and "Municipal"; but the council decided not to carry out any one of those designs.

LLANFAIR COUNTY SCHOOL.—At the last meeting of the Montgomeryshire County School Committee, a communication was read from the clerk of the Llanfair Governing Body, asking that a sub-committeee be appointed to consider further plans for a new school at Llanfair. Mr. Watkins, one of the members, stated that the Llanfair Governors had been placed in an inconvenient and unpleasant position. Some time ago the Llanfair Governors advertised for plans for the erection of the school, the advertisement plainly stating that the schools were not to cost more than £900. Mr. Shayler's plans were accepted, but the lowest tender sent in for the erection of the school according to the plans was nearly £600 in excess of the amount stated. The governors had made an application to the Charity Commissioners for permission to secure new plans, and the application had been granted. The Llanfair Governors now asked the county authority to appoint a committee to consider the new plans and pass them if they were suitable, so that there

need be no delay. The committee was duly appointed, and given power to act.

METROPOLITAN ASYLUMS BOARD OFFICES.—The managers of the Metropolitan Asylums District received, on Saturday, an order authorising the managers to purchase from the Corporation land on the Victoria Embankment at the corner of Carmelite-street as a site for new offices, at a sum not exceeding £53,000. Authority was given for the borrowing of the amount with a sum not exceeding £250 to cover expenses connected with the purchase. The chairman moved that the question should be referred to the Works Committee in order that the members might submit the name of an architect to prepare plans of the new building. No further delay, he said, ought to take place. Mr. Wells moved as an amendment, that the Works Committee should bring up the names of not less than three architects, who should be asked to prepare plans for the proposed offices. After some discussion the amendment was carried by a small majority, and adopted as a substantive motion.

WOLVERHAMPTON.—The Free Library Subcommittee of the town council were informed on Tuesday that the majority of the invited architects had consented to send in designs for the new building, and it was decided not to increase the number of competitors by throwing the competition open. The time for sending in the designs was, however, extended from the 14th to the 28th October.

CHIPS.

Mr. G. Barnes has been informed by the secretary of the Amalgamated Carpenters' and Joiners' Society that as a result of the ballot recently taken among the members of his society, it had been resolved by a large majority to make a general levy of 3d. per member during the continuance of the engineering dispute. This will bring an addition of about £600 per week to the strike pay fund.

A parish institute is about to be erected close to the church which was built a few years since at Kingstown, Portsea, from Sir A. W. Blomfield's designs. Towards the cost of the church the late Mr. W. H. Smith contributed upwards of forty thousand pounds, and Lady Esther Smith has accepted an invitation to lay the corner-stone of the new building on the 12th of October.

The new line from Stert to Westbury has so far progressed that the contractors have now laid their surface line for the whole of the distance, and have established a connection between Stert and Westbury. The making of the permanent way is being pushed on, and the stations and bridges are being erected.

The Streets and Buildings Committee of the town council of Edinburgh have made arrangements for a considerable development of the wood-paving scheme in the city. A commencement has been made this week with South Bridge-street, which is to be laid with wood between the Tron Church and the University. When this work is finished, Earl Grey-street will be dealt with in like manner, as also that portion of the north side of Princes-street not already paved with wood, extending from the south-west corner of South St. David-street to the Register House. Australian wood—jarrah and karra—will be used by way of experiment.

The directors of the North-Eastern Railway are about to carry out an extensive scheme of improvement in their main line. This will consist of widening the line between Tollerton and Shipton, near York; and between Thirsk and Otterington, near Northallerton. The tenders for these important and costly works will be required to be given in at the end of this month.

The Blackpool Town Council decided on Tuesday upon another important step for the improvement of the town, being in connection with the enlargement of the open fruit and fish market. The resolution was to the effect that the town clerk should seek, by an Improvement Bill to be introduced in Parliament next session, compulsory powers for the acquisition of property running along Market-street, Upper West Euston-street, and Lytham-street. This includes two hotels and a number of large business establishments, all of which are to be demolished in order to throw open the market.

Lieut-Col. A. C. Smith, R.E., Local Government Board Inspector, held an inquiry at Rugby on Friday, with reference to the application of the urban district council for sanction to borrow £11,500, being £8,470 for the purchase of 80 acres of land in the parishes of Bilton and Newbold for sewage disposal purposes, £2,700 for works of water supply, and £330 for purposes of street improvements.

Building Intelligence.

DUDLEY.—The town council gave their formal sanction on Tuesday to the proposal to construct a new theatre and arcades in the Birmingham-road by passing plans which have been prepared by Mr. A. Ramsell, architect, Dudley, subject to certain improvements to the structural arrangements. The site is close to the railway station and the termini of four tramway systems. The building to be known as the Opera House, which will be 150ft. wide at the front, will occupy the centre of the site, and be set back from the footpath 15ft. The cost of the undertaking is estimated at between £8,000 and £10,000. The building will be 53ft. in height from the floor level to the parapet. On each side of the central portico will be three smaller entrances, next to which will be the arcades, each of the latter being flanked by a shop. Shops will be constructed throughout the whole length of the arcades, which will extend round the theatre, forming a continuous covered promenade. The theatre will accommodate about 2,000 people. The stage will measure 36ft. by 60ft. There will also be a large rehearsal room, 36ft. by 25ft., and on the left of the grand staircase a lounge will be provided for the dress-circle visitors. The building will be heated with hot-water pipes and coils, and hydrants will be provided on each floor for the extinction of fire.

EDGBASTON.—On Monday the Misses Stokes laid the foundation-stone of the new church of St. Ambrose, Pershore-road, which is to replace a temporary church. The site, at the corner of Pershore and Raglan roads, has been given by Lord Calthorpe, and upon this is to be erected a building which will cost between £6,000 and £7,000. The designs, prepared by Mr. J. A. Chatwin, architect, of Birmingham, show a church of red brick, with terracotta dressings upon the outside, and Bath-stone dressings in the interior. The building will consist of a nave 90ft. long, with a chancel 36ft. long; north and south aisles, shallow north and south transepts, a choir vestry, with organ chamber over, clergy vestry, and an apsidal projection at the west end forming a baptistery. There is also to be a tower and spire at the north-west corner, and a south porch; but only a portion of the tower will be erected in the first instance. The spire, when completed, is also intended to be of terracotta, and will rise to a height of about 150ft. The architectural style is Gothic, with Flamboyant tracery to the windows. The floor of the church under the seats will be of wood, while the passages will be paved with Ruabon quarries. The church will accommodate 708 adults. The walls will be faced with bricks. Messrs. Collins and Godfrey, of Tewkesbury, are the builders.

GLASGOW.—The new art galleries now in course of erection on the southern fringe of the Kelvingrove Park, of which the Duke of York laid the memorial stone on Friday, are being built from the plans of Messrs. J. W. Simpson and Milner Allen, architects, London, which were selected in competition, and were illustrated by us as far back as our issue of April 15 and 22, 1892. The cost of the building designed by them fell not far short of £200,000, the contract price for the mason work alone amounting to £120,000, and the expectation now is that the building when completed will cost close upon a quarter of a million sterling. Some four years ago the first sod of the new galleries' foundation was cut, but as the work progressed the Exhibition Association began to feel the financial burden of the undertaking too severe a strain, when the corporation stepped in, and consented to complete the buildings. The buildings cover an area of about two acres. The galleries run east and west parallel with Sandyford-street, and the principal elevation fronts the park, viz., the north. The length of the building will be 400ft. and the depth 200ft. Including the basement story, in which the school of art will be quartered, the block will have three stories. Both at the main entrance in the north side and the Sandyford-street entrance there will be spacious vestibules, and from these there will be easy access into the central hall or into the galleries, which are to go all round the building on the two principal flats. On either side of the central hall there is to be a large court, and an arcaded gallery or balcony and promenade will go round the hall. The great hall is to be absolutely central, being planned on the bisecting lines of the site from north to south and east to west. Two hydraulic lifts will rise to the various galleries. The refreshment department will occupy a central position, and, while quite distinct from the museums and galleries, will be accessible from any part thereof. The buildings are to be fireproof throughout, and there will be a system of combined heating and ventilation, fresh air being introduced in basement ducts, warmed over batteries of steam pipes, and injected by means of a fan into the various galleries and rooms, downward extraction being provided for the vitiated air, which will pass away by the main extraction shaft. The buildings are being constructed of brick, the exterior being built of red sandstone from the Locharbriggs Quarries, near Dumfries, while some parts of the interior are being faced with white Giffnock stone. The exterior of the building is being treated as an astylar composition on severely Classical lines, but with Free Renaissance for details. Regarding the different apartments, it may be stated that the central hall will cover an area of from 10,000 to 12,000 square feet. There will be six galleries for art exhibits, two of them 94ft. 7in. by 25ft., and the remainder 93ft. by 28ft.; four pavilion galleries of 35ft. square, and four cabinet galleries 14ft. square. As to the museum, the east and west courts will be identical in size—105ft. by 64ft. The west gallery and the east gallery will be 94ft. 6in. by 37ft., and the other galleries, four in number, will be 93ft. by 28ft. There will be four pavilions of 35ft. square, and galleries will run round the east and west courts. In the school of art the elementary room will be 72ft. 6in. by 36ft.; the designing room, 35ft. by 20ft.; the antique room, 54ft. 6in. by 36ft.; the painting room, 36ft. by 36ft.; and the modelling room and clay store, 35ft. by 20ft. Masters' rooms and cloak-rooms are also included. Provision is likewise made for four offices, a library, a house of five rooms and kitchen for the resident attendant, manager's room, service rooms, larders, store rooms, sculleries, and pantries. The outer walls of the building vary in thickness from 3ft. to 4ft.

MAIDSTONE.—The ceremony of consecrating the new parish church of St. Luke, which is situate at the north end of Maidstone, was performed on Friday by the Rev. Dr. Eden, Bishop of Dover. The extreme length of the building is 121ft., width 58ft., and height 38ft. From the central beam the roof, which is of pitch-pine and tiled, slopes down on either side to the walls, which are about 10ft. high. In the design the architect has sought to embody the principle that every building, while exhibiting a knowledge of that which has preceded it, should not be merely a collection of archæological features tastefully combined, but that every part should indicate thought as to its purpose, construction, and artistic effect, and that the whole should at the same time possess unity and consistency. The new church, therefore, although Gothic in general character, lays no claim to be called Early English, Decorated, or Perpendicular. Neither can it be said to be a combination of these arbitrary distinctions of style. The design of many features is novel, such as the coupled shafts and bold segmental arches and mouldings of the nave arcade, the capitals of the chancel arch, the treatment of the east window of the chancel, and the west doorways. The fittings of the choir, including the seats for clergy and lectern, exhibit the same independence of treatment. The suppression of the customary clerestory, for the sake of insuring good acoustic results and preventing down draughts in the nave, has produced a low roof and its unbroken line from ridge to aisle walls. On the north side a small hexagonal tower, surmounted by a dove of beaten copper, has been erected, to serve as a bell turret, and forms one of the chief features of the exterior. All the doors open outwards on rollers. The west window, which is of an oriel pattern, has been made very large, to afford better lighting facilities, and immediately underneath it the baptistery projects out of the main building. The church seats 600 persons, although the pews, which are of Oregon pine, are only built to hold a congregation of 479. There are no stained-glass windows, though all the glass is tinted. Twin pillars of stone support the roof, and a feature of the building is the carving which has been executed in the stonework. In the arches of the nave are bosses of Scriptural animals and flowers. The church is heated by hot water, and lighted by incandescent gas-burners. Local ragstone has been used for the external facings, the windows, weatherings, copings, and some other

dressings. All the internal stonework, too, is of Monks Park stone. The roof is covered with Broseley tiles, and the bell turret with oak shingles. Messrs. Wallis and Sons, Maidstone, were the contractors. Mr. Ireson acted as clerk of the works. The whole, including the fittings, and furniture, was designed by the architect, Mr. W. Howard Seth-Smith, of London.

PAYHEMBURY.—The parish church, which has been closed for two years, was reopened on Friday, after having undergone renovation. The tower has been improved by the removal of the decayed stones, and the substitution of new material. A new clock has been fixed. The seats in the middle of the church have been repaired, and new ones are provided in the aisles. The roof has been treated with carving, and at the back of the altar there are three stained-glass windows. A memorial lectern is about to be placed in the church. The contractors for the work were Messrs. Northcott, of Ashwater, and Mr. Luxton, of Bridgwater. The architect was Mr. G. H. Fellowes-Prynne, of London.

ST. CLEMENT DANES.—A meeting of ratepayers, convened by requisition of the rector and churchwardens of the parish of St. Clement Danes, was held on Wednesday night under the presidency of the rector, the Rev. Septimus Pennington, who stated that this historic church would soon be in the hands of the restorer as a result of the Queen's Diamond Jubilee. The stands erected around the fabric in June last realised £5,750, and, legally, he was entitled to the whole of that sum. He had decided, however, to give the amount for the purposes of the complete restoration of both the exterior and interior of the church. The scheme of restoration and improvement included the repairing and redecoration of the interior, introducing an electric-light installation, repairing and restoring the organ, restoring the altar (which, now covered with stained wood, was found to be composed of costly carved marble), and the restoring of a chest in which the deeds of the church were deposited hundreds of years ago.

TYNEMOUTH.—The chairman of the Tynemouth School Board placed in position on Saturday a medallion of Her Majesty in the new building which is to be known as the Queen Victoria School. The school, which is being erected from the designs of Messrs. Marshall and Dick, architects, Newcastle, whose plans were selected in competition, will occupy a position at the corner of Coach-lane and Lovaine-place, North Shields, and when completed will accommodate 1,350 children, and in addition there will be a large cookery school for fifty girls. The first section of the scheme has been intrusted to Mr. Joseph Elliott, contractor. Mr. Moore is acting as clerk of the works. The arrangement of the school is on the central hall system. This hall runs the entire length of the school, and is lighted from the ends, the classrooms on each side, of which there are ten on each floor, opening directly off it. The hall on the first floor will be used for examination purposes or any large gathering. The school is intended to be used as an elementary school. There will be accommodation for 450 infants, and the remainder in equal proportions of boys and girls. The exterior treatment is in red brick with dressings of buff terracotta; the classrooms will be lined dado height with white glazed brick. The screens and other woodwork will be pitch-pine stained and varnished. The floors will be white maple wood. We illustrated the schools in our issue of May 15, 1896.

The Prince of Wales has accepted an invitation to pay a visit to Stammerham, Sussex, next month, to lay the foundation stone of Christ's Hospital (Blue Coat School), to be built from Mr. Aston Webb's designs.

A length of 1,100ft. of the new pier at Herne Bay has now been completed, and it is contemplated that by the end of the year another 1,000ft. will have been added. The whole structure of three-quarters of a mile is to be completed by May 30th next. The pier will have a large pavilion at the sea end and an electric tramway, the total cost being about £30,000. Messrs. Wrighson Head, and Co., of Stockton, are the contractors.

The heavy imports of timber this year have continued of late. Last month we imported £510,000 more timber than in August, 1896. The increased value is mainly in sawn timber, especially from Russia and from North America. The activity at the great ports of import is this year in excess of any previous period, but the stocks are now beginning to increase rapidly.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

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The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and Sixpence for every eight words after. *All Situation Advertisements must be prepaid.*

NOTICE.

Bound copies of Vol. LXXII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

PHENIG.—There is the Society of Architects' examination. For particulars, write the Secretary, St. James's Hall, Piccadilly, W., and enrol yourself as a student.

RECEIVED.—O. C. G.—W. A. P.—H. M. H. and Co.

Correspondence.

THE STORY OF A LECTERN—AN OBJECT-LESSON.

To the Editor of the BUILDING NEWS.

SIR,—When the Church Conference took place in Exeter in 1894, Sir Somebody Richmond read a paper, "Art and Architecture," in which he spoke in contemptuous terms of architects and art-workers generally, and bid the parsons present and their friends, if they really wished to avoid disappointment and see their churches worthily adorned, eschew all such, and apply to the real artist (such, we assume, as himself?) for help. That this advice has received consideration in some quarters is apparent by the experiences just incurred at a college school in the North, where the new chapel has been lavishly furnished at no little cost to those interested.

In the current issue of the *Griffin*, the school in question's monthly chronicle, is so amusing a story of how those concerned went to a prominent artist belonging to one of Sir Somebody's own particular school, and the disastrous results thereof, that I am tempted to give it *in toto*, simply suppressing names. Here it is:—

"We now come to the eagle lectern, subscribed for and presented to the chapel by the parents. To those who are unacquainted with the latter end of the unfortunate history of this generous gift, we announce, with very great regret, that the lectern has been rejected as impossible. As will be remembered by all connected with it, the sum of £85 was collected. After taking a vast deal of trouble to ascertain from art people the best place to go for an eagle, this committee intrusted the matter to Mr. ——, of ——. The latter forwarded designs for approval. These were of a very sketchy nature, and indicated no detail whatever, and were finally accepted by the committee on the strength of the artist's reputation, and his volunteered assurance that the finished work would be far better than any designs could possibly show. Mr. —— therefore undertook, for the sum eighty-five pounds, to turn out a lectern which should be good in construction and of artistic merit. He went to work, and we heard from time to time reports of his progress; how the lectern was exhibited at the Arts and Crafts in London, and how it elicited the warmest approval from all beholders. An illustration of the work, taken from the front, appeared in a newspaper called the *Builders' Journal*. Mr. —— also sent a photograph of it for the committee to see after he had received his cheque. It is only fair to the committee to say that this photograph was so extraordinarily bad that it might have been equally well meant to represent any other freak of nature or art.

"About the middle of this term the lectern arrived at —— ——. It had apparently been thrown anyhow into a coffin-shaped crate before being despatched, without the slightest attempt at packing. The result of this was that it arrived broken in half at the place where the bird was glued on with wooden dowels to the oak shaft. This, however, was put right by a carpenter with a gluepot in a very few minutes. It was then solemnly carted into the chapel and placed in position. To do it justice, it was not aggressively offensive when seen from the doorway at the opposite end of the building. The nearer one advanced, however, the more palpable its overwhelming defects appeared, till close examination revealed, in English, that the whole concern was a miserable failure and an unredeemed fraud. The body of the *soi-disant* eagle consisted of a hollow cylinder made from thin copper sheet, covered from the neck to thighs with thin pricked and hammered plates intended to represent feathers; but from the thighs downwards shaped into a bare and offensive rump, modelled exactly on the lines of a fifty-six pound shell. The cylindrical body was surmounted by a gnome-like head and beak. The former seemed to be incased in a tight-fitting nightcap, or smooth wig; the latter shaped like a diminishing socket and barbed at the end like a cod-hook. The legs were as thick in proportion to the rest of the creature, as the trunks of two well-grown oak-trees would be to a geranium. These legs were incased in rough trousers of the peg-top variety. Peeping out from the extremity of these limbs were two or three tiny claws, faintly indicated by the scratches on the surface of the semi-circular globe, on which the bird stood, and into which it had apparently sunk. Above the spherical rump, fastened to the middle of the back with small screws and furniture tacks, was a flat kite-like representation of wings and tail, also made of thin plates of hammered copper soldered stiffly together. For some reason best known to the artist, Nature's designs for wings had been abandoned, and an extra and very angular joint inserted in the black iron wire which ran round the edge where the bones would be in a live creature. Two blood-red beads did duty for eyes, and gave to the expression of the countenance a hideously tame effect, reminding one of a white mouse. At the lower extremity of the tail was placed an iron ledge apparently intended to hold a Bible. As the whole construction rocked and swung about if touched, we did not risk the safety of our best Bible upon it, even for an experiment. The shaft of the lectern was, if possible, worse in construction than the bird above it. It consisted of a roughly-planed tapering base of foreign oak. At the base of this were four panels in *repoussé* copper, said to represent four of the Prophets.

"Mr. —— had written several letters to the committee expressing his regret at having substituted Ezra for Jonah. He might have saved himself the trouble on this score. Having allowed us to pay our money, it would have been a small thing to have asked us to take our choice of prophets. However indifferent to the effect produced on the public by their personal appearance these Hebrews may have been, we doubt if even the mildest-mannered man amongst them would have clamoured for recognition as the original of any one of Mr. ——'s blotchy hieroglyphics.

"Even if the execution of these hammered panels had been good, their effect would have been annihilated by being raised only 6in. or 8in. from the floor. Beneath them, the woodwork spread out into a very cheap and vulgar moulding, supported on four gilded balls; most of the

gold had been rubbed off, either in transit or before sending, revealing nothing more precious than the iron underneath, covered with a coat of paint. The carpentry work of the shaft was beneath contempt; the little ledges of wood above the panels being glued on instead of being (as any novice knows they ought to have been) worked out of the solid. The general effect from a short distance was that of a moulting and moribund crow, clinging with paralytic limbs to the top of a gate-post, and spending its last energies in laying a monstrous egg. A most depressed and depressing *fowl*, as one of the committee called it.

"The same evening that this bird was unpacked, a letter was written to Mr. ——, begging him in the most courteous language that could be used, to allow this work of his to be returned to him, as wholly unsuitable to our chapel, and asking him to refund one-half of the money paid to him by the committee in final settlement of the whole matter. This he declined to do, on the curious ground that he was not a 'shopkeeper.' It is unnecessary to enter into the tone of Mr. ——'s letters, or the nature of his witticisms. Suffice it to say, that after questioning our right to 'make away on the grounds of Mr. ——'s personal taste with what he had been given to understand was a gift to the chapel,' he was presented with two more books full of the opinions of other people who had seen his lectern, and who will have to use the chapel. These opinions were not exactly fulsome in their flattery, even in the case of the only two out of the whole collection which expressed a qualified approval of Mr. ——'s work. The eagle was variously described as a dodo, a blasphemous creature, an obscene beast. The artist replied that no opinions in the world made the slightest difference to him; that the only judges in such matters were 'the body of artists who from time to time pronounced judgment on works of art, as they had done, when they accepted his lectern for exhibition at the Arts and Crafts.' Here matters rest at the moment. For the past three weeks Messrs. Morton and Co., of 79, Bold-street, Liverpool, have had the lectern on show in their shop-window. They have advertised it for sale in the papers. Many people have been to see it; but no one has offered to buy it. In the opinion of experts who have examined the work carefully, £10 to £20 is the very outside figure which we can hope to get for it, even after finding someone who likes it. The simple reason for this is that the value is not in it. The woodwork might all have been done by a village carpenter's apprentice, and the panels and other hammered stuff would be child's-play to a Toynbee Hall mission class of boys raked out of the streets and encouraged, without any technical training whatever, to amuse themselves by hammering flimsy sheets of brass and copper into some sort of shape. If any of our readers happen to be in the neighbourhood of Bold-street, Liverpool, it will be easy for them to call and see for themselves how little credit this bird reflects upon the maker, and to judge for themselves of the effrontery of a man who could offer such a jerry-built amateurish abomination as adequate exchange for 85 sovereigns. Had the bird been dug up in a field somewhere, one would have felt inclined to say that it was a creditable performance for some rustic monk of the 12th century, who had never seen an eagle, and who had never been taught to hold a chisel or drive a nail. There are still some slight hopes that matters may be arranged by which Mr. —— shall take the eagle back and refund some reasonable proportion of the collected money. Meanwhile it is best to look upon the whole sum as lost."

I may add, a sketch of the *rara avis* accompanies the above description, and quite suggests that the above scathing critique is by no means overdrawn.
—I am, &c., Harry Hems.

Ecclesiastical Art Works, Exeter, Sept. 10.

POOR MORTAR.

Sir,—The letter of "A. H." in your issue of the 3rd inst. contains a statement that the building inspector said that "good mortar deteriorates by being kept after mixing," and also mentions the fact that sand and dirt spoil the quality of mortar. These observations serve as a peg on which to hang the following remarks.

Mortar made with anything but lime and sand does not deserve the name of mortar, if it is to be used for laying bricks. The chemical action that occurs in making mortar is something on this basis—I advisedly say "something," because the action is too complex to pronounce a definite statement.

Limestone, when burned, becomes oxide of lime (CaO, chemically called calcic oxide). This body, when slaked with water (H_2O), becomes calcic hydrate—i.e., slaked lime ($CaOH_2O$). This hydrate of lime is a ready absorber of carbonic dioxide (CO_2, commonly called carbonic acid) from the air, whence the calcic hydrate becomes converted into calcic carbonate (carbonate of lime $CaOCO_2$), of which chalk is a very pure specimen. Now, the hardening or "setting" of mortar is due to the action that occurs in the conversion of the calcic oxide (quicklime) into calcic carbonate, for while this chemical reaction is taking place, there is a chemical action also occurring between the lime salts and the silica of the sand, whereby there is a more or less partial silicate of lime produced, which sets hard as stone. Now the hardening of mortar is due to the formation of this silicate of lime, which binds the particles of sand together in a closer bond, according to its production: the more silicate of lime produced, the firmer or harder the mortar becomes. From this fact, it is easy to see that any material which lessens the chemical reactions occurring in the lime and sand also lessen the cohesion of the particles of mortar; and hence mortar made with lime, sand, and any third material, such as garden-mould, cinder-ashes, builder's rubbish, &c., will never properly harden.

Again, let us consider the case of lime exposed to the air. Limestone, when burned, becomes converted into quicklime (CaO)—*i.e.*, oxide of calcium—and this quicklime, when slaked with water, becomes converted first into hydrate of lime, and then, on exposure to the air, into carbonate of lime; but by prolonged exposure to the air, the carbonate of lime becomes reduced again to calcic oxide, because the CO_2 in the $CaOCO_2$ (calcic carbonate) forsakes the CaO, and thus leaves it in its original state; but although such CaO is still quicklime, or oxide, it does not possess the energetic chemical action which quicklime does when freshly burned; consequently slaked lime that has been a long time exposed to the air does not make such good mortar as does lime which has been freshly burned and slaked.

Your correspondent "A. H." mentions the act of the old Romans keeping their mortar in pots for two years before using it; by such keeping there was a formation of silicate of lime carried on, and consequently when such mortar was exposed to the air, it rapidly set or hardened. If, however, such mortar had not been kept in pots, but left exposed to the air all that time, it would have become practically useless as a binding material, owing to the great amount of CO_2 which the lime would have imbibed (any builder knows that there is no binding property in a mixture of chalk and sand when mixed together with water). In the case of the early Italian fresco painters, they used to put the lime for years in caves or pits before use, so as to cause it to lose its causticity by the gradual expulsion of the CO_2, and then produce a "fat" CaO, which, when laid on a surface as a fresco ground, would quickly imbibe CO_2 from the air, and thereby inclose the colour in a layer of carbonate of lime, which held the paint secure against atmospheric influence and vapours.

It has been a noticeable fact that the death-rate in Birmingham during the past few weeks has been abnormally high—as much as 42 per 1,000, and in Wolverhampton even higher than that. A few facts will throw light on the cause. The Birmingham sewers are notorious as being overrun with big fat rats, which burrow their way into houses, and consequently permit of the ingress of sewer-gas into dwellings. Another factor in engendering disease is the great diversity in the levels of the drains and sewers in and around Birmingham. The city is built on several hills and slopes, and therefore it is impossible for the sewer-levels to be constant, like those of London. As a consequence, stagnant pools of sewage remain for a considerable time undisturbed. But chief of all the causes that have brought about the high death-rate is the large amount of jerry-building that is being carried on around Birmingham. During the last ten years the growth of the suburbs has wonderfully increased, and the ubiquitous "jerry"-builder is everywhere in evidence. Now, apart from the shoddy nature of the structures erected by such men—porous bricks, ill-fitting doors and windows, shaky floors, thin slates for tiling, &c—the chief sins of the individual are that the erection of most of these dwellings is on "made ground"—that is, hollows which have been filled up with dust-bin rubbish and garbage of all kinds, even road-scrapings, mud, and slush; the employment of mortar composed of a very little lime, any kind of sand, and a large quantity of sifted ashes from dust-bin rubbish, and the use of a plaster of mud on the walls. These shoddy erections are euphemistically called villas. They consist of a "reception and dining-room and three good bedrooms, with hall entrance, vestibule, &c." (save the mark!—they would be called workmen's cottages in London), rental 6s. weekly. The writer knows for a fact that the contract for all the brickwork in such villas is often taken at £15 per house.

The culmination of all these evils is this. The foul emanations that rise up from the ground on which the building is erected give rise to diphtheria and other blood and lung troubles. The bad mortar allows the walls to be perpetually damp. An hour's shower of rain will make any outside wall, which is usually only a 9in. one, so saturated with wet as to require a week's dry weather for such wall to become dry again. The mud that has been plastered in the interior of such walls also emits a most offensive stench, perfectly unbearable within 6in. of the wall. When the plaster becomes damp from the moisture that has penetrated through the bricks, there is a constant emanation of a germ-breeding effluvium from the plaster that is a most prolific cause of throat and lung diseases to all who sleep in such rooms, while the damp, fætid odour that arises from the ground underneath the basement-boards or tiles is supposed to cause paralysis in six months. Apart from all these evils, the air outside the houses is polluted for miles by sewer-gas that is belched forth from the street-pipes, which are erected along the main roads to ventilate the sewers. Strange to say, a native "Brum" is invariably boasting of his city being healthy, and is ever ready to cram down the throat of any doubter the height Birmingham stands above the sea-level, notwithstanding this argument is the greatest absurdity, for the height above sea-level matters not a jot if the air that is breathed at that altitude is foul and poisonous, which Birmingham air is.—I am, &c., H. C. Standage.

Erdington, near Birmingham.

PLASTERERS' STRIKE IN LIVERPOOL.

Sir,—The strike of plasterers in Liverpool, which commenced on the 1st of May last, still continues, and is being prolonged through the men on strike being employed by other contractors throughout the country, and I am instructed to write and ask if you will kindly request the members of local associations to refrain from employing these men during the dispute. The Master Plasterers are contending against the full strength of the National Association of Operative Plasterers, and it is an open secret that, if they are defeated, the operatives in other branches of the building trade in Liverpool intend to make similar claims, which include:—

(1) Limitation in the number of apprentices.

(2) The right of their delegates to visit all works to converse with the men.

(3) Railway fares in and out to country jobs weekly.

(4) That none other than plasterers do concrete flooring, floating for wood blocks and tiles, and lathing.

(5) The privilege of working overtime, when insisted upon by the men, to be paid time-and-a-quarter; and several other similar unreasonable demands.

If the Trades Union is successful in Liverpool these claims will, no doubt, be made in other towns. The officials have declined arbitration, and intimated that the operatives will not return to work until the whole demands are conceded.

I am instructed to ask you to call the attention of the members of all associations to the resolution which was unanimously passed at the recent meeting of the National Master Builders' Association, at Bristol, enforcing the necessity of all employers increasing the number of their apprentices in order to remove the present inconvenient scarcity of labour.—Yours faithfully,

J. Alfred S. Hassal, Secretary.

National Association of Master Builders of Great Britain, South Crescent Chambers, 26, Lord-street, Liverpool, 7th September.

P.S.—In taking on any plasterers during the present dispute, my Association would suggest that full inquiries be made as to where they were last employed.

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ILLUSTRATIONS.

HOTEL METROPOLE, MORECAMBE.—CORTILE, PALAZZO BALBI, GENOA.—STAIRCASE, PALAZZO DELLA UNIVERSITA, GENOA.—TENEMENT HOUSE AND BUSINESS PREMISES, LEITH.—ST. MARY THE VIRGIN, OXFORD.—ST. MICHAEL'S CHURCH, SITTINGBOURNE.—A COUNTRY HOUSE.—GATE-HOUSE, LOSTOCK HALL.

Our Illustrations.

HOTEL METROPOLE, MORECAMBE—SELECTED DESIGN.

THIS design, by Messrs. Mangnall and Littlewoods, of Manchester, was selected for the first prize in the public competition held recently, Messrs. Harrison, Hall, and Moore, architects, of Preston, acting as the assessors. The site for this hotel is at the extreme west end of Morecambe, and is bounded on its two sides by the sea front and the side promenade. The lodging-houses are principally facing Heysham-road, which is to the back of the plot, and Sefton-road, which runs along its right-hand side. The two refreshment-bars are placed at either corner of Heysham-road. All the principal rooms for visitors, together with the main entrance of the hotel, face the sea; the public portion of the hotel is situated opposite the side promenade, and is approached by a separate entrance; there are also to this side entrances for visitors, arrival and departure. These doorways are controlled by the manager's office and clerk's bureau. The ground floor accommodation includes a drawing-room, reading and writing room, sitting-room, and dining-room for private parties; a recreation-room, with the attending stage and retiring rooms. The coffee-room and dining-room are situated to the right-hand side of the front, and some of the principal administrative rooms in connection with it are placed on the ground floor, to expedite service and insure better supervision. These include manager's directing-room, service-room, china-cleaning and store room, plate store and strong room, wine-dispensing room, and the service staircase. Directly in the centre of the front is the grand hall, which contains porter's room, telephone-room, and lift. Between this and the grand staircase is the promenade corridor, which would be much appreciated in inclement weather. At the back of the grand staircase is the palm-house and smoking-lounge. The public portion of the hotel is kept entirely distinct, and contains a large smoke-room and a billiard-room for two tables. The basement contains all the necessary kitchens, store-rooms, and larders, laundry, &c., and a boiler-house and engine-room for the generation of electric light, &c. There is also a barber's shop and cycle room. There are 150 bedrooms, 8 sitting-rooms and bedrooms for servants in the hotel, 107 of which either face the sea front or side promenade. Provision is made for housemaids' room, service room, lavatory, &c. On the top floor is a photographic printing-room and two dark rooms for visitors. The hotel is designed in the English 17th-century Renaissance, and it is proposed to construct the principal elevations in buff and red terracotta, the cost being about £30,000.

CORTILE, PALAZZO BALBI, AND STAIRCASE, PALAZZO DELLA UNIVERSITA, GENOA.

THERE are not two finer examples of architecture in their way in all Genoa than these two courtyards, which we illustrate to-day. Of the Palazzo Balbi we gave a double-page pencil drawing by Mr. Maurice B. Adams in our Double Number, Jan. 3, 1896, and we then also described to some extent its next-door neighbour, the Palazzo della Universita, with its noble staircase and famous lions flanking the first flight from the cortile. The similarity of the treatment of the arcades in these two palaces can scarcely fail to strike the visitor, though there is a dignified simplicity in the grand proportion of the Balbi colonnade scarcely equalled among the Genoese palaces. The plastered walls are often referred to as one of the distinguishing features of Genoa, "the queenly city," and its white façades of stucco are quoted in evidence of the advantage and durability of that plastic and useful material. The accompanying photographs show a style of work well suited for the courtyards of many modern town buildings, and afford a fitting contrast to the fussy and over-detailed terracotta work, with its confectionery of ornament, such as we see in some of our more recent club-houses and hotels in London, devoid of dignity, cut up with endless jointings, petty in scale, as well as poor in proportion and idea. It is an advantage, therefore, to have work such as that here chosen for reproduction to-day placed before us as a corrective, at any rate; for they tend to inspire the eye and cultivate the taste, even if the exigencies of ordinary practice only too often prevent the architect from emulating such work, even though he may have the skill and good taste to do so.

TENEMENT HOUSES, AND BUSINESS PREMISES, LEITH.

THIS block of buildings occupies a good site in Great Junction-street, and has been erected by Messrs. Anderson and Co., Manufacturing Chemists, Junction Bridge Works, Leith. The stone used for dressings was red Corsehill, and for facework of walls, a stone from Hermand, of a greyish-blue colour. The slates were from Westmoreland, of a sea-green colour. Mr. James McEwan, 15, Hanover-street, Edinburgh, was the architect of the work, which was carried out by Mr. James Slater, contractor, Easter-road, Edinburgh.

CHURCH OF ST. MARY THE VIRGIN, OXFORD.

(FOR description see article on page. 391.)

ST. MICHAEL'S PARISH CHURCH, SITTINGBOURNE.

(SEE description on page 390.)

A COUNTRY HOUSE.

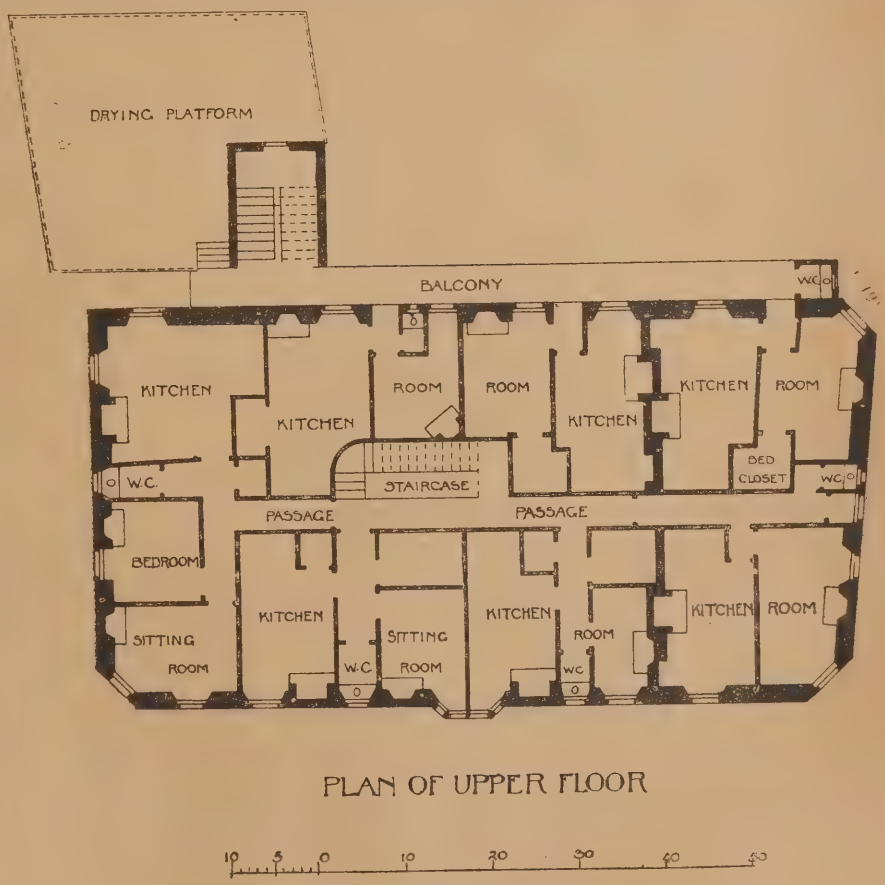
THIS house, illustrated from Mr. John Cash's Royal Academy drawing, represents a gentleman's house, designed by him to be built in brick and half-timber, in a picturesque and suitable style adapted to the surroundings of the site. In execution the buildings have, we understand, been modified in plan, which will sufficiently account for the plan not being shown here with the view.

GATE HOUSE, LOSTOCK HALL.

THIS building is a good specimen of the Domestic architecture of the closing years of the 16th century. It was built, according to the date on the uppermost panel, in 1590 A.D., of local stone, and is in a very fair state of preservation. The Hall itself, which was the seat of the Andersons, was a half-timber building, and was finally demolished at the beginning of the present century, together with some buildings adjoining the Gate House. There is a rough representation of the latter punched in the lead of the flat which covers the present building. The Gate House is now used as a farmhouse.—JOHN ORMOND.

Lord Herschell will deliver an address, on the 19th October, at the opening of the Art Gallery, which has been added to the municipal buildings at Reading.

The erection of the London County Council's new Lunatic Asylum at Horton, near Epsom, has given the Epsom Rural District Council a good deal of anxiety. Several hundred men are engaged in excavating and laying the foundations of the asylum; but the accommodation for them is so limited that large numbers have been compelled to sleep out, while others have erected a tent which contravenes the by-laws. The medical officer has informed the Council that they have no power to compel the contractor to provide accommodation for the men. The Asylums Committee of the London County Council have made ineffectual efforts to arrange for special workmen's trains, and in view of the fact that after Christmas the number of men will be increased to 1,600, the Epsom Council are considering the advisability of applying to the Local Government Board for sanction to borrow £7,000 or £8,000 for the immediate erection of fifty cottages to accommodate some 500 men. Before definitely deciding upon this step, they have asked the London County Council to inform them what steps they propose to take to meet the difficulty.



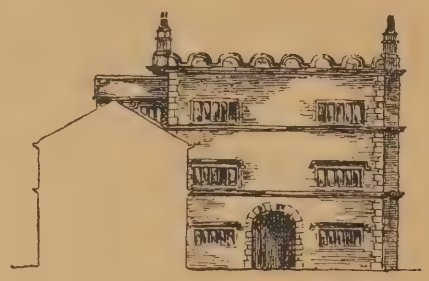
PLAN OF UPPER FLOOR

GATE HOUSE

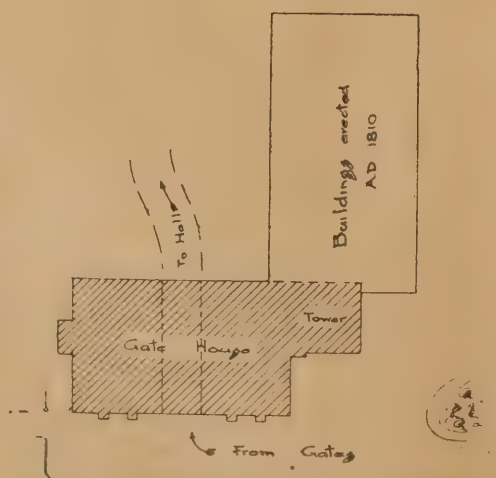
LOSTOCK HALL

NEAR BOLTON

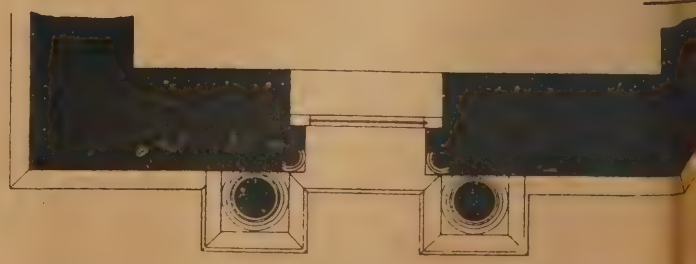
LANCASHIRE



SKETCH BACK ELEVATION



BLOCK PLAN



FR

A · COUNTRY · HOUSE · JOHN CASH · ARCHT

Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

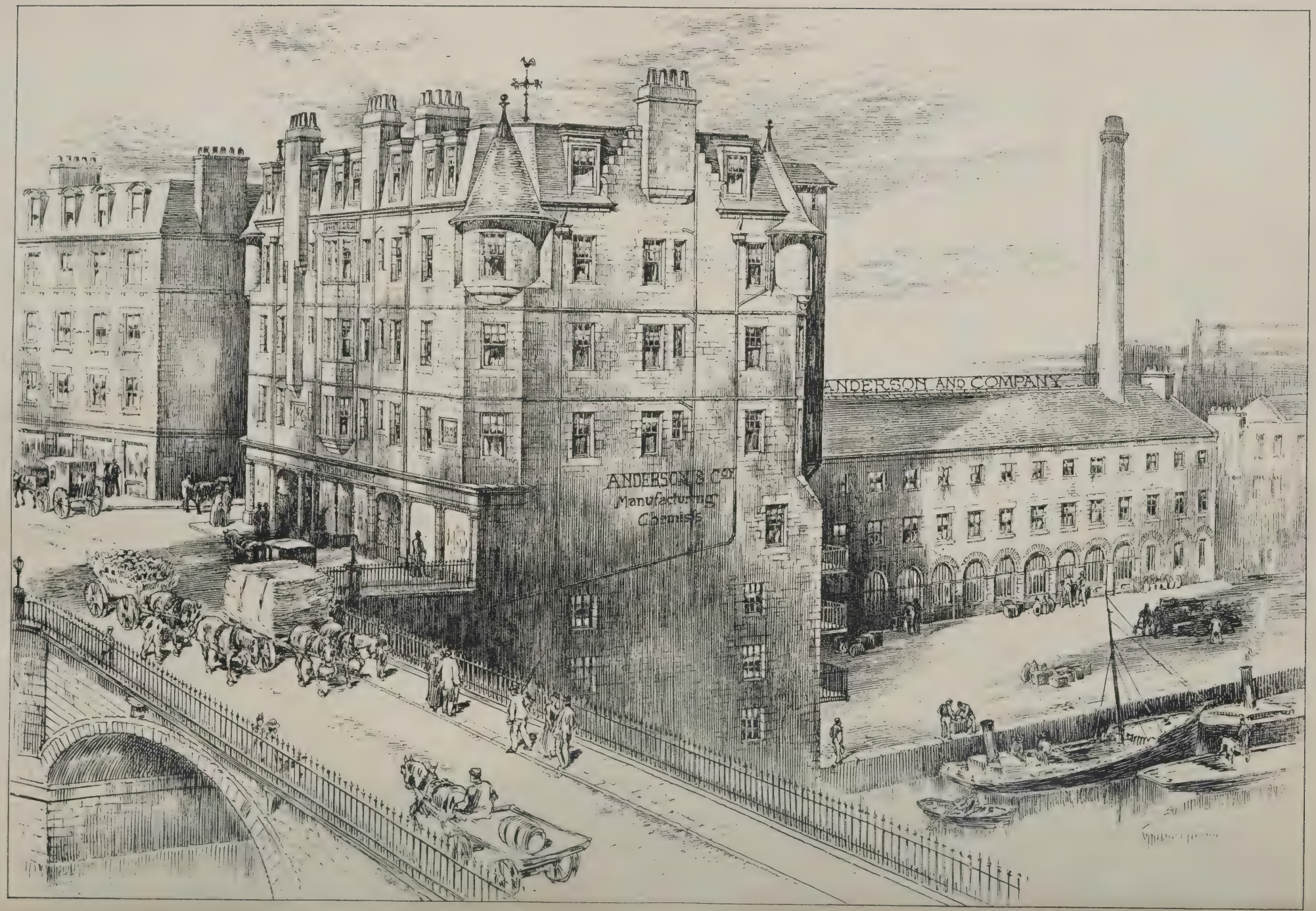


Photo-lithographed & Printed by James Akerman, 6 Queen Square W.C.

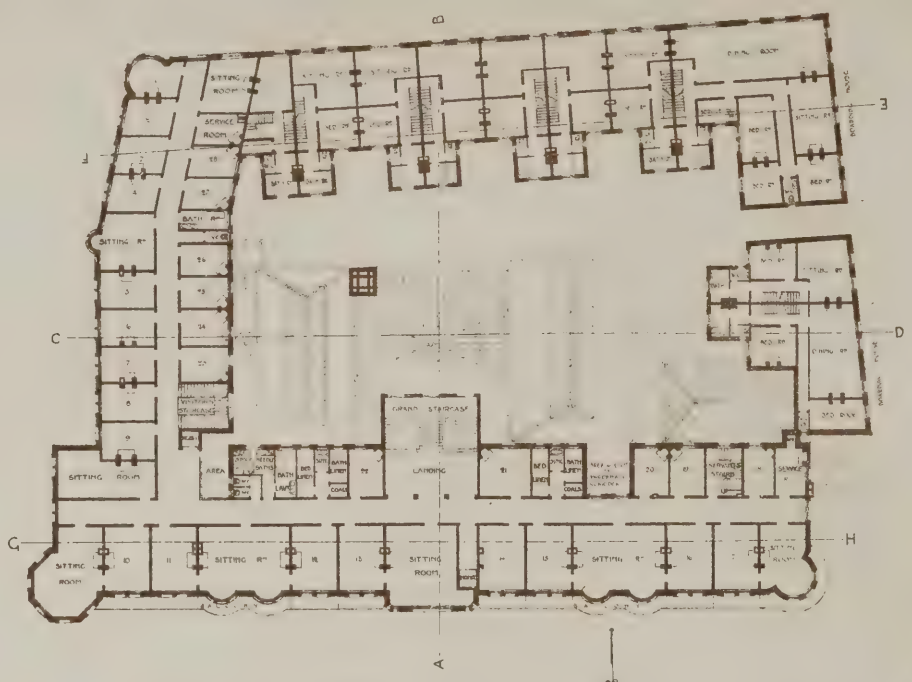
TENEMENT HOUSES & BUSINESS PREMISES · LEITH · JAS. M'EWAN ARCHT

CORTILE · PALAZZO · BALBI · GENOA

PT 17, 1897.

"PHOTO-TINT" by James Akerman 6 Queen Square London W.C.

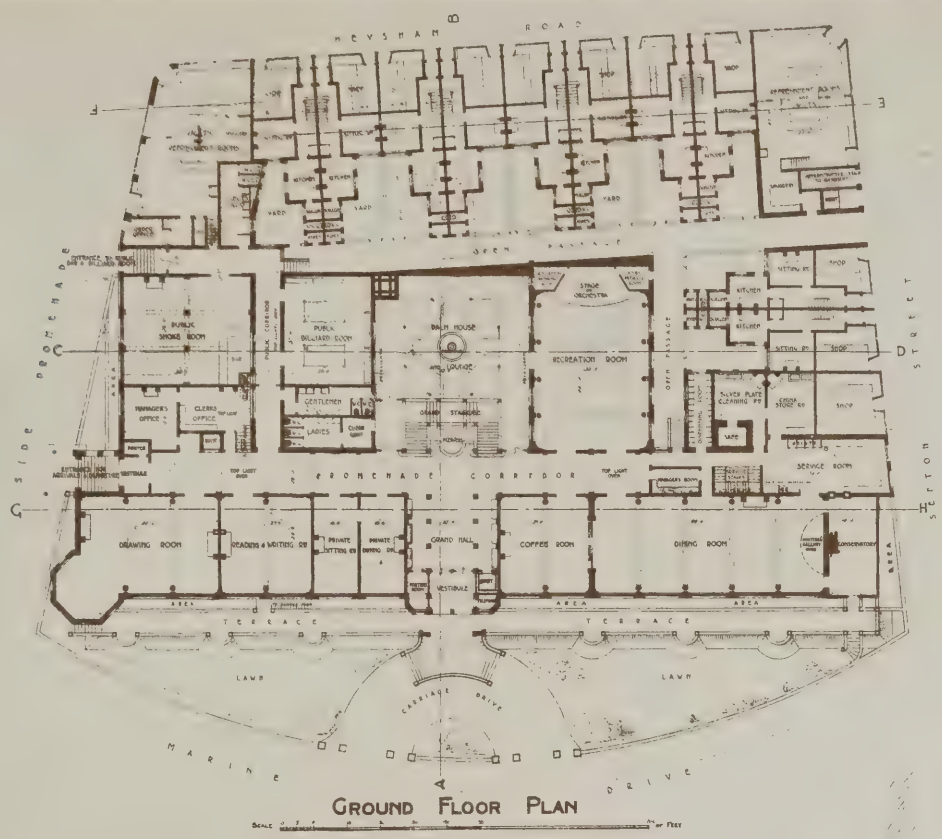
STAIRCASE · PALAZZO · DELLA · UNIVERSITÀ · GENOA ·



FIRST FLOOR PLAN

J. Langham delt.

HOTEL METROPOLE · MORECAMBE ·



GROUND FLOOR PLAN

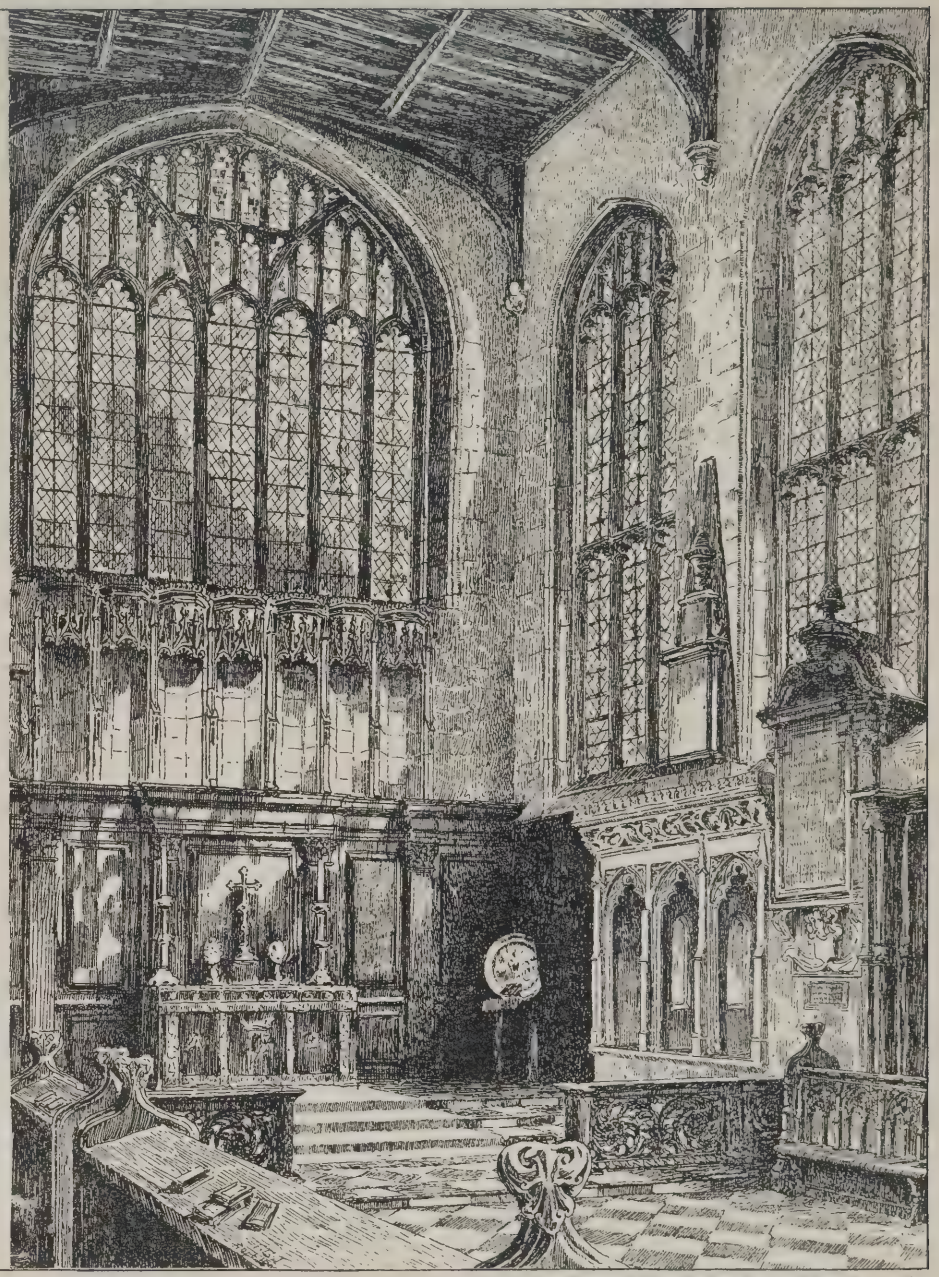
Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

D. DESIGN. MESSRS MANGNALL & LITTLEWOODS. ARCHTS

CHURCH OF ST. MARY THE VIRGIN, OXFORD.

FROM DRAWINGS BY T. G. JACKSON, R.A., ARCHITECT.

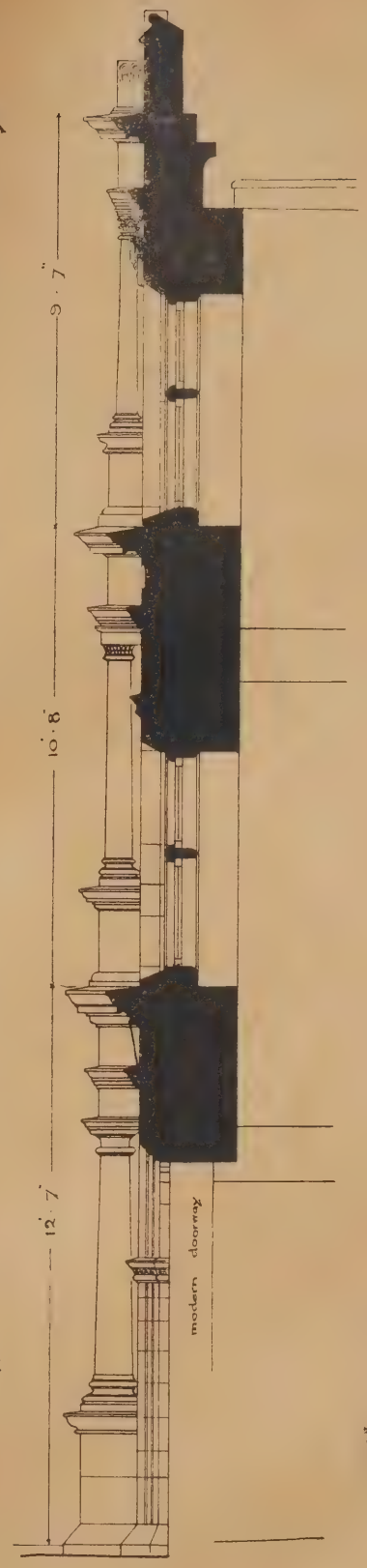
INTERIOR OF THE OLD CONGREGATION HOUSE



INTERIOR OF THE CHOIR

Photo-Lithographed & Printed by James Akerman, Queen Square, W.C.

Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.



ELEVATION

SECTION S---S

N THRO' R--R

Intercommunication.

QUESTIONS.

[11781.]—**White Plaster.**—What is the best white cement or plaster for external use on brickwork in half-timbered work? The situation is very much exposed to cold winds and bad weather, and I have already used a well-known cement, but after a short time the finishing coat separated and shelled off. Portland cement would require frequent painting. I should like a white cement, if it would be durable.—W. B.

[11782.]—**Water Supply by Meter.**—I shall be much obliged for a list of towns where water is supplied by meter, and the price charged per 1,000 gallons.—X.

[11783.]—**Tile Roofs.**—Should the "lap" be measured from the top of the tile, or from the nail-hole, which is about 1½in. below the top? I have always understood the latter; but have a dispute with a contractor on the matter.—M.

[11784.]—**Office Routine.**—I am anxious to ascertain the best means of planning out the office routine work of an architect's business—such as the necessary books and accounts, handling and filing of correspondence, and other papers. I am not aware of the existence of any literature dealing with the subject, and shall, therefore, feel much obliged if any of your readers can refer me to any books, pamphlets, or articles treating on the subject.—Cashier.

[11785.]—**Architects' Accounts.**—Can any reader give me the title, and author's and publisher's names of any book dealing with the keeping of accounts by architects? If possible, a note as to the published price will add to the value of the information.—S. E. C.

[11786.]—**Imitation Stone.**—Can anyone give me a simple recipe for imitation stone which does not necessitate burning, the chief ingredient of which should be good sharp sand?—W. R. P.

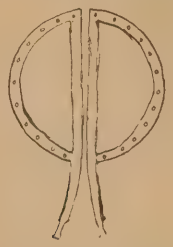
[11787.]—**Damp-Course.**—Which is the best and cheapest way of inserting a damp-course in an existing brick house which, unfortunately, was built without one?—T. Cornelius Wheeler.

[11788.]—**Church Bell.**—The wooden axle of this bell has given way. The rope is attached to a wooden wheel about 4ft. in diameter. The bell weighs 200lb. In refixing, it is desired to get rid of these wooden parts, and substitute steel for axle, and cast-iron wheel. Hitherto this bell has not sounded properly. The tongue clattered always when it struck on one side of the bell. How can this be remedied? Should there be a back-weight in the wheel? If so, where attached and what weight? What proportion should the weight of the tongue bear to that of the bell? Also, where is the proper point of suspension? Would it be better to have the bell fixed, and the rope attached to an arm in the tongue working on a pivot? This would avoid the clattering. Would the bell then give a clearer note?—Bell Ringer.

[11789.]—**Filling for Wood Joints.**—Can you advise a cement to be used as a filling for open joints in a chemical laboratory wooden bench—it should be able to resist boiling water?—L. M.

REPLIES.

[11770.]—**Greenhouse Stove.**—I did this by means of a pair of semicircular bellows, equivalent to an ordinary "atmospheric ring." They were made of iron tube and pierced, as shown in the sketch. Of course, air inlets



must be provided near the nozzles. A ring all but 12in. in diameter can in this way be introduced through a stoke-hole 4in. square. The draught through the body of the stove must be damped down, or it will run away with nearly all the heat. It is a good plan to fill in most of the central space with pieces of brick. The arrangement works well enough, but you will find it expensive in gas. If you care about that, you will save money by turning out the coke stove and replacing it by a proper gas-heated boiler.—R. C. Gilson, Harrow.

[11773.]—**Dover and its Neighbourhood.**—"A Tourist" will find an old structure of interest in the Town Hall in Biggin-street. The hall of Maison Dieu is a 13th-century building, and was built as a hospital for pilgrims coming from the Continent to Becket's shrine, Canterbury. The adjoining buildings are modern. Its main features are a fine oak-framed roof, very massive, and some interesting painted glass. The Norman remains of the refectory of St. Martin's Priory (now used as the hall of Dover College) is an interesting Norman structure. There is also the chapel, restored. These buildings are near the Priory Station of the L.C. and D.R. Railway. The foundation of the Knights Templars' Church may be seen on the Western Heights. The most interesting old buildings are St. Mary, in the Castle, partly of Roman work, restored and used as a garrison church; the Pharos, of Roman bricks and tufa, near the west end of church; St. Mary the Virgin, Cannon-street, with its fine Norman arcading in tower, and arcades and frescoes over western arch; St. Margaret's-at-Cliffe Church, St. Margaret's Bay, which has a fine enriched Norman porch, nave, arcading, and clerestory built of flint, and a beautiful painted glass E. window; Buckland Church, also churches at Ewell, Alkham (E. English), five miles from Dover, St. Radigand's Abbey, a ruin near the village of River, Barfrestone, the oldest Norman church in Kent, &c. Of course, the tourist can go to Canterbury and see its world-famed noble cathedral, and other churches, like St. Martin's, St. Augustine's Abbey; visit Folkestone and Hythe, with their fine churches, to the west of Dover; Deal, and Walmer to the East, and look at Deal Castle and Walmer Castle. All these places are within walking and short railway distances.—A Recent Visitor.

[11773.]—**Dover and its Neighbourhood.**—As might have been expected, there is a great deal of Norman work in this locality, in addition to the Castle. A very interesting church is worth "A Tourist's" visit, that of St. Margaret at Cliff, between Martin Mill Station and St. Margaret's Bay. He will find here a flint-built church with low square western tower of massive design, nave, and aisles. Externally, there is a unique Norman clerestory with shafts and blind arcading between the plain Norman lights. The porch has a handsome inner doorway of the same character, highly enriched with chevron, billet, and other ornaments in the arch; the jambs have shafts. Internally, the nave has Norman arcades, and four bays resting on circular and compound pillars alternating, the latter of four engaged shafts placed on the square. On the nave and aisle sides are piers like vaulting shafts. A chevron ornament is carried round each arch. The roof is cross-braced. There is a long chancel pierced by three circular-headed lights over the altar, and above, in gable, a two-light Norman window. The tower is open to the nave. The parish church of St. Mary's in the town has a fine tower with blind Norman arcading between the flat-faced angle buttresses, and is a good specimen of a Norman tower. Inside there are remains of arches in the same style.—G. H. G.

[11773.]—**Foundations in Soft Ground.**—I doubt whether "J. J." will find any high buildings in this country carried, in the manner he describes, by concrete rafts, with rods imbedded in same. In America concrete platforms have been used as foundations. A work on foundations has, I believe, been published in New York, which will give the information desired.—S.

[11774.]—**Flint Walls.**—Flint walling is used largely in chalk districts; the flint makes a good wall, impermeable to moisture and hard. The walls should be built in the same way as rubble is, the window recesses or reveals being built in brickwork in the same manner as in brick-walls. It is used largely in Norfolk, Suffolk, Sussex, and Kent. These are cut and trimmed, they should be built thick (about 2ft. in thickness); the flints should be flushed up with stiff, strong mortar. The mortar should be of quicksetting stone lime and coarse sharp sand. The walls should be bonded with lacing courses of brickwork, three or four courses deep. Before building flint walls, it would be as well for "G." to go to one of the districts named and make inquiries as to the thickness of walls and other particulars from a practical mason. Their durability is unquestionable, and in Norwich and other places in the eastern counties, also in Sussex, very effective treatment of flint with brick courses and dressings may be seen.—G. H. G.

[11777.]—**Map and Plan Drawing.**—I am not aware there is any book treating specially of this subject. Haskoll's work on Surveying may be found of use. I believe it is published by Lockwood and Co. The angles of fields can be obtained by any angular instrument having a vertical wire and a graduated table on which degrees and minutes are marked. The bendings or sinuosities of a field or a stream is obtained by running a chain-line along one side of the stream and taking offsets to the banks. By plotting these lines and offsets on the plan, the irregularities and curves can be determined. Baker's "Engineering Surveying," or Haskoll's work will give "B. D. A." all he wants to know.—G. H.

CHIPS.

The village schools at Chappel, near Halstead, Essex, have been reopened this week after enlargement and improvement, carried out by Mr. Beard, a local builder.

Mr. Compton Rickett, M.P., laid on Friday last the foundation-stone of a new Congregational church in Manor-road, Scarborough. The estimated cost of the building and site is £2,000, towards which £900 has already been raised.

The Handsworth Urban District Council adopted, on Friday, a report of the highways committee which recommended that the salary of Mr. E. Henworthy, C.E., the surveyor, be increased from £400 to £500 per annum.

Birdforth Church, which dates back to the 15th century, and was originally built as a wayside chapel, situated about five miles to the south of Thirsk, has been restored. The original building was of brick, surrounded at the western end by a turret, on which was placed a wooden "cote." The restoration has been effected at the expense of Viscount Downe. The old building has been re-roofed with French tiles, and the old pigeon-cote turret has been rebuilt with clamp bricks. The interior has been re-floored and re-seated, and the windows re-glazed.

Sentence of nine months' hard labour was passed, at the County of London Sessions on Monday, on Albert Bayliss, 25, furniture dealer, who was convicted on Friday last of offences against the Bankruptcy Acts. In order to defeat a claim, Bayliss entered into a bogus agreement to transfer his business at Station-road, Finsbury-park, to a man named Foster. He also, it was alleged, after having been adjudicated bankrupt, removed some of his property, and also made certain false entries in a document to conceal the state of his affairs and to defeat the law.

The Free Public Library at Norwich was re-opened last week after enlargement and restoration. The large apartment formerly used as the hired room for exhibiting the collection now removed to the Castle has been converted into a reference library, and the exterior of the building, the stonework of which had fallen into a lamentable condition of decay, has been coated with Tabary's metallic stone cement, this portion of the work being carried out by Messrs. Dreyfus and Co., of City-road, E.C. The whole of the work has been carried out from the plans and under the direction of Mr. A. E. Collins, the city engineer.

Another sale of building plots on the Thundersley Manor Estate at Benfleet took place on Wednesday week, when a large number of Jews—probably from 400 to 500—again attended, and many of them bought land upon which to build houses or shops in what promises to be, practically, a Jewish city in South East Essex.

Arrangements are being made for unveiling the work at West Smethwick, on Oct. 2, of a bust of Mr. James Timmins Chance, the donor of the park, which is being placed in the grounds by the trustees as a permanent memorial of the gift. The bust, which is the work of Mr. Hamo Thorneycroft, R.A., will cost close upon £1,000, including the provision of a suitable place for its reception.

The opening of the harbour extension and new pier at Polperro took place on Thursday in last week. The work has consisted in the removal of about 70ft. of the inner western pier, and the lengthening of the eastern pier by 30ft., while, on the opposite shore, a new stone pier of about 40ft. has been erected. The works, which have been carried out by Mr. J. Lang, Liskeard, cost £1,000. The engineers were Messrs. Jenkin and Son, Liskeard.

The death occurred, on Tuesday, from pneumonia, of Mr. Henry Borrows, art master at the Huddersfield Technical School. Mr. Borrows, who was a native of Pickering, and was fifty years of age, was for some years head master of the Corporation School of Art, Newcastle-on-Tyne, and went to Huddersfield in 1880. He was known for excellence of work in water-colour drawing and portrait painting.

Rawcliffe Hall, near Goole, the residence of Mr. Ralph Creyke, D.L., and ex-high sheriff of Yorkshire, was partially destroyed by fire on Sunday. The fire originated in the west end of the mansion, and is supposed to be attributable to a beam in the chimney catching fire. The more ancient half of the house, dating from the 17th century, was burnt out. Most of the contents of the lower rooms, including valuable Florentine furniture, curios, and pictures by well-known painters, were saved. The damage, which is covered by insurance, is estimated at £15,000.

The churches of Hampton Lovett (near Droitwich) and Kirk Ella (near Hull) have just been successfully lighted by means of the "Cathedral" lamp, supplied by Messrs. Jones and Willis, of Birmingham and London.

The Bangor county school, Bangor, North Wales, is being warmed and ventilated by means of Shorland's patent Manchester grates and special inlet panels, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

The Grand Central Station at New York, the headquarters and metropolitan station of the New York Central and Hudson River system, is now being enlarged and entirely changed as to its exterior, although the interior arrangement of the ground floor is not to be changed at present. The original building was 240ft. on Forty Second-street by 692ft. on Vanderbilt-avenue. Three more stories are now to be added, giving a uniform height of six stories, and the towers to be carried up proportionately. The entire building will be faced with stucco, and the enlargement will cost 700,000dol. The added room thus provided is needed for the executive officers and the 500 to 600 clerks employed.

An American syndicate, which has discovered immense timber forests in Labrador, will take a lease of the tracts from the Colony of Newfoundland. They will begin operations next season.

A new Roman Catholic school has just been built at Crieff, Perthshire, from plans by Mr. T. Monteath, of that town. It is faced with Dunmore sandstone, provides a nice hall 50ft. by 20ft., and 16ft. in height, and classrooms. Accommodation is provided for 130 children, at a cost of £7 10s. per head.

At Chadderton, near Oldham, on Tuesday, three steeplejacks were repairing the top of a very lofty mill chimney, belonging to Messrs. M'Dougall, chemical manufacturers, when part of the coping gave way, and one of the men, John Greenwood, was killed by falling to the ground. A large mass of brickwork fell on his body. The other steeplejacks had a narrow escape, one saving himself by clutching the scaffolding.

Engineering Notes.

Bridging the Mississippi.—A contract has just been concluded by the Chicago and Alton Railroad Company with the Lasig Bridge and Iron Works, of Chicago, for the construction of a new bridge over the Mississippi at Louisiana, Missouri. The new structure is intended to replace an existing bridge, which was built in 1873, when loads were much lighter than they are now. The new structure will be a single-track bridge of nine spans, and will carry two locomotives of 123 tons each, followed by a rolling load of 400lb. per lineal foot. There will be five spans of 158ft. each, a draw span 440ft., and three other spans respectively 257ft., 226ft., and 316ft. long, making the total length of the bridge 2,029ft. The foundations will be masonry on piles, and the bridge will be 12ft. above the high-water mark. The new bridge will be built under the old structure, and there will be no interruption of traffic.

Edinburgh.—The new North Bridge was formally opened on Wednesday by Lord Provost M'Donald and the magistrates and council. The undertaking replaces the old North Bridge, which, begun in 1763, was opened in 1772, having taken nine years to build. Under the present contract, the old bridge has been renewed and the new bridge erected in about two and a half years. The old bridge had to be taken down and the new bridge built without interfering with the railway traffic being carried on underneath, or the tramway and other street traffic above. Scaffolding of a peculiar construction had to be employed, and methods of working more or less of a novelty had to be introduced as the work went on. The first half of the new bridge, having been completed, was opened on the 12th October, 1896, and the remaining half of the old bridge was taken down and the last half of the new bridge built between that time and this—a period of eleven months. The best view of the structure will always be secured from Jeffrey-street. It affords an immense improvement overhead to the street traffic, while underneath the Railway Company get, in greatly enhanced facilities for the carrying on of their traffic, the full value of their contribution towards the cost of the bridge. The bridge is built under an Act of Parliament obtained in 1894, which also authorised the widening of North Bridge-street—an improvement now also in progress. Constructed of iron girders resting on stone piers and abutments, the bridge consists of three spans of 175ft. each. The width between the parapets is 75ft., as compared with 54ft. of the old bridge as altered more than twenty years ago. Each span is formed of six steel arched ribs, each 175ft. from pier to pier, with a 20ft. rise at the centre of the arch. They are set into the masonry of the abutments in cast-iron springers, each weighing 12 tons. The holding-down bolts are 3in. in diameter. Each rib is 4ft. in depth by 1ft. 9in. in breadth, and it weighs about 40 tons. They were built at the Glasgow works of Sir William Arrol (Limited), were milled to suit the radius, and were delivered in nine-ton "lifts" or segments. On top of these "booms" are fixed vertical posts, which carry longitudinal girders, and on these again are fixed cross-girders, which carry the brick arching forming the roadway. The whole is braced diagonally and horizontally by lattice-girders, &c. In the bridge there are about 2,000 tons of chilled steel and about 500 tons of cast-iron work, which is chiefly of an ornamental nature. The spandrels of the great spans are filled in with an arcading graduated in height, surmounted by a frieze broken up by carved corbels, and carrying a moulded festoon of flowers and fruit. At each end of the large spans is an expansion joint, which has a play of 1½in., so as to make due allowance for expansion and contraction caused by the summer and winter temperature. In taking down the old bridge nothing of great interest was found. The only curious objects embedded in the masonry were an old pewter jug, now in the Antiquarian Museum, and several old moulded headstones and carved stones, as if from an ancient church. The foundation-stone, laid on the 21st October, 1763, by Lord Provost Drummond and the "Merrie Masons" of his day, was not discovered. The abutments at the south and north ends of the bridge rest on solid rock. The two large piers are built on concrete foundations, laid, the south pier 40ft. below the rail level, and the north pier 35ft. below ground. Each of these piers is 100ft. long, measuring from east to west, and 22ft. in thickness. They are hearted with brick laid on cement, and faced with grey sandstone ashlar. In the construction of the bridge there has been used by the Messrs. Beattie 100,000 cubic feet of ashlar, equal to 8,333 tons; nearly 3,000,000 bricks, and 10,000 cubic yards, or about 800 tons, of concrete. In addition to this there were half a million of blue bricks required for the arching, already alluded to, which carries the roadway. From the spring of the arches the piers are carried up above the iron parapet of the bridge with ornamental panelled and moulded faces, and below the top moulding is a carved ornament. On the top of the arched brick, asphalte has been spread, and on that are placed the granite blocks of the roadway. The cable rails have been laid, and on each side of the roadway of the bridge a subway for pipes has been constructed, about 12ft. by 2ft. in depth, with manhole entrances at each pier. The engineers of the bridge were Messrs. Cunningham, Blyth, and Westland, C.E., Edinburgh; the City superintendent of works, Mr. Robert Morham, designed the elevation; the contractors were Sir W. Arrol and Co., Limited, Glasgow, with Messrs. William Beattie and Sons, Edinburgh, sub-contractors for the mason work. The cost is £90,000, of which the North British Railway Company contribute £30,000.

Glasgow.—The new Prince's Dock at Cessnock, on the south side of the Clyde, formally opened by the Duchess of York on Friday, is close to the shipbuilding district of Govan. Nearly fifteen years have elapsed since the construction of Prince's Dock was decided upon. It has cost, including the graving dock and equipment, nearly a million and a half sterling. Mr. James Deas, C.E., the engineer of the Clyde Trust, who had designed and superintended the construction of Queen's Dock, was commissioned to prepare Parliamentary plans for utilising the space for docks. Spacious outer and entrance basins give access to a canting basin, from which branch eastwards at right angles to the basin and parallel to the river course three large basins, separated from each other by spacious quays. The canting basin is 1,135ft. long, and large enough to allow of the easy turning of a vessel 700ft. long, if ever such a leviathan should be constructed. Each of the three basins is about 300ft. broad and 1,200ft. long, and the intervening quays have a breadth of 250ft. The depth of water in the docks will be from 20ft. to 28ft. at low water, and from 31ft. to 39ft. at high tide. The water area, including the canting basin, 15½ acres, is 35 acres, and the quays measure 3,737 yards—over two miles. Originally the trustees obtained power to construct two graving-docks at the head of the inner basins, but that idea was abandoned in favour of one large dock, parallel to and immediately south of the two existing dry docks, and with access from the entrance basin of the new dock. This dry dock, of which the Duke of York laid last week the last cope-stone, is one of the largest in the world, is 880ft. long and 82ft. broad on the floor, and 115ft. broad at the top. It has an entrance 83ft. wide, and the depth of water on the sill is 26½ft. The dock can be divided by steel gates into two practically independent sections, the outer 460ft. and the inner 420ft. long. The total cost of the dock, including the pumping and other apparatus, is about £240,000.

Scarborough.—Mr. J. E. Everett, the resident engineer for the construction of the road round the Scarborough Castle Hill, reports that up to September 1 there had been laid a total length of 204ft. of wall, 18ft. high, or within 4ft. of the finished height; 172 blocks had been made, containing 369 cubic yards of concrete. As soon as the cliff was made safe to work under, more rapid progress than had hitherto been possible might be expected. Every effort was being made to push on the work of sloping the cliff, the worst part of which is now finished. The Scarborough Castle keep and walls are to be included in the proposed lease of the Castle Hill to the Scarborough Corporation, the plateau, or "yard," of which it is intended to lay out in pleasure grounds. The corporation's present lease of the dykes and holmes expires on April 5, 1903. This the corporation are prepared to surrender, and they express their willingness to take a fresh lease for 31 years of the whole hill and the dykes and holms at a yearly rental of £150, the corporation undertaking the ordinary maintenance of the keep and walls if before the date of the new lease the fabric is put into substantial repair by the Woods and Forests Department.

CHIPS.

The dissolution is announced of the partnership hitherto subsisting between C. A. Hindley, E. H. Hindley, and J. A. Stenhouse, upholsterers and decorators, Welbeck-street, W., under the style of Charles Hindley.

A stained-glass window is about to be placed in Truro Cathedral by Eliza Lady Truscott, in memory of her husband, the late Sir Francis Wyatt Truscott, who was a native of Truro, and served as Lord Mayor of London in 1879.

The city council of Sheffield accepted with thanks last week a three-quarter size portrait by Mr. Ernest Moore of the late Alderman Edward S. Foster, a former mayor of the city, who took a very active part in the promotion of the scheme for the erection of the town hall, and for the street improvements in the centre of the city. It was agreed to hang the portrait in the new town hall.

At the last meeting of the Southend Town Council a cheque for £922 was drawn in favour of Mr. Brunlees, the original engineer of the pier extension, being the amount awarded to him by the arbitrator, with costs. The question of the costs of Mr. Brunlees' solicitor stands over.

The vice-chairman of the Huddersfield School Board formally opened, on Friday, the newly-enlarged board school at Spark Hall, Longwood. The event was of some interest, and the Huddersfield School Board have had no new buildings or extensions opened during the last five years. Longwood is progressing both industrially and numerically, and to the Spark Hall school 152 places have had to be added. For this purpose two cottages were bought for £300, and other land, which brought the total cost of the enlargement to £2,935. The additional accommodation includes a covered playground for the children.

New board schools are on the eve of completion at Burnham-on-Crouch from plans by Mr. F. Chancellor, of Chelmsford.

A new organ in the Wesleyan Chapel at Burnham, Somerset, built by Mr. W. Sweetland, of Bath, was opened on Thursday in last week.

The parish church of St. Mary, Postling, East Kent, was reopened on Thursday in last week, after restoration, at a cost of £600.

The scheme for restoring Brierley Hill parish church has had an unexpected development. It was estimated that the total expenditure would be £3,500, of which Mr. John Corbett, of Impney, Droitwich, promised to contribute one-half. The response of the parish was so satisfactory that more than the amount needed was raised. At a meeting of the general committee, to receive tenders, there was great surprise when it was found that the amount in every one of the seven tenders was almost double the sum named in the estimate—the lowest being £6,797, and the highest £7,852. A deputation is to wait upon Mr. Corbett to talk the matter over.

The work of restoring the ancient parish church of Wilmslow has now been taken in hand. The chancel roof is to be raised and a clerestory inserted, various changes are to be carried out in the De Trafford and Pownall chapels and the nave, and new entrance-gates and boundary-walls are to be erected. The work is expected to cost nearly £2,000, towards which £900 has already been raised.

The formal opening of the new building now nearing completion at Eglinton Toll, which is for the use of the southern section of the Glasgow United Young Men's Christian Association, took place on the 9th inst. The building contains a large hall capable of seating 800 people, a smaller hall, eleven educational or class rooms, a gymnasium, a social parlour, a library and reading room, as well as other smaller rooms.

A parish hall is about to be built at Nigg, near Aberdeen, from plans by Messrs. Walker and Duncan, architects. The estimated cost is £750.

Last winter's gales have proved terribly destructive and costly to the River Tyne Commissioners' work in making the Tyne a harbour of refuge at all states of the tide for any vessel. A breach has been made in the North Pier. Repairing is declared to be impossible, and the advice of Sir J. Wolf Barry, C.E., and Mr. C. E. Matthews is to rebuild the pier from the breach sea-ward, at an estimated cost of £302,000. The piers had just been finished when the misfortune happened. The River Tyne Commissioners, on Friday, practically adopted the report of the experts.

Lord Balfour of Burleigh, Secretary for Scotland, formally opened, on Friday, a fine new school at Clackmannan, which has been erected at a cost of rather over £3,000, to accommodate some 400 children.

LEGAL INTELLIGENCE.

A Borough Surveyor's Failure: In re R. S. Dugdale, of Huddersfield.—The public examination in bankruptcy of Mr. Dugdale, borough surveyor of Huddersfield, and formerly deputy surveyor for Salford, was held on Friday at Huddersfield. Debtor said that going to Huddersfield from Salford he owed £300, and had been insolvent ever since. Up to 1890 he had £500 a year, and since then £600. He had received nearly £500 in pupils' premiums, £300 from Huddersfield Corporation for extra services, and about £100 each from Wakefield, Leeds, and London County Councils. During the last three years his receipts reached £2,300. He had not made speculations, and all had gone on account of family expenses, personal illness, and the repayments of loans. His deficiency was £1,370. He ought to have filed a petition years ago, but hoped to pull through. The public examination was closed.—A large meeting of the General Purposes Committee of the Huddersfield Corporation had under consideration on Tuesday the status of Mr. Dugdale. The meeting lasted an hour and three-quarters, and came to the consideration of the matter after it had been dealt with at a protracted sitting of the Finance Committee. The result of the proceedings was that, by an almost unanimous vote, the General Purposes Committee came to the conclusion that opportunity should be given to Mr. Dugdale to send in his resignation. Whilst not a few members of the committee gave expression to a feeling of sympathy with Mr. Dugdale in his difficulties, it was evident, on the other hand, that a pretty general opinion prevailed that the proper conduct of corporate affairs and the discipline of the department more intimately concerned required that such a decision should be arrived at.

Col. J. T. Marsh, R.E., held an inquiry at the town hall, Clacton, on Friday, with reference to the urban district council's application for sanction to borrow £450 for the provision of shelters on the sea front; £2,800 for the purpose of a scheme for using sea water; and £1,250 for the provision of a town yard.

Judgment was pronounced by a final decree on July 21 last in favour of the validity of the will, dated October 2, 1896, of Mr. James Toleman, of 110, Haverstock-hill, and of 17, Goswell-road, wallpaper manufacturer. The gross value of the personalty was £109,499. Large sums were bequeathed to charities.

A new building is about to be erected in Callcott-road, Brondesbury, parallel with High-road, Kilburn, to be called Callcott Court, with frontage of 140ft. The block will consist of residential flats, with extended right and left wings, designed in the Georgian style. Messrs. P. Palgrave and Co., Westminster, are the architects for the work.

At Worcester, a new Masonic hall, with frontages to St. Nicholas and Trinity streets, has been built from plans by Messrs. Henry Rowe and Sons, of that city. The chief elevation is Classic in character, and is carried out in red brick and terra-cotta. Messrs. J. Wood and Son, of Worcester, were the contractors.

For the erection of the new general hospital for Newport, Mon., to be built in Cardiff-road, the tender of Messrs. A. S. Morgan and Co., of Newport, has been accepted at £29,950. The architect is Mr. Richard J. Lovell, of 48, Queen Victoria-street, E.C.

The first section of the electric tramways at Dover—that from Buckland to the London, Chatham, and Dover Railway Station near the harbour, a distance of two miles—was opened by the mayor of that borough on Monday in last week. The tramways have been laid out by Mr. H. E. Stilgoe, the borough engineer of Dover; while the electrical part of the scheme has been carried out by Mr. Stephen Sellon. The contractors for supplies were Messrs. Dick, Kerr, and Co., of London; while the contract for road works was undertaken by Messrs. J. H. Briggs and Co., of Blackburn.

In the case of James Sills and John George Sills (trading as James Sills and Son), of Loughborough, builders and contractors, the order for discharge from bankruptcy has been suspended for two years ending July 21, 1899.

The death is announced from Worksop of Mr. Oscar Harrison, who has been architect and engineer since 1895 to the Worksop and Retford Brewery Co., and was previously for five years the surveyor to the Worksop Urban District Council and its predecessor, the local board.

The corner-stone of the new church of All Saints, which is being erected in Devon-street, Moses Gate, Farnworth, was laid on Saturday by the Mayor of Bolton. The building will be Late Decorated in style, and will seat 586 persons. The facing materials are red brick with red Ruabon terracotta dressings. Mr. R. Knill Freeman, F.R.I.B.A., of Bolton, is the architect, and Messrs. J. B. and J. Entwistle, of Kersley, near Bolton, are the contractors.

STATUES, MEMORIALS, &c.

Folkestone.—For many years past the vicar of Folkestone (Canon Woodward) has been desirous of restoring the ancient cross in the parish churchyard, the old steps of which have remained in good condition to this day, though the shaft and cross have long since been destroyed. Opposition of a strenuous character interposed, and the intended restoration had from time to time to be postponed, but has now been accomplished, and on the 8th inst. the mayor and corporation attended in full state at the unveiling of the cross, and after the blowing of the old horn by the mace-bearer, which, according to ancient custom, was the signal for the assembling of the inhabitants at the cross, the mayor performed the unveiling with befitting ceremony. The restored cross is based upon the model of English Mediæval crosses of the 15th century, and has been erected upon the ancient steps. The shaft is octagonal, with spreading base and richly-carved cap, above which are sculptured panels; that to the west representing the Crucifixion with the Blessed Virgin and St. John. On the opposite panel is represented the Virgin and Child, with attendant angels; whilst on the south, looking seawards, is St. Peter, the patron of fishermen; and to the north, looking towards the town, is St. Eanswith, the patron saint of Folkestone, whose image is impressed upon the borough seal. The sculptured subjects are beneath carved canopies, richly crocketed, and the whole is terminated by an octagonal spirelet, surmounted by the cross. The work has been executed in Portland stone by Messrs. Earp and Hobbs, from the designs and under the directions of Mr. S. Slingsby Stallwood, F.S.A., architect, of Reading, formerly of Folkestone.

A block of residential mansions is now in course of erection on the site of the Forge, West End-lane, N.W. There are to be three self-contained flats. Messrs. P. Palgrave and Co., 28, Victoria-street, S.W., are the architects.

The Star Theatre of Varieties at Dublin is being reconstructed from plans by Mr. R. Henry Brunton, of London, and will be reopened at the end of October. The contractor is Mr. Dalton, of Ranelagh, Dublin.

A Primitive Methodist Central Hall and Sunday-schools are in course of erection in Station-road, Wigan, from plans by Mr. J. B. Thornley. The buildings are Classic in design, and are faced with Accrington brickwork, and have dressings of Yorkshire stone. Mr. J. Johnson is the builder.

The construction of the proposed balcony at the Observatory at Greenwich has been sanctioned. This will give an all-round view of the sky from the building where the 28in. telescope is stationed.

The town council of Montgomery have decided to apply to the Light Railway Commissioners for an order authorising a light railway from the town to the railway station.

The town council of Ayr unanimously agreed on Monday to purchase that part of the lands of Blackburn adjacent to the sea, lying between the Low Green and Seafield, for £2,000. The object is to secure the ground for public recreation, and to extend the esplanade. It was reported that a settlement had been effected with the insurance company relative to the burning of the Town Hall, whereby the insurance company had tendered, and the works committee had agreed to accept, £9,500 for the damage done.

Barnby Gate Wesleyan Church at Newark-on-Trent, which has lately undergone extensive repairs at a cost of upwards of £4,000, has been formally reopened.

The Southport Corporation recently entered, as an experiment, into an agreement with a contractor to cart the ashpit refuse in one district, the work having for many years been exclusively in the hands of corporation workmen. After a week's experience, the contractor has asked to be released from the agreement.

At the last meeting of the Beverley Rural District Council, Mr. Ernest Picker, of Dewsbury, chief assistant to the surveyor for the county council of Lancashire, was appointed surveyor, Mr. E. T. Felgate having resigned.

The new organ now being built for Bangor Cathedral by Messrs. W. Hill and Son is to be opened on Tuesday next by Sir Walter Parratt, Mus.Doc., organist of Windsor Castle.

Messrs. E. and H. Lumley announce one of the most likely land sales of the season on Friday next at South Hayling, where residential houses are in great demand. A large marine mansion, suitable for a yacht club or hydropathic establishment, is also offered.

Old Mill, Kilburn, is to be demolished, and a block of residential flats to be erected upon the site with a return frontage to Mapesbury-road. Messrs. P. Palgrave and Co., Westminster, are the architects, and the building is estimated to cost £12,000.

WATER SUPPLY AND SANITARY MATTERS.

Rhyl.—At Monday's meeting of the Rhyl Urban District Council a special committee reported that correspondence had been going on with Mr. Baldwin Latham, C.E., as to Mr. Jacob Biggs's claim of £3,504 1s. as extras and damages in connection with the new sewerage system. The committee had discussed the several items, and expressed the opinion that none of them could be sustained. As to the "delays," it was asserted that the council had good grounds for making a very heavy claim for penalties for non-completion of the works within a specified time by the contractor. Mr. Baldwin Lathan had attended the meeting, and explained his position with regard to the matter. It was resolved (1) to repudiate Mr. Biggs's claim entirely; (2) to instruct the clerk to prepare a claim for penalties against Mr. Biggs.

Stafford.—The Stafford corporation sewerage works, which have cost £45,000, were opened by the Mayor on Wednesday. The work has taken three years to complete, and about 16 miles of deep main sewers and 11 miles of main sewers have been laid. The sewage is first treated at the sanitary depot where a destructor and sewage pumping machinery and reception tank have been erected; thence it is pumped to a farm half a mile away. This land was purchased from Lord Stafford for £11,000. Here the sewage will be treated by precipitation and filtration on the land.

CHIPS.

Lady Gertrude Rolle will this week lay the foundation-stone of the clock tower at Exmouth which is to mark the record reign of the Queen. The clock tower will occupy a good site in this rising sea resort of the West in the grounds of the Imperial Hotel, and opposite the esplanade, which is a mile long.

Seven candidates presented themselves at Tuesday's meeting of the rural district council for Stone, Staffs, for the appointment of surveyor, the salary being £150 per year. The contest lay between Messrs. Brandon, of Chebsey, and Myatt, of Moddershall, and, the voting resulting in a tie, the chairman gave his casting vote in favour of Mr. Myatt. The latter was formerly a member of the council, but resigned in order to qualify as a candidate.

The laying of the subterranean telegraphic cable, under the superintendence of Mr. W. H. Preece, F.R.S., between London and Birmingham, is being carried out with great success. Watford is the head-quarters of the operations, and the cable has now been laid over nine miles on both sides. The cable contains 76 conductors, each conductor weighing about 150lb. per mile. The paper which covers the conductors is kept dry by air pumped by artificial means.

Eight architects of New York have been selected to make competitive designs for the new city college to be erected on 138th and 140th-streets and Amsterdam-avenue in that city, to cost about £95,000 to £100,000. Plans will be completed about December 1.

Turner's house at Twickenham, known as Sandycombe Lodge, Sandycombe-road, St. Margaret's, will be offered for sale by Messrs. Chancellor and Sons at the Mart on Tuesday next. According to Mr. Ruskin, the artist bought this house in 1808, and resided there till 1827; but other writers place the period of his residence at Sandycombe Lodge as from 1814 to 1826. The auctioneers assert that the house was built after designs by Turner himself. The original structure has been added to.

The Society of Miniaturists will hold their next exhibition about the middle of October at the Grafton Galleries.

The dissolution of partnership is announced of W. P. Hampton and G. Hampton, under the style of Hampton and Sons, house furnishers, decorators, upholsterers, builders, house and estate agents, of Pall Mall East, and Cockspur-street, S.W.

Estate business at the Auction Mart, Tokenhouse-yard, last week was of a very insignificant character, and although sales were held on three days, the aggregate realisation was only £6,330, the lowest recorded for some years past. The second week in September generally marks the end of the dullest period, and signs of a revival of activity are already apparent. The volume of business this week has been considerably greater, and it may be expected to gradually increase until the beginning of October, when the autumn season will commence in earnest. In the provinces, the announcements of forthcoming auctions are numerous, and the prospects of a busy time seem very favourable.

The selection of a site in Greenwich Park for the magnetic pavilion has given much trouble; but one which appears in every respect suitable has been found on the east side of the observatory, at a distance of between 300 and 400 yards.

Our Office Table.

THE "house list" of members of the Society of Architects, nominated as officers and council for the ensuing session of that body, was published yesterday, in readiness for the annual meeting of the society, which will take place on Thursday, October 28th. Mr. T. Walter L. Emden, J.P., L.C.C., of 105-6, Strand, one of the vice-presidents, is proposed as president in succession to Mr. Robert Walker, J.P., of Cork, while Major F. Seymour Leslie, R.E., who has served the society for many years as hon. corresponding secretary, and Mr. Silvanus Trevail, of Truro, are nominated as vice-presidents. The older members will be pleased to see that Mr. Edgar Farran is to be asked to resume the duties he carried out so efficiently in the earlier days of the society as hon. corresponding secretary, and that Mr. Ellis Marsland has consented to serve another year as hon. secretary. The nominations of ordinary members of council are: Messrs. C. A. Basset-Smith, G. E. Bond (Rochester), William Cooper (St. Leonard's-on-Sea), R. W. Coventry Dick, Herbert J. Jones (Bristol), A. J. Lacey (Norwich), J. R. Manning, R. Lane Pearce, George H. Phillott, M.A. (Cheltenham), G. Gard Pye, T. R. Richards, and R. Frank Vallance (Mansfield).

MR. B. T. BATSFORD'S forthcoming publications include "Later Renaissance Architecture in England," by John Belcher and M. E. Macartney, the second and concluding parts; "Bungalows and Country Residences," by R. A. Briggs, fourth edition, with additional plates; "A History of Architecture for the Student, Craftsman, and Amateur," by Professor Banister Fletcher and Banister F. Fletcher, third edition, revised; "The Influence of Materials on Architecture," by Banister F. Fletcher; "Modern Opera Houses and Theatres," by E. O. Sachs, third and concluding volume; "Examples of Old Furniture, English and Foreign," drawn by A. Ernest Chancellor; "Windows: a Book about Stained and Painted Glass," by Lewis F. Day; "Alphabets: Old and New," selected by Lewis F. Day; "Examples of Greek and Pompeian Decorative Work," measured and drawn by J. Cromar Watt; "Estimating: a Method of Pricing Builders' Quantities for Competitive Work," by George Stephenson, third edition, revised; and "Repairs: How to Measure and Value Them," by George Stephenson, second edition, revised.

THE School of Art Wood-carving, Central Technical College, Exhibition-road, South Kensington, has been reopened after the usual summer vacation, and we are asked to state that one or two of the free studentships, maintained by means of funds granted to the school by the Institute, are vacant. To bring the benefits of the school within the reach of artisans a remission of half fees for the evening-class is made to artisan students connected with the wood-carving trade. Forms of application for the free studentships and any further particulars relating to the school may be obtained from the manager.

THE classes in Architecture, Building Construction, and Modern Practice at King's College, Strand, W.C., conducted by Professor Banister Fletcher, F.R.I.B.A., assisted by his sons, Messrs. B. Flight Fletcher and H. Phillips Fletcher, AA.R.I.B.A., will reopen on Monday, October 4. These courses are intended to furnish full information in the theory and practice of architecture and building construction, and in the application of the principles of mechanics to construction. They are also specially arranged to enable architects' pupils, assistants, and others intending to follow the profession of architecture, to prepare for the progressive examinations of the Royal Institute of British Architects, the Surveyors' Institution, the statutory examination for those seeking the appointments as district surveyor and building surveyor, also the examination for appointments in the Admiralty, War Office, Civil Service, and other public examinations. A special course is arranged for architectural students who wish to prepare for the R.I.B.A. and other examinations in one year. Gold, silver, and bronze medals are awarded to students by the Worshipful Company of Carpenters, and a bronze medal is given by Mr. Arthur Cates to the student who stands first in the third year of the college course. Full particulars will be given by Professor Banister Fletcher, 29, New Bridge-street, Ludgate-circus, E.C.

A DRAFT of the new constitution and by-laws which it is proposed to submit to the Convention of the American Institute of Architects at Detroit a fortnight hence, has been sent out, and shows that very radical changes are contemplated. The most important of these is the abolition of the present system of electing Fellows of the Institute by direct vote, and the substitution of a federal system, under which every candidate for admission to the Institute must be a member of a local society, and must make his application through a State Association, to which all the local societies in the State are affiliated. Such application must be signed by the president and secretary of the local society, as sponsors for the candidate's good character, and the State Association elects the candidates from its own territory to Fellowship in the Institute, members of the Institute from other States having nothing to do with the election except that the president and secretary of the Institute must approve and sign the candidate's application to his State Association, and may withhold their signatures if they have reason to object to the candidate.

A "PYRAMIDICAL RAILWAY" which has recently been constructed in the Marine Park at Southend-on-Sea, was inspected on Wednesday. The Marine Park, close by the sea and extending to twenty-seven acres, was purchased by the syndicate a little more than a year ago, with the idea of developing its attractions as a place of public entertainment. Built on a huge conical framework, the main supports of which are of iron, the pyramidical railway, ascending spirally, presents the appearance of a series of galleries—five tiers, diminishing in circuit towards the top. The train, however, does not run from the base upwards, but downwards from the summit, to which the cars with the passengers are first raised from the ground by a big lift in the interior of the so-called pyramid. The motive force for this and the running of the cars is a steam-engine of four horse-power in the basement. From the top the cars descend the inclined track to the ground level, and proceed in the final stage through a short "cutting" which, for realistic effect, is to be formed into a tunnel. At the end of the journey which is estimated at a quarter of a mile, and is accomplished in about a minute and a half, the cars gradually rise on a reversed gradient, and move up to the elevator, where they halt automatically. There are three rails, two outside on which the wheels run, and a central check-rail. This new development of the switchback railway was erected by Mr. W. D. Pitt.

A NEW method of laying dust on the road bed is now being tried on the West Jersey and Seashore division of the Pennsylvania railroad, being the invention of Mr. J. H. Nicol, an assistant engineer to the company. The device consists in sprinkling the ballast with a heavy petroleum oil. The quantity of oil needed is 2,000 United States gallons per mile, and the distribution is effected from special cars, shields being provided to protect the rails from the spray. The operation is effected at the rate of four miles per hour. The use of the oil in this way was inaugurated last April, and up to August over 100 miles of track had been treated on the branch named, whilst a certain amount of work had also been done on other of the company's branches. The experience gained so far shows that one application of the oil is enough for at least one season, and the road is then absolutely free from dust.

The Rev. Canon Wilkinson, D.D., opened, on the 9th inst., new Sunday-schools which have been built in Dean-street for his old parish, St. Martin's, Birmingham. A large centre hall, Gothic in style, will serve not only for Sunday schools, but for meetings and for mission services. There are, in addition, three classrooms. The work has been carried out, to the plans of Mr. J. H. Hawkes, by Messrs. Barnsley and Son, also of Birmingham, and has cost about £2,500.

The Middlesex Hospital has received a further sum of £2,000, being part of a sixth share of the residuary estate of the late Mr. David Brandon, F.R.I.B.A.

At the closing meeting of the Trades Union Congress on Friday, on the voting for the Federation Committee, Mr. H. Johnson, London, was elected as a representative of the Carpenters' trade.

In the case of Christopher Hopkins, of St. Bernard's-road, East Ham, builder, the discharge from bankruptcy has been suspended for two years, ending August 12, 1899.

MEETINGS FOR THE ENSUING WEEK.

SATURDAY (TO-MORROW).—Dundee Institute of Architecture. Visit to Edinburgh to inspect (in conjunction with the members of the Edinburgh Architectural Association) the M'Ewan Hall and Blackford Observatory, Craigmillar Castle, Holywood, &c. To meet at Waverley Station, Edinburgh. 9.58 a.m.

THE ARCHITECTURAL ASSOCIATION, 56, GREAT MARLBOROUGH STREET, W.

NEW MEMBERS.

Students desirous of becoming members of the Architectural Association are requested to apply to the Hon. Secs. as early as possible for Nomination Forms.

Students whose nomination forms have been approved by the Committee will be admitted to the Classes provisionally, pending their election.

The Classes Commence on the 11th OCTOBER at 6.30 p.m., and the Studio Opens on the 12th OCTOBER at 6.30 p.m.

Nomination Forms, together with a pamphlet containing full particulars of the Studio, Lectures, Classes, and School of Design may be obtained on application to the Hon. Secs., at 56, Great Marlborough-street, W.

SEPTEMBER 25th.—SUMMER VISIT to the Grove Hospital, Tooting (Mr. A. H. Tiltman, Architect). Members to meet at the site at 3.30 p.m. Train from Ludgate Hill to Tooting Junction at 2.54, or from Victoria to Balham at 2.38.

Members who propose to attend this visit are requested to send a postcard to Mr. S. K. Greenslade, 53, Bedford-square, W.C.

E. HOWLEY SIM, G. B. CARVILL, } Hon. Secs.

THE SURVEYORS' INSTITUTION

(INCORPORATED BY ROYAL CHARTER).

Temporary Address—
SAVOY STREET, VICTORIA EMBANKMENT, W.C.

EXAMINATIONS, 1898.

PRELIMINARY EXAMINATION.

Notice is given that the Preliminary Examination for the admission of Students will be held on the 19th and 20th of JANUARY NEXT.

It is proposed to examine Candidates from the counties of Lancashire, Cheshire, Yorkshire, Durham, Cumberland, Westmoreland, and Northumberland, at Manchester. Candidates from other counties in England and Wales will be examined in London.

Irish Candidates will be examined in Dublin.

PROFESSIONAL EXAMINATIONS.

Notice is also given that the Annual Professional Examinations for Land Agents, Valuers, and Building Surveyors (held under the provisions of the Charter), qualifying for the Fellowship and Associateship of the Institution, will commence on the 21st of MARCH NEXT.

English Candidates for the Professional Examinations will be examined in London.

Irish Candidates will be examined in Dublin.

Particulars as to subjects, course of examination, prizes, scholarships can be obtained of the Secretary.

All applications for the Professional Examinations, Divs. II., III., IV., and V., must be sent in before the 31st of OCTOBER, and applications for the Students' Preliminary Examination before the 30th of NOVEMBER. The necessary Entry Forms for the various Examinations can be obtained of the Secretary.

CHIPS.

Mr. W. H. Wagstaff, A.M.Inst.C.E., 57, Saltergate, Chesterfield, has been instructed to report as to the best means of sewage disposal at Bolsover, near Chesterfield.

A new National school at Edgmond, near Shrewsbury, was opened last week. The school has been built by Mr. Whittingham, of Newport, from plans prepared by Messrs. Veall and Son, of Wolverhampton, the original contract being £872, which does not include school furniture nor the fencing and laying-out of the playground.

The urban district council of Machynlleth adopted at their last meeting plans prepared by Mr. W. C. Kirby, their engineer, for the drainage of the town, at an estimated outlay of £2,800.

The foundation-stone of the new church of St. Paul, Great Yarmouth, was laid on Thursday in last week. Only the first section of the permanent building, consisting of nave and porch, are in hand under the present contract. The building will be Late Gothic in character, and will be faced with brickwork with half timber. Messrs. Bottle and Olley, of Yarmouth, are the architects, and Mr. W. Cork is the builder.

The subway at Boston, Mass., was formally opened for street car traffic on September 1. At present only the Boylston-street and Tremont House cars are using the subway, but the Tremont-street and Shawmut-avenue entrance is very nearly completed, and will be in use by the beginning of October. The contract for building the last section near the Union station has been awarded, and work started. The Transit Commissioners believe that before next summer the entire subway will be in use, and Tremont-street entirely free from cars.

The city council of Norwich decided at their last meeting to raise the salary of Mr. A. E. Collins from £600 to £800 per annum.

Mr. John Thompson, of Peterborough, has just restored the parish church of Boothby Pagnell, near Grantham, at the expense of Mrs. Thorold, of Boothby Hall, who has thus spent several thousand pounds. The architect for the restoration was Mr. J. L. Pearson, R.A.

St. Columb magistrates investigated on Friday several charges arising out of the dispute as to the alleged right of way over the Newquay Headlands. Twenty-two residents of Newquay were committed to the Quarter Sessions on the charge of damaging the property of the Headland Hotel Company. Five of the defendants were fined for assaulting Mr. Silvanus Trevail, the chairman of the company. Two others pleaded guilty to assaulting the police, and were bound over to keep the peace.

LIST OF COMPETITIONS OPEN.

Battersea—Baths and Washhouses, Battersea Park-road	£100 (merged), £50, £25	W. M. Wilkins, Vestry Clerk, Municipal Bldgs., Lavender Hill, S.W.	Sept. 22
Frinton-on-Sea—Witton Wood-lane School (150 places)	No premium or assessor	A. R. Chamberlayne, Clerk, Station-road, Clacton	,, 24
Blaenau Festiniog—County Police Buildings	£15 15s.	J. Morris Jones, County Surveyor, Trawsfynydd, Merioneth	,, 25
Skipton—Cottage Hospital (16 beds, £2,500 limit—no assessor)	£15, £5	W. H. Dawson, Hon Sec. to Committee, Skipton	,, 30
Merthyr Tydfil—Second Floor to Dowlais Board School	£10	E. Stephens, Clerk, Merthyr Tydfil	,, 30
Skegness—Clock Tower (£300 (!) limit)	£7 10s., £2 10s.	W. Pillsworth Hiley, Garfield House, Skegness	,, 30
Morecambe—Sewerage Scheme	£100	Jno. Bond, Surveyor, U.D.C., Morecambe	Oct. 1
Ludlow—Electric Lighting Scheme	£20 (merged)	John H. Williams, Town Clerk, Ludlow	,, 1
Lower Bebington—Sewerage Scheme	£50, £35, £20	Joseph Young, Surveyor U.D.C., 72, Stanley-terrace, New Ferry	,, 1
Leeds—Wholesale Dead Meat Market and Abattoir	£100 (merged), £50, £25	John Harrison, Town Clerk, Municipal Buildings, Leeds	,, 8
Dorking—Workhouse Infirmary (65 beds, £4,000 limit)	No first, £15, £5	Geo. Scales, Clerk, High-street Dorking	,, 13
Colne—Technical School, Free Library, and Public Hall (£5,500 limit)	£50, £35	Alfred Varley, Town Clerk, Town Hall, Colne, Lancs	,, 20
Wolverhampton—Free Library (selected Architects)		The Town Clerk, Wolverhampton	,, 28
Eastcote and Northwood, near Ruislip—Sewerage Scheme	£40 for Combined Scheme, £15 for Eastcote, and £25 for Northwood.	C. Woodbridge, Clerk, R.D.C., 38, High-street, Uxbridge	,, 30
Southend—District Church	No premium offered; no Assessor named	Rev. E. C. Kimber, Avenue-terrace, Southend-on-Sea	Nov. 20
Mexico—Legislature Palace (1,500,000dol. limit)	15,000dol. Mex.	Secretary Public Works, Mexico City	,, 30
Cardiff—Town Hall and Law Courts (A. Waterhouse, R.A., Assessor—£200,000 limit)	£500 (merged), £300, £200	J. L. Wheatley, Town Clerk, Town Hall, Cardiff	Dec. 4
Carlton, Victoria—Children's Hospital	£100, £50, £25	J. Nicholson, Hon. Sec, Pelham-street, Carlton, Australia	(1898) Jan. 30
New York—Sun Dial (Plaster Model)	500dol., 250dol.	Sec., National Sculpture Soc., 215, West 57th-street, New York	(1898) Feb. 28
Newcastle-on-Tyne—New Infirmary (local Architects)	(No first) £150, £100, £50	Secretary, Building Committee, Newcastle	(1898) Mar. 1
Brighton—Artisans' Dwellings (local Architects only)	£75, £25	F. J. Tillstone, Town Clerk, Brighton	—
Lewisham—Free Library (£4,000 limit)	25gs.	Edward H. Oxenham, Clerk, Town Hall, Catford, S.E.	—
Boscombe—Hospital Enlargement, Shelley-road		J. Pratt, Assistant Sec., 126, Christchurch-road, Boscombe	—
Tottenham—School Board Offices		J. F. Adams, Clerk, School Board Offices, Tottenham, N.	—
Forest Hill—Free Library (£4,000 limit)	25gs.	Edward H. Oxenham, Clerk, Town Hall, Catford, S.E.	—
Carlisle—Board School (530 places)	£20, £10	S. Cartmell, Clerk, 27, Lowther-street, Carlisle	—

LIST OF TENDERS OPEN.

BUILDINGS.

Pontlottyn—Sixty-five Dwelling Houses	Building Club	Wm. Jones, Secretary, Board Schoolhouse, Pontlottyn	Sept. 18
Portsdown—Masonic Hall, Thomas-street		J. J. Phillips and Sons, Architects, 61, Royal-avenue, Belfast	,, 18
Wadsley—Washhouse and Laundry at Asylum	West Riding Asylum Committee	J. Vickers Edwards, County Surveyor, Wakefield	,, 18
Bradford—Alterations to Premises in Chapel-lane	Builders' Exchange Company	Abm. Sharp, Albany Buildings, Market-street, Bradford	,, 18
Taunton—Additions to Co-operative Premises, Magdalene-st.	Committee of Management	F. W. Roberts, Architect, Taunton	,, 18
Leeds—House, Albion Inn Estate, Dolly-lane		Charles Berry, Architect, 44, Primrose-road, Beckett-street, Leeds	,, 18
Dalton-in-Furness—Farm Buildings, Greenhills	Mrs. Ashburner, Ruskinville	Jno. Butler, Architect, Barrow	,, 18
Ingleton—Dwelling House		J Brookes, Main-street, Ingleton	,, 18
Kendal—Refronting Shop, 22, Wildman-street	J. Collinson	John Stalker, M.S.A., Architect, Kendal	,, 18
Resolven—Mixed Schools (528 places)	School Board	J. Cook Rees, Architect, Church-place, Neath	,, 20
Warminghurst, Pulborough—Single Cottage	Duke of Norfolk, E.M., K.G.	W. Heveningham, Estate Office, Arundel	,, 20
Warrington—Infirmary Workhouse	Guardians	William Owen, F.R.I.B.A., Cairo-street Chambers, Warrington	,, 20
Ravensthorpe—Seventeen Artisans' Dwellings, Aire-street		S. Wood and Son, Architects, Cheapside, Heckmondwike	,, 20
Winwick—County Asylum	Lancashire Asylums Board	Fred. C. Hulton, Clerk, County Offices, Preston	,, 20
Bradford—Business Premises in Ivegate		Jas. Ledingham, F.R.I.B.A., District Bank Chambers, Bradford	,, 20
Thakeham-place, Pulborough—Pair of Cottages	Duke of Norfolk, E.M., K.G.	W. Heveningham, Estate Office, Arundel	,, 20
Selby—Bacon Factory	Yorkshire Bacon Curing Co.	E. Townsend, Secretary, 1, Abbey-place, Selby	,, 20
Horfield—New Schools, Ashley Down	Horfield School Board	Walter S. Paul and James, Architects, 15, Clare-street, Bristol	,, 20
Llandudno—Electric Lighting and Refuse Destructor Buildings	Urban District Council	A. Conolly, Clerk, Council Offices, Llandudno	,, 20
Hunslet—Warehouse at Kinyon-street	C. and E. Roberts	Thos. Winn, Architect, 70, Albion-street, Leeds	,, 20
Wilton—Workhouse Laundry	Board of Guardians	G. M. Wilson, Clerk, 12, Bridge-street, Salisbury	,, 20
Leeds—Alterations to Virginia House, Headingley-lane	C. Roberts	Thomas Winn, Architect, 70, Albion-street, Leeds	,, 20
Torkington, Arundel—Pair of Cottages	Duke of Norfolk, E.M., K.G.	W. Heveningham, Estate Office, Arundel	,, 20
Kennington-road—Baths, Movable Floor	Lambeth Baths Commissioners	H. J. Smith, Clerk, Vestry Hall, Kennington-green, S.E.	,, 20
Lambeth—Camp Sheathing, Lett's Wharf	Commissioners of Sewers	H. Montagu Bates, Clerk, Guildhall, E.C.	,, 21
Northowram—Residence		J. F. Walsh, Architect, Bank Chambers, Halifax	,, 21
Whitehaven—Rebuilding 30, Lowther-street	R. T. Weld	Moffat and Bentley, Architects, Whitehaven	,, 21
Castleford—Additions to House and Shops, Carlton-street	George Drake	Arthur Hartley, Architect, Carlton Chambers, Castleford	,, 21
Middlesbrough—Alterations to the Albert Park Hotel	James Eadie, Limited	J. Mitchell Bottomley, Architect, Middlesbrough	,, 21
Portsmouth—Additions, Omega-road Board School		A. Bone, Architect, Cambridge Junction, Portsmouth	,, 21
Twerton, Bath—Steam Laundry	Bath Hygienic Laundry Company	Ernest J. White, Secretary, Northgate Chambers, Bath	,, 21
Lewisham—Fire Brigade Station, High-street	London County Council	C. J. Stewart, Clerk, Spring-gardens, S.W.	,, 21
Northowram—House		J. F. Walsh, Architect, Bank Chambers, Halifax	,, 21
Shotby Bridge—Cottage Houses	Gateshead Board of Guardians	C. A. Sharp, A.R.I.B.A., 24, Grange-street West, Newcastle	,, 21
Limerick—Works at City Dispensary	Guardians	J. O'Malley, B.E., 10, Glentworth-street, Limerick	,, 22
Pontypridd—Additions, Cilfynydd Board Schools		A. O. Evans, Architect, Post Office Chambers, Pontypridd	,, 22
Port Gaverne—Residence	Saville Smith, J.P.	Wise and Wise, Architects, Launceston	,, 22
Harrogate—Residence, Park-drive		E. Tweedale, Architect, 12, South-parade, Leeds	,, 22
Cramlington—Dwelling-House	J. Carr	Boolds and Hardy, Architects, Market-place, Morpeth	,, 22
Castleford—Cart-Shed, Whaledale-road	Urban District Council	H. H. Broadbent, Clerk, Council Offices, Castleford	,, 23
Acton—Beaumont Park Schools (600 places)	School Board	E. Monson, F.R.I.B.A., Acton Vale, W.	,, 23
Ault Hacknalt—Doe Lea School	U.D. School Board	Rollinson and Son, Architects, 13, Corporation-street, Chesterfield	,, 24
Ivybridge—Additions to Board Schools	Ivybridge School Board	John Ashford, Solicitor, Russell Buildings, Plymouth	,, 24
Liskeard—Villa	J. H. Blamey	John Sansom, Architect, Liskeard	,, 24
Yearby—Reading-Room		E. A. Whipham, A.R.I.B.A., 52, High-street, Stockton	,, 24
Featherstone—Laying-out Cemetery	Burial Board	W. H. Fearnley, Architect, Station-lane, Featherstone	,, 24
Westbury-on-Severn—Police Station	Gloucestershire County Council	E. T. Gardener, Clerk, Shire Hall, Gloucester	,, 25
Bovey Tracey—School at Heathfield		J. W. Rowell and Son, Architects, Newton Abbot	,, 25
Blackburn—St. Barnabas's Schools	Building Committee	Fred J. Parkinson, Architect, 9, Richmond-terrace, Blackburn	,, 25
Dymock-on-Severn—Police Station	Gloucestershire County Council	E. T. Gardener, Clerk, Shire Hall, Gloucester	,, 25
Ebchester—Sixteen Houses	Owners of Hamsterley Colliery	Hamsterley Colliery Offices, Ebchester, R.S.O.	,, 25
Great Yarmouth—Two Houses, Wellesley-road	Joseph Ellis	Chas. G. Baker, Architect, Town Hall Chambers Great Yarmouth	,, 25
Forres—Additions to Cluny Hill Hydropathic Establishment		John Forrest, Architect, 129, High-street, Forres	,, 27
London—Lunatic Wards, Infirmary, High-street	Guardians of Lewisham Union	H. C. Mott, Clerk, Union Offices, Lewisham	,, 27
Liverpool—Additions, Lodge-lane Baths	Corporation	W. R. Court, Engineer, 15, Great George-square, Liverpool	,, 27
Pudsey—Cabinetmaker's Workshop at Occupation-lane		William Davey, 27, Brunswick-road, Pudsey	,, 27
Lewisham—Lunatic Wards at Workhouse Infirmary	Board of Guardians	H. C. Mott, Clerk, 286, High-street, Lewisham	,, 27
Pembury, Tunbridge Wells—Boiler House Enlargement	Waterworks Committee	W. C. Cripps, Town Clerk, Tunbridge Wells	,, 27
Pencoed—Chapel		Rev. Stephen Jones, Coychurch, Bridgend	,, 27
Ormskirk—Board Room and Offices	Guardians	Alfred Dickinson, Clerk, Ormskirk	,, 28
Bradford—Seven Houses and House and Shop, Lidget Green		Samuel Robinson, Architect, 15, Cheapside, Bradford	,, 28
Chadwell Heath—Foundations, also Lodge, Lunatic Asylum	West Ham Town Council	Fred E. Hilleary, Town Clerk, Town Hall, West Ham	,, 28
Lumphanan—Public Hall		Clerk to the Parish Council, Lumphanan, N.B.	,, 28
Humberstone, Leicester—Additions, Borough Asylum	Leicester Corporation	Jas. Bell, Clerk to Visitors, Town Hall, Leicester	,, 28
Pellon—House on Blackwood House Estate		C. F. L. Horsfall and Sons, Architects, Lord-street, Halifax	,, 29
Pontardawe—Infants' School	Llanguicke School Board	W. W. Williams, Architect, Island Chambers, Swansea	,, 29
Burnley—Memorial Fountain, Queen's Park		Borough Surveyor, Town Hall, Burnley	,, 29
Rotherhithe, S.E.—Shelter at South Wharf	Metropolitan Asylums Board	J. Duncombe Mann, Clerk, Norfolk-street, Strand, W.C.	,, 29
Harpenden—Police Station	Herts County Council	Urban A. Smith, County Surveyor, 41, Parliament-street, S.W.	,, 29
Bootle—School for 1,000 Children, Gray-street	School Board	F. K. Wilson, Clerk, Balliol-road, Bootle	,, 30
Seaford—Alterations at Sewage Pumping Station	Urban District Council	W. H. Pawson, Clerk, Seaford	,, 30
Redditch, Wales—Police-Station and Petty Sessions Court	Worcestershire County Council	Mr. Henry Rowe, County Surveyor, Worcester	Oct. 1
Banbridge—Stationmaster's Office at Station	Gt. Northern (Ireland) Railway Co.	T. Morrison, Secretary, Amiens-street Terminus, Dublin	,, 4
Halifax—Drapery Warehouse, Rawson and Powell-streets		Jackson and Fox, Architects, 22, George-street, Halifax	,, 4
Clones—Platform Roofs at Station	Gt. Northern (Ireland) Railway Co.	T. Morrison, Secretary, Amiens-street Terminus, Dublin	,, 4

BUILDINGS—*continued.*

Bethnal Green, E.—Band Stand, &c., Boundary-street	London County Council	C. J. Stewart, Clerk, Spring-gardens, W.	Oct. 5
Sligo—New Flooring at County Infirmary	Governors	W. T. Vernon, Registrar, Sligo	,, 7
North Woolwich—Stores and Offices, near Beckton	London County Council	C. J. Stewart, Clerk, Spring-gardens, W.	,, 12
Earby—Station Hotel	Mrs. Hartley	Charles Parsons, 9, Grimshaw-street, Burnley	—
Hucknall Torkard—Nurses' Home		A. N. Bromley, Architect, Prudential Buildings, Nottingham	—
Clown—Two Houses		W. H. Wagstaff, A.M.I.C.E., Architect, Saltergate, Chesterfield	—
York—House at The Mount	A. K. Butterworth	A. A. Gibson, Architect, 8, Cambridge-crescent, Harrogate	—
Walthamstow—Terraces of Cottages		Eugene Beaumont, Architect, 78, Fleet-street, E.C.	—
Clacton-on-Sea—Pair of Villas, Hayes-road, and Five Houses, Rosemary-road		John H. Harman, Estate Office, Marine Parade, Clacton	—
Ramsgate—Four Cottages, St. Luke's-avenue	Gas Committee	W. A. Mackintosh Valon, C.E., Ramsgate	—
Burnopfield—Four-stalled Stable		Turnbull Brothers, Leases, Burnopfield	—
Lowick—National School Restoration		The Vicar, Lowick, Northumberland	—
Belfast—Branch at 183, North-street, Belfast	Home and Colonial Stores	Robert Keir, Ordained Surveyor, 20, George-street, Edinburgh	—
Ballygowan—Reroofing and Receiling Presbyterian Church		Joseph Gibson, Ballygowan	—
Rochdale—Additions, Carriage Factory, Tweeddale-street		Smith and Cross, Architects, Town Hall, Rochdale	—
Writhlington—Nineteen Houses and Shops	Radstock Breweries Co.	J. Ace Beynon, M.S.A., Coleford, Bath	—
Rhayaden—Wesleyan Church		F. G. Evans, Architect, Castle-road, Builth Wells	—
Bromborough—Detached Villa		Bell, Williams, Son, & Co., Surveyors, 40, North John-st., Liverpool	—
Kendal—Enamelling-House, Stramongate Bridge	Herbert Croft	John Stalker, M.S.A., Architect, 57, Highgate, Kendal	—
Bromsgrove Lickey—Residence		F. J. Yates, Architect, 1, Newhall-street, Birmingham	—
Carlisle—Warehouses, Scotch-street		T. Taylor Scott, F.R.I.B.A., Architect, Carlisle	—
Portadown—Convent	Sisters of Sacred Heart	J. J. Macdonnell, Architect, 27, Chichester-street, Belfast	—
Gwersyllt—Additions to National Schools		J. Plant, Wilderness Works, near Wrexham	—
Pontypool—Two Houses, Wainfelin-road		C. Foxwell, 14, Wainfelin-road, Pontypool	—
Newbury—Additions, Atlas Brewery	Berks Brewery Co.	Jas. H. Money, Architect, The Broadway	—
Bournemouth—Wesleyan Church and Schools, Westbourne		R. Curwen, Archt., Hamilton House, Bishopsgate-st. Without, E.C.	—
Water Fulford—Farm Buildings	Captain Key	Digby Cayley, 7, Blake-street, York	—
Enfield—Terraces of Cottages		Eugene Beaumont, Architect, 78, Fleet-street, E.C.	—
Pensford—Schools	Stanton Drew School Board	J. Ace Beynon, M.S.A., Sunnyside, Coleford, near Bath	—
Swanage—Burlington Hotel		Pearce and Offin, Dorsetshire Bank Chambers, Bournemouth	—
New Ferry—Mortuary	Lower Bebington U.D.C.	Joseph Young, Surveyor, 78, Stanley-terrace, New Ferry	—
Roths, N.B.—Town Hall		R. B. Pratt, Architect, County Bank House, Elgin	—
Bletchingley—Workhouse Enlargement	Godstone Board of Guardians	E. A. Head, Clerk, East Grinstead	—
Camberwell—Pair of Semi-detached Villas, Benhill-road		S. Evans, Architect, 36, Heron-road, Herne Hill, S.E.	—
Long Eaton—Alteration of a Shop	Leeds and Leicester Boot Co.	Ernest R. Ridgway, M.S.A., Architect, Long Eaton	—
Llanelly—Additions and Alterations to Brynawel New-road		W. Griffiths, Architect, Llanelly	—
Stockton-on-Tees—Buildings and Chimney, Bridge-road	Imperial Tramways Co.	Clifton Robinson, C.E., Bridge-row, Stockton-on-Tees	—
Revolving Observation Towers—Twelve		Secretary, Revolving Observation Tower Syndicate, Gt. Yarmouth	—
Leeds—Extension of Mill Premises, East-street	Roberts, Mart, and Co., Limited	Ambler and Bowman, Architects, 9, Park-place, Leeds	—
Hexham-on-Tyne—Square Chimney (75ft. high)		John Fenwick and Sons, Limited, Hexham-on-Tyne	—
Holbeach—Public Hall	Holbeach Public Hall Company	Joseph Sawyer, F.R.I.B.A., 63, Chancery-lane, London, W.C.	—

ENGINEERING.

Stratford, E.—Electric Wiring, Technical Institute	West Ham Corporation	F. E. Hilleary, Town Clerk, Town Hall, West Ham	Sept. 20
Whittingham—Electrical Plant at County Asylum	Lancashire Asylums Board	J. J. Muspratt, County Offices, Preston	,, 20
Bo'ness—Pipe Track, from Lochcote to Easter Carriber	Police Commissioners	R. J. Jamieson, Town Clerk, Bo'ness	,, 20
Barking—Electric Lighting Plant	Urban District Council	W. C. C. Hawtayne, C.E., 20, Bucklersbury, E.C.	,, 21
Port Elizabeth, Cape Colony—Electric Lighting	Town Council	Davis and Sloper, 54, St. Mary Axe, London, E.C.	,, 21
Llandyfaen—Works of Water Supply	Llandilo Urban District Council	R. Shipley Lewis, Clerk, 16, Rhosmaen-street, Llandilo	,, 21
Plymouth—Heating and Ventilating Municipal Buildings	Corporation	Jas. Paton, Borough Engineer, Plymouth	,, 22
Ilkeston—Sinking Shaft at Little Hallam Pumping Station	Works Committee	Wright Lissett, Town Clerk, Ilkeston	,, 23
Boston, Lincs—Sluice to Kirton Drain Outfall	Commissioners of Sewers	R. W. Staniland, Clerk of Sewers, High-street, Boston	,, 23
Glasgow—Heating Apparatus, Kennedy-street Washhouse	Corporation	J. Lindsay, Interim Clerk, City Chambers, Glasgow	,, 23
Pontefract—Engines and Boilers at Workhouse	Guardians	Wm. A. Glover, Clerk, Pontefract	,, 24
Leeds—Electric Lighting Board Room	Board of Guardians	J. H. Ford, East Parade, Leeds	,, 25
St. Alban's—Heating and Ventilating Lithographic Printing Works, Campfield	Orford Smith, Ltd.	G. P. Smedley, Architect, 110, St. Martin's-lane, Charing Cross, W.C.	,, 27
York—Widening Railway between Shipton and Tollerton Stations, Avenue Junction (Thirsk) and Otterington Station, and between Castle Hills Junction and Wiske Moor	North-Eastern Railway Company	C. N. Wilkinson, Secretary, York	,, 29
Plymouth—Electrical Plant for Tramways	Corporation	Jas. Paton, Borough Engineer, Plymouth	Oct. 2
Lisburn—Steel Girder Bridge over Antrim-lane	Gt. Northern (Ireland) Railway Co.	T. Morrison, Secretary, Amiens-street Terminus, Dublin	,, 4
Hipperholme Mills—Water Tower, Tanks, &c.		Medley Hall, Architect, 29, Northgate, Halifax	,, 4
Clones—Steel Girder Bridge over Monaghan-road	Gt. Northern (Ireland) Railway Co.	T. Morrison, Secretary, Amiens-street Terminus, Dublin	,, 4
Hull—Engines and Pumps		F. J. Bancroft, Waterworks Engineer, Town Hall, Hull	,, 7
Nice—Steel Bridge over the Paillon	Official	Le Mairie, Nice	,, 18
Hull—Electrical Equipment of Tramways (9 miles Double Track)	Corporation	A. E. White, City Engineer, Town Hall, Hull	Nov. 5
Leeds—Sinking Well in York-street	Yorkshire Pure Ice Company	W. S. Braithwaite, Architect, 6, South Parade, Leeds	—
Galway—Steel Joists, Iron Roof, and Balcony for Convent		James Costello, Sea-road, Galway	—

FENCING AND WALLS.

Lordship-lane, S.E.—Walls and Railings, Free Library	Camberwell Vestry	O. S. Brown, Surveyor, Vestry Hall, Peckham-road	Sept. 18
Aylesbury—Retaining Walls to Terraces, Buckingham-road and Walton-road	Urban District Council	J. H. Bradford, Surveyor, 2, Rickford's Hill, Aylesbury	,, 18
Gateshead—Boundary Walls at Workhouse	Board of Guardians	G. Craighill, Clerk, Prince Consort-road, Gateshead	,, 21
Featherstone—Boundary Walls to Cemetery	Burial Board	W. H. Fearnley, Architect, Station-lane, Featherstone	,, 24
Homerton—Boundary Walls, Union Infirmary	Hackney Board of Guardians	F. E. Coles, Clerk's Offices, Homerton, N.E.	,, 29
Nottingham—Walling-in Garden, Mansfield-road		W. H. Radford, Architect, Pelham Chambers, Nottingham	—
Fairfield, North Derbyshire—Retaining Wall to Village Green	Urban District Council	Garlick and Flint, Architects, Buxton	—
Fort William—Hill Fencing (1,000 yards)		N. B. Mackenzie, British Linen Bank, Fort William	—
Ramsgate—Iron Fence (1,650ft. run)	Gas Committee	W. A. McIntosh Valon, Engineer, Ramsgate	—

FURNITURE AND FITTINGS.

Downpatrick—District Lunatic Asylum	Board of Control	Secretary, Board of Control, Custom House, Dublin	Sept. 20
Hessel—Two Cottage Homes	Sculcoates Board of Guardians	W. Jackson, Clerk, Bowl-alley-lane, Hull	,, 24
West Ham—709 Chairs for Town Hall	Corporation	Lewis Angell, Borough Engineer, Town Hall, Stratford	,, 28
Darenth—Gore Farm Fever Hospital	Metropolitan Asylums Board	T. Duncombe Mann, Clerk, Norfolk-street, Strand, W.C.	,, 28
Chester-le-Street—Workhouse Infirmary	Board of Guardians	R. Dickinson, Clerk, Union Offices, Chester-le-Street	,, 28
Crewe—Technical Institute	Town Council	J. A. Jenkins, Secretary, Municipal Offices, Crewe	—

PAINTING.

York—Exterior of Hospitals	York Charity Trustees	William Hepper, Architect, 4, Spurriergate, York	Sept. 18
Dundee—Extension of Eastern Necropolis	Town Council	Thomas Thornton, Town Clerk, Dundee	,, 18
Leicester—No. 12 Iron Bridges over the River and Canal, and No. 51 Borough Boundary Landmarks	Highway Committee	E. G. Mawbey, C.E., Borough Surveyor, Town Hall, Leicester	,, 18
Morley—Buildings, Gates, Bandstand, &c., at Dartmouth Park	Corporation	M. H. Sykes, Borough Surveyor, Town Hall, Morley	,, 20
London, W.—South Dispensary, East-street, W.	Marylebone Guardians	Henry T. Dudman, Clerk, Northumberland-street, Marylebone-road	,, 20
Bentley-with-Arksey—School Buildings & Schoolmaster's House	School Board	J. Parkinson, 58, Bentley-road, York	,, 20
Pittington—Four Cottages and Business Premises	Amicable Industrial Society	Secretary, Amicable Industrial Society, Pittington	,, 20
Leicester—Interior of Market Hall and Auction Rooms	Markets Committee	E. G. Mawbey, C.E., Borough Surveyor, Town Hall, Leicester	,, 20
Wellingborough—Workhouse	Guardians	Sharman and Archer, Architects, Wellingborough	,, 21
Tottenham, N.—Water Tower and Tank at Downhills	Urban District Council	P. E. Murphy, 712, High-road, Tottenham	,, 21
Castleford—Council Offices	Urban District Council	H. H. Broadbent, Clerk, Council Offices, Castleford	,, 21
Leeds—Decoration of Board Room	Board of Guardians	J. H. Ford, Clerk, East Parade, Leeds	,, 25
Maidstone—Police Court	Town Council	Herbert Monckton, Town Clerk, Maidstone	,, 25
Selby—Thirty Houses (outside only)		T. C. Fawcett, Ousegate Maltkin, Selby	—
Wrexham—Twelve Houses in Regent-street		J. Squire, 10, Temple-row, Wrexham	—
Dewsbury—Twelve Houses in Reform-st., and Four at Fall-lane		J. C. Thornes, 1, Ashworth-terrace, Dewsbury	—
Northallerton—Langton Grange Farmhouse and Buildings		W. R. West, Solicitor, Thirsk	—
Keighley—Eight Houses at Stoney Bank, Skipton-road		Robert Tomlinson, Builder, Keighley	—

PLUMBING.

Belfast—All Public Buildings in District	Commissioner of Public Works	G. E. Shanahan, Assistant Secretary, Public Works Office, Dublin	Sept. 23

ROADS AND STREETS.

Heath Town—Paving, &c., James-street	Urban District Council	J. W. E. Stirk, Clerk, Office of Council, Heath Town	Sept. 18
Morley—Sewering and Kerbing of Clough-street		M. H. Sykes, Borough Surveyor, Town Hall, Morley	,, 20
Tottenham—Tar-Paving and Drainage on Commons within District	Urban District Council	Edward Crowne, Clerk, Tottenham	,, 21

ROADS AND STREETS—*continued.*

Cardiff—Kerbing and Paving Gileston and Pontcanna-roads	W. S. Powell	C. Telford Evans, Architect, 8, Queen-street, Cardiff	Sept. 21
Dudley—Paving and Sewering New Streets on the Firs Estate	Special Road Committee	John Gammage, Borough Surveyor, Town Hall, Dudley	,, 21
Tottenham—Kerbing and Paving part Seven Sisters'-road	Urban District Council	Edward Crowne, Clerk, Tottenham	,, 21
Cardiff—Paving, Kerbing, and Channelling 16 Streets	Corporation	W. Harpur, M.I.C.E., Borough Engineer, Town Hall, Cardiff	,, 22
Blackburn—Paving and Sewering of Various Passages	Corporation	Alfred Gill, Town Clerk, Birkenhead	,, 29
Erdington—Paving and Making Good Hillaries-road and Frederick-road	Urban District Council	Herbert H. Humphries, Surveyor, Public Hall, Erdington	,, 29
Harrogate—New Road and Sewers	Stonefall Park Estate Company	Whitehead and Smetham, Architects, Albert Chambers, Harrogate	—
Enfield—Making Cahsfield-road, Enfield Lock		Crawter and Co., Cheshunt, Herts	—

SANITARY.

Birmingham—Culverts and Sewers in Stoney-lane	Public Works Committee	John Price, City Surveyor, Birmingham	Sept. 18
Plymouth—Underground Convenience	Town Council	Jas. Paton, Borough Engineer, Municipal Buildings, Plymouth	,, 18
Bury—Construction of Brick Manholes for One Year	Corporation	J. Haslam, Town Clerk, Bury, Lancs	,, 18
Clapham, York—Construction of Sewers	Settle Rural District Council	C. E. Bygrave, Clerk, Castleville, Settle	,, 20
Basford, Notts—Sewers (3,300 lineal yards)	Rural District Council	Herbert Walker, A.M.I.C.E., Newcastle Chambers, Nottingham	,, 20
Ludgate-circus, E.C.—Alterations to Underground Convenience, New Bridge-street	Commissioners of Sewers	H. Montague Bates, Clerk, Guildhall, E.C.	,, 28
Newick—Sewerage Works	Chailey Rural District Council	J. Miles, Clerk, 173, High-street, Lewes	Oct. 5
South Moor, Co. Durham—Sewage Works	Owners of Townley Estate	T. C. Nicholson, F.R.I.B.A., Blaydon-on-Tyne	—

STEEL AND IRON.

Edinburgh—C.I. Pipes (1,000 tons)	Edinburgh Water Trust	Jas. Wilson, C.E., 72A, George-street, Edinburgh	Sept. 18
Colne—Ironfounders' Work, Refuse Destructor	Corporation	T. H. Hartley, Borough Surveyor, Colne, Lancs	,, 23
Ilkeston—C.I. Water-Mains	Corporation	Wright Lissett, Town Clerk, Ilkeston	,, 23
Stockport—C.I. Gas-Mains	Corporation	J. Meunier, Millgate Gasworks, Stockport	,, 23
Frome—C.I. Water-Pipes (70 tons)	Urban District Council	G. W. Bradbury, Clerk, Public Offices, Frome	,, 27
Waterford—Steel Flange Rails (1,500 tons)	Waterford & Limerick Railway Co.	J. J. Murphy, Secretary, Head Offices, Waterford,	,, 28
Axbridge—C.I. Socket Pipes (800 tons)	Rural District Council	A. Powell, A.M.I.C.E., 3, Unity-street, Bristol	Oct. 4
Christiania—143,700 Fish-Plate Screens	Norwegian State Railways	Styrelsens Expedition Skontor, Statsbanerne, Christiania	,, 6
Christiania—340,500 Railway Plates, and 823,000 Dogs	Norwegian State Railways	Styrelsens Expedition Skontor, Statsbanerne, Christiania	,, 6

STORES.

Chorley—Paving Materials for Twelve Months	Corporation	J. Mills, Town Clerk, Chorley	Sept. 18
Bury, Lancs—Ironmongery, Paints, and Timber	Corporation	J. Haslam, Town Clerk, Bury	,, 21
Blaina—Limestone (1,700 tons) and Gravel (200 tons)	Urban District Council	W. L. Roach, Surveyor, Blaina	,, 22
Rochester—Fireclay Retorts (1,500ft. run) & Firebricks (50,000)	Gas Light Company	J. M. Veevers, Secretary, Gas Offices, Rochester	,, 23
Hoylake—Redwood Piling (80,000ft.), Granite (7,000 tons), Sandstone (7,000 tons), and Portland Cement (2,500 tons)	West Kirby U.D.C.	Roderick Williams, Clerk, Hoylake	,, 27
Merthyr Tydfil—Broken Limestone	Gelligaer Rural District Council	F. T. James, Clerk, 134, High-street, Merthyr Tydfil	,, 29
Barking and Crossness Outfall Works—Commercial Green Vitriol (2,500 or 5,250 tons)	London County Council	C. J. Stewart, Clerk, Spring Gardens, S.W.	Oct. 5
Barking and Crossness Outfall Works—Lime (11,500 tons or 23,000 tons)	London County Council	C. J. Stewart, Clerk, Spring Gardens, S.W.	,, 5

Trade News.

WAGES MOVEMENTS.

Leeds.—The plasterers' labourers in Leeds are asking for an advance of ½d. per hour. They at present receive 6½d. A conference took place on Monday evening between representatives of the men and their employers, but no settlement was arrived at. The masters complain that the men have not given them sufficient notice of their intention to make the demand. To grant such a concession, they say, would mean a serious loss, as they have entered into contracts on the present basis.

Peterborough.—A settlement between the master builders and the carpenters and joiners of the Peterborough district with regard to the rate of wages has, after nearly nine months' of correspondence, been effected. The men had asked for an increase, and the masters had offered a halfpenny rise to all joiners whom they considered competent. Last week four delegates met the master builders, and an agreement was signed that the standard rate of wage was to be 7d. per hour. The agreement dates from January, 1897, until January, 1900, and if any alteration is then desired a three months' notice must be given.

The Skilled Labour Market.—The Labour Department of the Board of Trade report that the market at the end of August was considerably affected by the continuance of the dispute in the engineering trade. On the whole the general state of employment has somewhat declined, compared both with the previous month and with the corresponding month of last year. In the 113 trade unions making returns, with an aggregate membership of 462,256, 17,440 (or 3·55 per cent.) were reported as unemployed at the end of August, compared with 2·7 per cent. at the end of July, and with 3·4 per cent. in the 110 unions, with a membership of 429,621, from which returns were received for August, 1896. The building trades still continue briskly employed, the percentage of unemployed in unions making returns being 1·2, compared with 1·3 in July and 1·1 per cent. in August, 1896. The furnishing trades remain busy. The percentage of unemployed Union members at the end of August was 1·7, compared with 1·9 in July and 2·1 per cent. in August of last year. Changes in rates of wages, affecting about 132,100 workpeople, were reported during August, of which number about 131,000 received increases and about 1,100 sustained decreases. The net result was an average advance estimated at 7d. per head on the weekly wages of those affected. The increases include about 3,400 building trade operatives.

The Mersey Docks Board have decided, on the recommendation of their works committee, to provide a 40-ton movable hydraulic crane at the new graving dock at the Canada Dock, at a total estimated cost of £10,200.

LATEST PRICES.

IRON, &c.

	Per ton.		Per ton.
Rolled-Iron Joists, Belgian	£5 15 0	to	£6 0 0
Rolled-Steel Joists, English	6 0 0	,,	6 10 0
Wrought-Iron Girder Plates	5 15 0	,,	6 10 0
Bar Iron, good Staffs	7 0 0	,,	8 0 0
Do., Lowmoor, Flat, Round, or Square	17 0 0	,,	17 0 0
Do., Welsh	5 15 0	,,	5 17 6
Boiler Plates, Iron—			
South Staffs	7 17 6	,	8 5 0
Best Snedshill	10 0 0	,,	10 10 0
Angles 10s., Tees 20s. per ton extra.			
Builders' Hoop Iron, for bonding, &c., £6 15s. 0d. per ton.			
Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.			
Galvanised Corrugated Sheet Iron—	No. 18 to 20.		No. 22 to 24.
6ft. to 8ft. long, inclusive	Per ton.		Per ton.
gauge	£10 15 0	...	£11 0 0
Best ditto	11 5 6	...	11 10 0
	Per ton.		Per ton.
Cast-Iron Columns	£6 0 0	to	£8 10 0
Cast-Iron Stanchions	6 0 0	,,	8 10 0
Cast-Iron Sash Weights	—	,,	4 2 6
Cast-Iron Socket Pipes—			
3in. diameter	5 10 0	,,	5 15 0
4in. to 6in.	5 5 0	,,	5 10 0
7in. to 24in. (all sizes)	4 15 0	,,	5 5 0
[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]			
Pig Iron—	Per ton.		
Cold Blast, Lilleshall	105s. to 110s.		
Hot Blast, ditto	57s. 6d. to 62s. 6d.		
Wrought-Iron Tubes—Discount off Standard Lists f.o.b.			
Gas-Tubes	75p.c.	Fittings	77½p.c.
Water-Tubes	70	,,	72½
Steam-Tubes	62½	,,	65
Galvanised Gas-Tubes	60	,,	62½
Galvanised Water-Tubes	55	,,	57½
Galvanised Steam-Tubes	45	,,	47½
	10cwt. casks.		5cwt. casks.
	Per ton.		Per ton.
Sheet Zinc, for roofing and working up	£20 10 0	to	£20 15 0
Sheet Lead, 3lb. per sq. ft. super.	15 5 0	,,	15 15 0
Pig Lead, in 1cwt. pigs	14 5 0	,,	15 5 0
Lead Shot, in 28lb. bags	17 0 0	,,	18 0 0
Copper Sheets, sheathing and rods	60 0 0	,,	61 0 0
Copper, British Cake and Ingot	51 10 0	,,	52 0 0
Tin, Straits	61 8 9	,,	61 18 9
Do., English Ingots	64 10 0	,,	64 12 6
Spelter, Silesian	17 7 6	,,	17 17 6
	Per ton.		Per ton.
Cut Clasp Nails, 3in. to 6in.	£8 15 0	,,	£9 15 0
Cut Floor Brads	8 10 0	,,	9 10 0

Wire Nails (Points de Paris)—

0 to 7	8	9	10	11	12	13	14	15	B.W.G.
8/6	9/0	9/6	10/3	11/0	12/0	13/0	14/9	16/9	per cwt.

TIMBER.

Teak, Burmah	per load	14 5 0	,,	15 10 0
,, Bangkok	,, ...	10 10 0	,,	15 0 0
Quebec pine, pitch	,, ...	—	,,	—
,, yellow	,, ...	2 0 0	,,	4 0 0
,, Oak	,, ...	5 10 0	,,	6 10 0
,, Birch	,, ...	4 5 0	,,	6 0 0
,, Elm	,, ...	4 0 0	,,	5 5 0
,, Ash	,, ...	3 5 0	,,	4 10 0
Dantsic and Memel Oak	,, ...	2 10 0	,,	3 10 0
Fir	,, ...	2 5 0	,,	4 5 0
Wainscot, Riga p. log	,, ...	1 10 0	,,	3 15 0
Lath, Dantsic, p.f.	,, ...	4 10 0	,,	5 10 0
St. Petersburg	,, ...	5 0 0	,,	6 10 0
Greenheart	,, ...	8 0 0	,,	8 10 0
Box	,, ...	£4 10 0	to	£15 0 0
Sequoia, U.S.A. ...per cube foot		0 1 8	,,	0 1 10
Mahogany, Cuba, per super foot 1in. thick	,, ...	0 0 5	,,	0 0 6½
,, Honduras	,, ...	0 0 5	,,	0 0 6½
,, Mexican	,, ...	0 0 4	,,	0 0 5
Cedar, Cuba	,, ...	0 0 4½	,,	0 0 5
,, Honduras	,, ...	0 0 4	,,	0 0 5
Satinwood	,, ...	0 0 7	,,	0 1 0
Walnut, Italian	,, ...	0 0 3½	,,	0 0 7
Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 11in.:—				
Quebec, Pine, 1st		£20 10 0	to	£26 10 0
,, 2nd		15 0 0	,,	17 10 0
,, 3rd		7 10 0	,,	11 0 0
Canada Spruce, 1st		10 10 0	,,	12 0 0
,, 2nd and 3rd		8 0 0	,,	9 0 0
New Brunswick		7 10 0	,,	8 0 0
Riga		6 10 0	,,	7 10 0
St. Petersburg		8 10 0	,,	12 10 0
Swedish		9 0 0	,,	15 10 0
Finland		8 0 0	,,	8 10 0
White Sea		9 10 0	,,	16 0 0
Battens, all sorts		5 0 0	,,	20 0 0
Flooring Boards, per square of 1in.:—				
1st prepared		0 8 6	,,	0 15 6
2nd ditto		0 7 0	,,	0 12 0
Other qualities		0 5 0	,,	0 6 6
Staves, per standard M:—				
Quebec pipe		—		—
U.S. ditto		35 0 0	,,	42 10 0
Memel, cr. pipe		230 0 0	,,	240 0 0
Memel, brack		200 0 0	,,	210 0 0

OILS.

Linseed	per ton	£16 0 0	to	£16 10 0
Rapeseed, English pale	,, ...	28 0 0	,,	28 5 0
Do., brown	,, ...	26 10 0	,,	26 15 0
Cottonseed, refined	,, ...	16 0 0	,,	17 0 0
Olive, Spanish	,, ...	28 0 0	,,	30 0 0
Seal, pale	,, ...	23 10 0	,,	24 0 0
Cocoanut, Cochin	,, ...	27 15 0	,,	28 0 0
Do., Ceylon	,, ...	22 10 0	,,	22 15 0
Palm, Lagos	,, ...	22 0 0	,,	23 0 0
Oleine	,, ...	18 15 0	,,	19 15 0
Lubricating U.S.	per gal.	0 6 3	,,	0 7 6
Petroleum, refined	,, ...	0 0 4¾	,,	0 0 4¾
Tar, Stockholm	per barrel	1 2 0	,,	1 5 0
Archangel	,, ...	0 12 6	,,	0 15 0
Turpentine, American	per ton	21 0 0	,,	21 10 0

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BUILDING VARIATIONS, HERE AND ABROAD.

PRACTICE in one locality or district for a long time begets a narrow and somewhat mannered style, which is noticed both in workmanship and design. Of course, the provincial or local architect suffers chiefly from this kind of restraint. He is obliged to use one kind of stone or brick, and to adopt methods of doing work under contracts or otherwise which are in use in the district. It is extremely hard to break through these methods, as he soon finds to his cost if he specifies anything that is new or that is not known by the local workmen, or even if he treats anything differently to the local manner. The builder or workman cannot turn his hand to the new method: he says it cannot be done; that it is impracticable, or he cannot get any workmen to do it the way suggested. The mason or bricklayer has been taught to lay stones or bricks in a certain way, and he is slow to undertake any new mode of building walls, and the consequence is if the architect designs any feature or detail that is not understood, he has to take the risk of any failure that may ensue. This is particularly observable in the modes of dealing with stone in stone districts, and in places where brick is more used, as we at once notice in the North when compared with South. No doubt the provincial practitioner is more restricted than the Londoner in these respects; but even London practice is limited in its choice of materials and modes of construction and treatment. In all parts of the Metropolis we find much the same kinds of house-building and business premises, mainly controlled by the use of stock and red brick, by the same specification description of making sashes and frames, of roofing, and the various other usual sorts of fittings ironmongery, and the like. Wherever we go, north, south, east, or west, from Highgate to Penge, or from Hammersmith to Woolwich, the same kind of dwellings and buildings are to be seen—we notice a general likeness everywhere: the same dingy stock-brick wall, sash window and door, slated or flat roof, chimneys, and the like. And in matters of style, detail, and ornament there is "much of a muchness" also, for we notice, with slight variations, the same treatment of doors, entrances, windows, and dressings, till we get perfectly sick of the eternal sameness and want of invention of "jerry" builders and of Philistinish architects. We cannot expect to import new materials; the grievance is in repeating the same features and details when we have often more judicious ones within our reach.

One building is differentiated from another mainly by these circumstances: (1) by its use, (2) by the materials employed, (3) by methods of construction. We may now deal chiefly with the last two of these, which are chiefly owing to local conditions. But it is worth notice that, given the same materials in adjoining countries, it does not follow that the same style or treatment is adopted. The two countries look on the materials and their mode of employment differently. Thus, stone and brick, timber and iron are used both by us and our neighbours across the Channel; but each country has its own way of using them to produce like results. And it is about this element of treatment chiefly that we may say a few words. Those countries that are most free from the constraints of tradition or style are the most successful in their use of materials. Thus if we have been in the habit of using bricks to imitate stone or to follow a particular style, it is impossible for us to produce a brick style that is really truthful. The habit of covering our brick buildings with stucco or cement to imitate stone has made us lose sight of the proper treatment of brick. Hence we must look to Continental examples of brickwork in Belgium, Germany, and elsewhere for a proper treatment of this material Our best recent buildings of brick have, in fact, followed these models, and have become, therefore, more Continental than English. And we may say the same of what we call Classic. As a fact, our architects have been head and hand tied to Italian or Greek traditions more than the French or the Germans have been. We used to copy Greek temples and Italian palaces, as we have examples to show; but the French capital itself can hardly show so exact a repeat (except, perhaps, the Madeleine) as St. Pancras Church is of the Greek Erectheion and the replica of the "Temple of the Winds" in its steeple. And this is because our neighbours have learned to use their materials like brick and stone honestly, without trying to imitate details, and just why the same materials in their hands have been turned to better account.

Let us take a few of the features which differentiate English buildings from those on the Continent. The mode of treating walls of masonry is one. Anyone who has travelled at all in districts in which different local materials and workmanship exist, will have noticed the modes of using the common rubble and sandstones; of building jambs and window pilasters and architraves, of dealing with the flat surfaces of walls by stucco or otherwise. These are often thrown into panels, with stone or brickwork in the quoins and jambs, as in our flintwork. In most cases the local stone is used, as we see in Normandy, in the plinths and basements of houses. Our neighbours are fortunate in having some cheap materials and concretes. The Béton Aggloméré, patented by Coignet, and the ordinary béton employed are used largely. Their limestones are also well adapted for wall-building. The Creuilly stone is largely used in spire-building in Normandy and elsewhere, also in the walls of houses, and they have the knack of keeping the harder veins of rock for special purposes, and using the softer beds for walls—a practice the old 12th-century builders adopted.

In the neighbourhood of Paris we see the porous concrete or artificial stone of yellow or brownish colour largely employed for building walls of dwellings; this rough kind of walling is sometimes pointed and looks like our Kentish "rag"-work, very often it is covered by a coating of stucco and makes a good wall. Window dressings have also a character of their own across the Channel. The usual architrave mouldings returning all round the opening or plain reveals are less frequent; the dressings are, instead, plain projecting pilasters or bands of stone or brick, the wall surfaces being left of rough rubble or rough stucco. A more solid and structural character is the result of this plain frame of brick or stone round the window openings of ordinary houses, and it is certainly more satisfactory and finished in appearance than the "hole in the wall" opening, so common in English building. The window head is sometimes a plain stone lintel, straight or slightly pointed on the top, resembling a flat pediment, or it is a flat brick arch; so the window-sill in France, and in other countries like Belgium, is seldom a plain weathered slab of stone with a projecting square edge, but moulded and made a feature of interest. These differences in matters of detail, which are passed unnoticed by the ordinary observer, arrest the attention of the architect.

Everyone must have noticed the greater prominence given to the doorway in all French cities. It is larger, and more ornamental, and the most ordinary building in Paris has an entrance which would often put to shame that of many of our City offices and banks in London. As one of the most important features of civic architecture, we may profitably note a few of the characteristic details of the doorway as we see it abroad. It is much higher as well as wider than the English doorway is as a rule—often rising through the entresol. Examples meet us in every main street or boulevard—as in the Boulevards Hausmann, St. Martin, Des Italiens, Capucins, Sebastopol, &c. In some of these thoroughfares—as in the first named—the doorway is of considerable height, the arched heads are carved in relief at the springing and keystones, and the wooden doors or gates are in two leaves, with small doors for use. The ornamentation or sculptured relief is sometimes profuse of Rococo design; but there are many examples of refined Renaissance character. And this remark extends to the woodwork of the doors. The upper panels have often well-designed frieze decorations planted on the framing, or raised decorations in wood, more or less Classical in taste, especially in the upper portion or doorhead. The frieze-panel or attic above the casing is, indeed, one of the features which give the French doorway a decorative character quite its own. "Le Grand Roy," in his palaces, and his successor, Louis XV., both encouraged these decorative doorways and *portes cochères*. After this the ornamental doors became thin and over-refined and pseudo-Classical; but the Neo-Grec and pseudo-Roman styles still prevail. Examples of doors after Le Paultre, Puget, and Lemercier, are frequently met with in France. Le Paultre was a master of decorative doorways in the 17th century. Interior doors with attic panels of severe form and good proportion may be found. The Hôtel de Lassay, and an old hotel at Dijon, have very beautiful instances of attic panels and side panels on the jambs with rich relief carvings. The fancies of the sculptor and decorator were often let loose on these hotel and palatial doorways. At the Hôtel de Mantignon, Paris, the window-head keys are ornamented with a small piece of sculpture. The *menuiserie* became quite pliable in the hands of sculptor-artists like Harpin and Puget, in the interior doors of the period, as those of the Hôtel de Soubise, where we see a profusion of the most charming conceits, paniers, sculptured keys, panel-frames, and figures. Such monumental doors as those of the Panthéon, by Constant Dufeux, of the Library of Sainte Genevieve, designed by Labrouste, and the grand bronze doors of the Madeleine and St. Augustin are examples that are well known. The carved door-frames and centre-posts are also peculiar to Belgium and France, and many of them are very beautiful examples of art craftsmanship. To describe adequately the subject of doorways and pedimental compositions over them would require an article; we content ourselves with mentioning two or three other distinctive details which separate our own from foreign buildings. We have spoken of windows. We envy our neighbours across the Channel their ironwork in the shape of grilles and balcony railings. What dignity and security the iron grille or screen gives to the windows of the basement and ground stories! Hardly an important house or building is without external ironwork of good design. Some of them are charming examples of smithing. Then we notice the greater interest imparted to blank wall surfaces, like the flanks of high chimney-stacks and the sides of houses, by carved panel-work or modelled decoration. Surely we may take a lesson here profitably. Many of our London chimney-stacks and blank walls are large and bare enough to call for some kind of decorative treatment, and the panel-work

seen on the sides of the lofty stacks of the Louvre, Hotel de Ville, and other buildings are examples of treatment that may be followed. Unfortunately with us, our large buildings which have these blank spaces are too great a temptation to the bill-poster, who offers high rents for them to exhibit some monstrosity in the form of trade advertisements. The streets of the French capital, generally planned at acute and obtuse angles, and radiating from some great building like the Madeleine or the Grand Opéra in straight lines, suffer from the lack of variety, and in the long boulevards there is a painful sense of horizontal lines. Three or more series of balconies, added to cornices, rows of high dormers, and Mansard roofs, create an almost oppressive horizontality, compared with which our irregular lines of street and broken skylines and façades are pleasing and varied. Each has its advantages; but we should be sorry to follow the example of our neighbours. Straightness and uniformity of elevation would be dearly bought with narrow streets, without the charm of the rows of trees which make the Continental boulevard so attractive.

THEATRE-PLANNING AND CONSTRUCTION.

ONE of the few features of interest in the Victorian Era Exhibition at Earl's Court is the section devoted to theatre-planning and construction during the latter half of the Victorian era, which contains a large and representative collection of drawings, plans, and details of the leading London and provincial theatres, which have been erected during the present reign. To the able and experienced hands of Mr. Edwin O. Sachs, member of the Drama Committee of the Exhibition, and the author of "Modern Opera Houses and Theatres"—the most important treatise on the subject, which illustrates all the chief playhouses in Europe, published by Mr. B. T. Batsford, which we lately noticed in these pages—the collection and arrangement of the Architectural room has been intrusted. His special knowledge of the subject of theatre-planning and construction has been of great value in this direction, and has enabled the committee to bring together a very complete series of plans, sections, and views of the leading playhouses. Theatre construction is an essentially technical branch of architecture, and there are few architects who possess any special knowledge of the subject. The original drawings of eminent theatre architects, as those of the late Mr. C. J. Phipps, F.S.A., Mr. Frank Matcham, Messrs. Perry and Reed, Mr. Ernest Runtz, Messrs. Wylson and Long, T. E. Collcutt, and others, are to be seen, in addition to a very comprehensive series of plates published in Mr. Sachs's own great work, and to copies and prints in his own collection. A very instructive series of diagrams of block plans of London and provincial theatres and music halls, specially drawn for this exhibition, are hung on the walls. These block plans are drawn to a uniform scale of 1 to 500, so that anyone may at once compare the relative sizes of these buildings. Glancing over the series of London houses and theatres of varieties, we find the Alhambra in Leicester-square the largest in area, followed closely by the Palace Theatre, the Lyric, and the Oxford. From these block plans we naturally turn to the detailed plans themselves. Historically viewed, the three principal London theatres of the century now drawing to a close are those of Covent Garden, Drury Lane, and Her Majesty's, plans and elevations of which have been prepared by Mr. Edwin O. Sachs. These are followed by lithographic plates from Mr. Sachs's volumes representing noted London theatres built during the last twenty years, the lithographic work being executed by Mr. Jas. Akerman. A very instructive comparative view is thus afforded of the improvements in planning and construction during this period, which it is of interest to note. Compare, for example, any of the early theatres with Mr. R. D'Oyly Carte's English Opera House, or with the Lyric Theatre. We notice, first of all, the improvements in the location, or the near approach to isolation which the new theatre possesses; the greater attention to division of the auditorium by separate walls and partitions into sections, thus facilitating a speedy emptying of the house in case of panic—a most important consideration, which the old theatre-builder seemed to disregard altogether; also the provision of separate exits to each portion of the audience. If we compare the new with the old plans, we shall be struck with the improved planning in all these points; there is complete isolation, or three sides, at least, are accessible. The auditorium is divided into separate parts, or "risks," each having its own entrances and exits. We do not mean to infer that an ideal plan has been arrived at. This is far from being the case; but these principles of planning have been kept in view. Sir Henry Irving's "Safety Theatre" plan, lent by Messrs. Darbyshire and Smith, is an ideal design shown by ground plan, circle plan, and longitudinal section, and expresses the great tragedian's views on these points. In the plan illustrating these views we find a rectangular area divided into the usual stage and auditorium longitudinally. The stalls, pit, and gallery on the lower plan are separated by partitions into sections, each having its own stall entrance, pit entrance, and gallery entrance, with pay-offices, retiring-rooms, &c., on one side of auditorium, and immediately giving access to each section, and on the other side correspondingly placed are the exits and retiring-rooms for each division. The stair entrance to upper circle is located at the short side or back of the auditorium, also the exit. In the section we see the dress and upper circle arranged in one inclined gallery, each separated from the other, the object of which is to reduce the height of audience above the street level. Two separate exits to each section of the audience is given. In narrow and confined sites, it is impossible to follow these latter suggestions, and the idealist in theatre planning has not found a large following by our London theatre architects and managers. Several of these schemes are before the public, a few of which we have noticed at various times; but the "ideal" site has not yet turned up at the right time and place. The New Theatre Royal, Exeter, by Messrs. Darbyshire and Smith, situated on a site bounded by streets at a sharp angle, follows Sir H. Irving's plan. There are three entrances in Longbrooke-street to the second circle, amphitheatre, and pit, also exits, and the main dress circle entrance is at the acute corner. The same architects' "Manchester Palace Theatre of Varieties," illustrated by plans of the different levels and sections, indicates a departure from the old plan. The auditorium is a wide semi-octagonal area, with promenade round it a large foyer, and the building is isolated on three sides. Mr. C. J. Phipps's Theatre, Wolverhampton, shown by area and first tier plans, also exhibits a wide auditory 70ft. wide, and a well arranged plan of entrances, &c. One of the main conditions of a safe theatre is the avoidance of considerable height in the seating of the audience. This condition is exceedingly difficult to observe in a London theatre on a small site; but there are a few recent theatres—as one at Dalston—which show improvement in this respect, avoiding the break-neck upper gallery and amphitheatre. One of the last of the late Mr. Phipps's works was Her Majesty's Theatre, and we have here, besides a view, plans of area, first tier, &c. We recently gave the exterior design of this building in the Building News of May 14 last. The auditorum and stage occupy the inner area of the rectangular site. Towards the Haymarket is a spacious vestibule with pit, first and second tier, staircases, and other entrances and exits on the return side. A large theatre of varieties is the "Colosseum," Dalston, from the designs of Messrs. Wylson and Long, who contribute plans of the Oxford Music Hall, one of the latest and best, the Empire Theatre, Bristol; the Lyric, Bath; Winter Gardens, Blackpool (which is shown in colour detail and a large model of the decoration); the Empress Theatre, Brixton. The Colosseum has a large auditorium, and the audience is confined to a balcony and gallery—a decided improvement on a number of superimposed galleries.

The lithographic plates of London theatres include, besides Mr. R. D'Oyly Carte's New Palace Theatre of Varieties, which we have illustrated, Daly's Theatre, with three tiers; Garrick Theatre; Grand Theatre, Islington; Lyric, and Trafalgar Theatre; also those of Wolverhampton Grand Theatre, Leeds, Cambridge, and the Shakespeare Memorial Theatre, Stratford-on-Avon, by Mr. F. W. Unsworth, which was fully illustrated in the "B.N.," besides plates of several music-halls: the Alhambra Theatre, by J. Tavenor Perry and F. H. Reed; the Empire Variety Theatre, Palace Theatre, Manchester; Oxford Theatre, London. All these plates are from Mr. Sachs's work. The series of photos. representing these and other theatres of London, the valuable collection of plans designed and executed under the supervision of Mr. Frank Matcham, including the Lyric, Hammersmith; Empire Palace, Edinburgh; Theatre Royal, Bolton; Grand Theatre, Islington; Canterbury Music Hall, Grand Theatre, Blackpool; Opera House, Wakefield; Alhambra, Brighton, and a dozen or two others, and the late Mr. Phipps's drawings, make a valuable historical series of this branch of design.

Examples of modern theatre construction in its latest development will be found of interest. The drawings and details of the iron and steel cantilevers and roof-trusses of Mr. D'Oyley Carte's Palace Theatre show the great advances made in the fireproof construction of this class of buildings. Here we have drawings showing the radiating cantilevers and cross-beams and stanchions of the dress circle and second circle, also the main girders of roof and gridiron floor over stage. In the Alhambra Theatre, and in several new houses, the same framework construction covered with concrete has been introduced. These details have been prepared by Mr. Sachs from the working drawings of the Horsley Iron Company. We also notice large sections and detail drawings of the stage and hydraulic bridges of the Lyric, executed by Clark, Bunnett, and Co., Ltd., and the fire-resisting curtain 32ft. between grooves of iron stanchions, and 27ft. in height. The plan of hydraulic bridges and stage shows five of these bridges, the back one travelling from cellar to 10ft. above stage, and the others to stage floor. The United Asbestos Company show a model of a fire-resisting curtain (Max Clarke's patent), constructed by Messrs. Clark, Bunnett, and Co. for the Lyric Theatre. This is framed with L-iron, and is supported by counterweights which slide in grooved iron uprights; it is covered with asbestos cloth. Messrs. Strode and Co. contribute diagrams of appliances used for stage-lighting where gas or electricity is employed. These show arrangements of gas-cocks, of footlights for gas installations, gas batteries, side-lights, float-lights for electric installations, &c. Other stage details are exhibited by Mr. Edwin O. Sachs; also a few models—one of the Empress Theatre at Earl's Court, the largest, probably, in Europe, with its enormous iron-braced roof of segmental shape. Architects who visit Earl's

Court Exhibition will also find much in the admirable reproduction of an English town, entitled "Picturesque England," carried out by Messrs. John Barker and Co., of High-street, Kensington. In one of the quaint half-timbered buildings, Messrs. Doulton and Co., of Lambeth, exhibit some fine faïence, and pottery in the course of manufacture. The architectural details and features of the brick, stone, and half-timber buildings of the 16th and 17th centuries are exceedingly well reproduced.

THE SANITARY CONGRESS AT LEEDS.

We continue and complete our report of the well-attended and successful congress at Leeds of the Sanitary Institute, from our last issue p. 393, with a notice of some of the papers read at the end of the week.

THE SANITARY ASPECTS OF WOOD PAVEMENTS.

A paper having this title was read by Mr. Charles Mason, of London, before the conference of Municipal and Sanitary Engineers, Mr. Thomas Hewson, borough engineer of Leeds, in the chair. The author held that most of the adverse criticism bestowed upon wood as a paving material was due to careless and improper methods of laying and subsequent maintenance rather than to the material itself. Wood, if properly selected and treated and thoroughly well laid, had advantages which should favour a continuance of its adoption as a carriage-way pavement until some better substitute had been discovered. Asphalte was undoubtedly the most sanitary of all materials for street pavements, but its general adoption on other than comparatively level roads was practically prohibited until horse haulage became a thing of the past. The life of a wood pavement varied from five to twelve years, according to the amount of traffic, quality of wood, and method of laying. The unsatisfactory method of laying and maintaining wood pavements, coupled with the fact that renewals were not sufficiently frequent, was mainly the cause of complaints as to the insanitary condition of wood pavements; of course, excepting a faulty system of scavenging, which could easily be remedied. From an experience of seven years in the construction and maintenance of wood pavements in London, he had arrived at the conclusion that wood pavements were condemned on sanitary grounds because—1. Too little attention had been given in the past to the contour of the road to allow for a natural fall to the gullies. 2. The wood used had in many cases not been carefully selected and properly treated with a preservative. 3. The expansion joint in each channel was allowed to become a source of nuisance. 4. Repairs had not been carefully executed, and renewals had not been made at frequent intervals. 5. An inefficient system of scavenging had been allowed to exist. The hard woods mostly used for street-paving works were those known as "Kauri" and "Jarrah," from Western Australia. They were generally laid close-jointed, and grouted with pitch and tar, and formed an excellent sanitary pavement. Their liability to contraction, however, had proved a drawback, as the spaces left between the blocks when contraction took place became filled with road detritus, which it was impossible to get out. The essentials for a satisfactory wood pavement were—a properly-constructed roadway, careful maintenance and frequent renewals, and good scavenging. Wood was suitable for town pavements, on account of its being less noisy and less slippery than any other kind of pavement used for heavy traffic. In order to overcome the objections mentioned, all soft woods should be carefully creosoted (in vacuum, and not simply dipped), the blocks laid "close-jointed" to a proper contour both transversely and longitudinally, and grouted with bituminous composition. The blocks when thus laid did not expand more than was requisite to bind the whole pavement together. Wood blocks thus laid and cleansed by periodically washing formed as perfect a pavement for carriageways as it was possible to obtain.

In the discussion that followed, Mr. Price, city surveyor, Birmingham, remarked that in his city they had no hard wood pavements, but they had a large and rapidly-extending area of soft wood pavements. He quite agreed that the scavenging of wood pavements must be efficient if they were to be kept in a really healthy condition. The Birmingham roads were swept and watered every night. Mr. R. S. Rounthwaite, surveyor, Sunderland, said he had found hard wood pavements very slippery, but apart from that consideration, they at Sunderland had had wood pavements which lasted from eighteen to twenty years. He thought soft wood blocks the safer. Mr. Mason favoured the blocks being put directly on the concrete. He thought it better to put a thin layer of sand under the blocks. Mr. Cox, Bradford, favoured the hard wood blocks. They were certainly a little slippery in wet weather, but if the street was fairly level, there was not much danger in that direction. He did not agree with Mr. Rounthwaite as to the method of laying the blocks. On the other hand, he had experienced no difficulty in making the concrete foundation perfectly fit for the reception of the blocks without any intermediate layer of sand. Mr. White, Folkestone, thought soft wood blocks did not compare at all favourably with the hard variety. He had not found the hard wood pavement slippery. Sometimes steam rose from soft wood pavements, which was not very healthy. That never occurred with a hard wood road. Mr. Mason, replying, said the point which he wished to emphasise most was that wood pavements, to be healthy, needed careful and systematic scavenging and frequent renewals. The life of a pavement, as he had said, depended entirely upon the traffic passing over it. The wood pavement in the Strand only lasted from four to six years.* He had found no difficulty in laying the blocks directly upon the concrete bed. They were cut by machinery, and were all the same size. The chairman (Mr. Hewson) said the paving of streets in the centre of a large city was a serious matter. He did not think any authority was justified in putting down a pavement which would not last at least seven or eight years. They must consider the tradesmen, who were paying enormous rents. It was too bad to pull up the roads in front of their premises every three or four years.

THE DISADVANTAGES AND DANGERS OF COMBINED DRAINAGE.

Dr. Bushell Anningson read a paper on this subject, in which he pointed out in regard to the disadvantages of combined systems of drainage, that the definitions of the terms "drains and sewers" of the Public Health Act, 1875, had, by throwing the responsibility of the maintenance of such systems upon the local authority, led to serious drainage difficulties in regard to the repair of defects in old parts of town communities, and in the development of building estates in newer parts of towns, and in the measures necessary for the diversion of sewage from the natural watercourses under the Rivers Pollution Prevention Act, a result due mainly to the natural reluctance of local authorities to charge upon the public revenue moneys for what in fact was an improvement of private property and a relief to owners of unhealthy houses. Mr. Anningson pointed out that in practice these combined systems, while being treated legally as sewers, were physically treated merely as drains. The several contributory houses were allowed to be connected thereto without interceptors and ventilating shafts, such as would be insisted upon in respect of a recognised public sewer. He remembered instances in which the poison of typhoid fever had been conveyed from one household to others adjacent along the line of the common conduit; and suggested that under the existing legal difficulties the best remedy would seem to be to treat the common conduits as real branch sewers, and disconnect each contributory house by an air interceptor and ventilating shaft of its own.

Mr. Lewis Angell, borough engineer, West Ham, said the corporation of that town had had hundreds of miles of drains, which formerly were considered as private drains, thrown upon its hands to repair and maintain, under the new interpretation of the law. It was held under the old interpretation of the law that these combined drains were private drains, but, as was not uncommon, a lawyer had driven a coach and horses through the Act of Parliament, and it had been held that the drains were public sewers. A clear definition of the terms "drains and sewer" was needed.

THE PROGRESS OF SANITARY WORK.

Dr. T. Pridgin, F.R.S., in opening the section devoted to the discussion of Sanitary Science and Preventive Medicine with an address, contrasted the growth of public opinion on sanitary matters during the past quarter of a century. He pointed out that many points then urged, almost as if open to doubt, or, at any rate as needing strong arguments to compel acceptance, now "went without saying"; that forecasts as to the possibility of diminished death-rate under improved sanitary conditions had been fulfilled; and that the public conscience had been awakened to the necessity of securing improved conditions of living, not only in the great towns, but also in villages and scattered hamlets. What was then almost sanitary chaos was now, as far as legislative plan was concerned, bit by bit being reduced to order; and the possibility had been established of such order reaching every corner of the country. Much remained to be done. Many people might feel that the progress of sanitary work had been slow. He thought they might maintain, looking back 25 years, that it had been great. It had probably been quite as rapid as was desirable for real progress. About 25 years ago the Legislature for the first time provided that there should be medical officers of health throughout the whole kingdom. When that Act came into force, medical officers had to be appointed, the majority of them having had no previous training whatever in sanitary work, and sanitary inspectors had to be appointed in the same manner. But the work had trained and developed both medical officers and sanitary inspectors, and now the nation required, for the position of medical officer, a man very highly trained, and who had given proof of the training he had undergone. In the same way, sanitary inspectors almost entirely—there were some exceptions—must give proof of a very considerable amount of training. All this was progress, and it was progress based upon public opinion supporting and sanctioning it.

DISINFECTION.

Dr. Spottiswoode Cameron, the Leeds Medical Officer, introduced the subject of disinfection, and explained the methods carried on in Leeds. Professor Delepine said he had found that a most efficacious method of disinfecting rooms was to wash the walls with a solution of bleaching powder. Mr. H. Kenwood followed with a paper on the disinfection of rooms by formic aldehyde vapours. By means of a model which he exhibited, he illustrated a handy method of disinfecting by this means. The cost of disinfecting an ordinary sized room would, he said, be under sixpence.

ENGINEERING AND ARCHITECTURE.

In opening the section dealing with these subjects, Mr. Lewis Angell, the president, said the most striking feature of the Victorian era had been the development of the practical and useful. It was not until the reign of Victoria that the profession of the civil engineer came into existence, and they had now arrived at a condition of nil admirari, and become as gods "directing the great sources of power in Nature for the use and convenience of man." Engineering and architecture represented the constructive side of sanitary science. The science and the laws of sanitation were now well known and established, and all he could hope was to drive home old-established truths by repeating line upon line and precept upon precept. Upon the general engineering principles of town drainage, engineers were in the main agreed. The English water-carriage system was accepted as the cheapest, most efficient, and least objectionable, and was universally extending, and would ultimately extend to every civilised town in the world. The history of sewerage revealed erratic procedure. Sewage was 30 years ago declared to be a "mine of wealth," if applied to land. Sewage farms had had their day, however, and chemists, patentees, and stockjobbers had failed. The question had now taken a new and interesting biological aspect. They were harking back to first principles, to the engineer's tanks and the resurrection of the microbe hitherto killed by the chemist with his patents and reagents. Probabilities indicated that microbes worked for good and evil, and that the good would prevail; that the purification of sewage would be effected by living organisms. Referring in detail to sewer ventilation, the president declared himself in favour of free and open ventilation. The cardinal conditions of health—pure air, pure water, and unpolluted earth, with the accessories of wholesome food, proper clothing, and suitable houses—the necessaries of life—comprised the whole gospel of sanitation. In our own habitations

* And always stinks.—Ed. B.N.

there should be ample means of ventilation in all living-rooms, no connection between the dietetic water supply and the drains, no connections with the sewer except for the discharge of sewage, the drains should be trapped outside and freely ventilated, and all discharges from cisterns, baths, &c., should be in the open air. The president commented on the decision of the Queen's Bench, by which the term "public sewer" applied to every description of drain and sewer except drains used for the drainage of one building only, or premises within the same curtilage. The Lord Chief Justice might well have said that the condition of the sewer laws was a scandal. Several recent attempts had been made to put the law on a more equitable basis, but the Bills had been invariably blocked in the interests of property-owners. There was, however, a Nemesis in all this. The local authorities of the past would not provide the small staff of inspectors necessary for the proper supervision of buildings and house drainage, and unprincipled owners and "jerry" builders could on their own premises do very much as they pleased. The local authorities had now to provide not only a large staff to discover the defects of the past, but, at a great cost, to remedy the bad work which could have been prevented by proper supervision. The housing of the working classes was a prominent feature in sanitation. Whether this should be accomplished by flats or by workmen's trains was a matter for serious consideration. Much good had been effected in the Metropolis by the clearance of unhealthy slums and the substitution of piles of tenements, but it was questionable whether it was desirable to concentrate the working population on so limited a space, with only street gutters for the children's playgrounds. With the facilities now given by the very cheap workmen's trains and trams, it would be infinitely better to distribute the population. The requirements of the model by-laws of an open space—relatively small though it be—at the rear of houses, and a specified width of roadway in front, precluded the repetition of the old courts, alleys, slums, and rookeries, as also the very objectionable back-to-back houses, which, unfortunately, continued to exist in many towns which could be named. After referring to the disposal of storm-water, and the proper dimensions of house-drains, he said: Sanitary principles, they were told, if carried to their logical conclusion, would prohibit carpets, tapestry, curtains, architectural mouldings, and reliefs—anything, in fact, which could harbour dust and dirt in houses; walls should be smooth, polished, and without angles. In food, people must so study what to eat, drink, and avoid, and by an all-round anxiety to preserve health render life not worth living. There was the happy medium in all things which wisdom dictated. Small local practitioners took up sanitary shibboleths, and dogmatically ascribed to sewers, gullies, or ventilators illnesses for which they could not otherwise account. Even those from whom they expected more science frequently gave their dicta without taking the trouble to investigate. Typhoid and diphtheria were generally ascribed to sewers and drains, but nearly every large outbreak of enteric fever had, upon careful scientific investigation, been distinctly traced to contaminated milk or water, and not infrequently to shell fish, while diphtheria had been ascribed to personal contamination in schools. The municipal engineer should have had a liberal education to safeguard him against the narrow motives and influences by which he was surrounded. He should be something more than a sanitary "expert." He should have practical experience in general engineering. At present the office of engineer was open to any brassplate man, who could obtain responsible official positions upon the mere testimonials or votes of good-natured friends. The Sanitary Institute, as also the Association of Municipal Engineers, had established examinations to test the knowledge of aspirants for public offices. Such examinations might not be an absolute proof of general fitness, but as an examiner he said they afforded *primâ facie* evidence that the candidates who passed were not mere quacks, and local authorities would do well to require diplomas or certificates before making an appointment. It should not be competent for anyone not holding a qualifying certificate from some recognised examining board to present himself as a candidate for any of the higher municipal offices. Subject to such evidence of qualification, local authorities might have the selection and appointment of such officers; which appointment, subject to good behaviour, should be as permanent as in the Civil Service, carrying with it superannuation.

FEVER HOSPITAL CONSTRUCTION.

In a paper on this subject, Mr. Edwin T. Hall, F.R.I.B.A., of Moorgate-street, E.C., reminded his audience that the organised attack on smallpox, scarlet fever, diphtheria, &c., was the outcome of the latter half of the Victorian era. Even in the county of London no hospital specially set apart for scarlet fever existed until 1849, when the London Fever Hospital was opened; and in the country generally local authorities first derived their power to provide hospitals for infectious diseases under the Sanitary Act of 1866. When public infectious hospitals were first constructed in England it was common to devote a part of the site to smallpox and another part to all other infectious diseases, one set of staff quarters being common to both. It was, however, found that the danger from smallpox was great, not only to the sick patients in other parts of the hospital, but to the surrounding district, and separate hospitals were instituted for smallpox. In London, the Metropolitan Asylums Board in 1885 came to the momentous conclusion to abandon land hospitals for smallpox, and to establish hospitals on the Thames at Darenth. The happy result followed that the disease had been practically exterminated in the Metropolis. The value of isolation was shown in a remarkable degree, and it was demonstrated that the fast-travelling tide of the river caused, by friction, movement in the air even in the calmest days sufficient to carry away and oxygenise heavy gases. In any scheme of hospital construction for a town too much stress could not be laid on the necessity for an ambulance station and an organised ambulance service. On the question of the maximum size of an infectious hospital, he had not been able to find any data to prove that any limit need be set. Given an adequate area of land and an adequate staff, a hospital might be of any size. The site for any hospital should be as open as possible. If one could be found surrounded by roads, it would be better, because all roads were channels for wind currents. It should be on elevated ground, so that drainage might be readily carried away, and should be as compact as possible. Much had been said as to the maximum number of patients per acre that should be put on the site, but he was not aware of any data that justified any one of the arbitrary figures suggested. The area required should be determined first in regard to the facilities which naturally existed for a rapid change of the surrounding atmospheres, and next, the necessity for a zone between the infected buildings and the boundaries. The one-storied hospital was the medical ideal, but the practical suggested and permitted of the two-storied pavilion. There should be two entrances only to a hospital—one for the staff, patients, and stores, and the other for the hearse, coffins, &c., the latter being so placed that it was out of sight of the patients. Having described the internal arrangements of several large hospitals, Mr. Hall then said the factor first to be considered in planning was how many patients should be put in a pavilion. In cases of scarlet fever, it was considered by medical men most economical, from the nursing point of view, to have not less than fourteen in a ward. The Asylums Board had fixed the number at twenty, and they might well accept that as a good rule for a large hospital. The best height for a ward from a practical point of view was 13ft. Any greater height was not aërially of any value to the patient, and any less height in a large ward looked oppressive. It was of great importance to insure a uniform temperature to all parts of a pavilion, and he believed the best form of heating was by low-pressure hot-water radiators beneath windows. He deprecated horizontal pipes around the walls of a ward, and those in trenches were not to be tolerated at all. It was far better to put all horizontal pipes in the open basement beneath the pavilion. There should, in addition, be central fireplaces, which gave cheerfulness to the room, and were most valuable extractors of foul gases. In his judgment, a central stack was much better for an infectious ward than a stove with horizontal flues carried to the external walls. He believed in the artistic treatment of a ward as a refining influence as well as a curative value to patients, and thought that the surface of the walls of a ward should be of impervious material, faced with Parian, Keene's, or Robinson's cement, painted in various artistic colours to rest and please the eye. In addition to the ordinary pavilion of a hospital, there should be isolation pavilions, for the reception of cases of which the diagnosis was not certain. After dealing exhaustively with the fittings of a hospital, he said he would recommend as the motto for the inside of an infectious hospital, "Let nothing be hidden." In conclusion, he urged on all local authorities the desirability of making their hospitals architectural in treatment.

SANITARY ADVANCES IN MUNICIPAL ENGINEERING.

A lecture to the members of the Congress was delivered on Thursday evening by Mr. H. Percy Boulnois, M.Inst.C.E., the city engineer of Liverpool. The author called attention to the multitude of subjects which a city engineer was expected to know something about. These included, amongst many others, sewerage, bridges, water, road-making, tramways, street lighting, architecture, surveying, and building. Municipal government theoretically was splendid; practically, it often failed. It failed principally because that government was ever changing. As each succeeding November came round fresh men took seats on the controlling bodies. The consequence was that the municipal engineer had no sooner educated one committee to a proper standard than he had to start to educate another. This was very much against advancement. Then, again, in small towns men got into municipal bodies for purposes of their own. Sewerage used to be exceedingly defective. The drains were badly constructed—mere elongated cesspools. But the municipal engineer had changed all that. He had properly graded the drains, and consequently large communities were now able to live together with almost perfect immunity from disease. He drew attention to the difficulties experienced in insuring that sewers shall be self-cleansing, and described the various methods of flushing which have been adopted. He likewise explained in detail the question of sewage disposal, and pointed out the advances which had been made in this direction, giving a brief description of the latest advance under this head, what was known as the septic system, where decomposition was allowed to proceed in tanks under safe conditions, and the effluent passed through filters. He strongly advocated the use of refuse-destructors for dealing with the enormous accumulations of house and trade refuse which had daily to be collected in every large city throughout the country. Respecting sanitary road-making, he pointed out that a properly paved roadway upon a good bed of Portland-cement concrete was impervious, and absolutely sanitary, whereas a macadamised road for busy traffic was unsuitable on account of its porous nature. A street efficiently paved with Australian hardwood approached as nearly as possible perfection in street-making. Mr. Boulnois concluded with a reference to the debatable question of the housing of the labouring classes. The class of persons for whom the benefits of the various Acts of Parliament were intended were the "labouring" classes, and not the "artisan" classes, who had better wages, and could afford to live in houses provided by private enterprise. For the labouring classes, whose wages were precarious and sometimes very small, it was essential they should be housed in cheap houses, at a rent of about one shilling per room per week, and that these houses, though sanitary in every respect, should not be made too attractive, or they would induce the artisan classes to occupy them who could afford a dearer class of house. Such houses could not be built on the ideal as to how these people ought to live. It was this higher ideal which had practically prevented the benefits which should have been derived from the various Labouring Classes' Dwellings Acts being enjoyed by the classes for whom they were passed. In Liverpool cheap houses were now being erected by the corporation, which were letting as fast as they could be erected at 1s. 3d. per room per week. The net return from these houses would be nearly 5 per cent. per annum on the outlay.

OUR SUPPLIES OF WATER.

The members of the section for Chemistry, Meteorology, and Geology met at the Municipal Buildings, Mr. W. Whitaker, F.R.S., presiding. In his opening address, Mr. Whitaker remarked that whilst years ago there were various wonderful theories accounting for the occasional outflow of water, these outbursts were now known to be merely owing to the rise of the underground

water level after seasons of heavy rainfall, until it became an overground one along the bottom of the valley. In the course of the past session of Parliament two Bills promoted by the corporations of Nottingham and of Newark had a somewhat lengthened consideration in Committee of the House of Commons. This inquiry had some peculiar features. In the first place there was not a single company in the case; but there was a multitude of corporations and of other local authorities, opposing the whole or part of both Bills. A second peculiarity was the absence of chemists, an occurrence previously unknown in such a case. The fact was that no question of quality arose. In both cases the new red sandstone was the source of supply involved, and by means of wells. In each case the promoting corporation asked for a protective radius; really a ring within which no other works for public supply should be established, their own works being, of course, the centre of the circle. One of the two schemes was for the supply of a population of 20,000, while the other was for a population nearly fifteen times as large. The smaller scheme asked for the larger radius (four miles), and to have it for nothing; the result being that finally the application was unsuccessful; whilst the larger scheme asked for a smaller radius (two miles) and got it, by paying for it.

AIR POLLUTION IN TOWNS.

A paper on this subject was read by Dr. J. B. Cohen, of the Yorkshire College. He said pure water and wholesome food had so long been recognised as essential to the general health of the community that they now claimed the strictest supervision on the part of every municipal body. It seemed remarkable, therefore, that the air, the consumption of which exceeded in weight five times that of liquid and solid food, should be subjected to no more searching test than that furnished by the daily meteorological record, which gave no information as to its purity at all. Yet it was much more important to know the extent of atmospheric pollution than its temperature, pressure, dampness, or the direction of its currents, however valuable they might be. If a daily record was kept of the bacterial condition of the air, in addition to its temperature and pressure, they would have some direct evidence of its purity in different parts of a town, and, granted that the experience of others confirmed his own, they would find that the bacterial conditions would be a fair test of the sanitary condition of the places in question. Smoke was another source of pollution of a town atmosphere. He doubted whether anyone would care to dispute that health was affected by a smoky atmosphere. No one could dispute the fact that the discomfort and dirt arising from the smoke were very great. The problems they had to face were, how to purify the atmosphere from its bacterial impurities, which arose from overcrowding and insufficient sanitary accommodation, and from the smoke. Those problems, like that of river purification, were rendered particularly complex, not from any inherent difficulty, but from the fact that long habit and a deplorable want of foresight had shackled them with "vested interests." To begin with, boiler chimneys, which were accountable for much smoke, required some more rigid and intelligent system of inspection. Smoke inspectors should be empowered to advise, and the adviser must be a man who knew his business. The domestic hearth was more difficult to deal with. If gas was charged at a rate more nearly approaching its cost, its consumption for heating purposes would be more general. From a careful study of the subject, he felt in a position to state that gas fires, judiciously used, were thoroughly healthy and efficient heating appliances.

THE HOUSING OF THE WORKING CLASSES.—BACK-TO-BACK HOUSES CONDEMNED.

In a paper on "Operating the Housing of the Working Classes Act in Leeds," read on Friday, Mr. George F. Carter, A.M.Inst.C.E., Assistant-Engineer (Insanitary Areas), Leeds, the writer dealt in detail with the York-street and Camp Field insanitary areas, and the steps which were being taken by the corporation to clear them. It was proposed, he said, to deal with the York-street area as follows:—The buildings on the first section of the area would be demolished, and dwellings afterwards erected for the accommodation of 500 persons of the working-class. The second section would then be cleared, and provision made for another 500. Then the third section would be dealt with, and provision made for 1,000, or, in all, a total provision of 2,000 persons of the working class. Afterwards the fourth section would be cleared. It was not intended that all the accommodation should be in the area itself. The committee had determined to arrange for the erection of about 100 houses (to accommodate about 500 persons) upon a part of the Ivy House Estate, belonging to the corporation. The type of house it was proposed to erect would comprise a good-sized kitchen or living-room, a scullery with copper fitted in, two good bedrooms on the first floor, an attic, and a cellar for food and coals, or an outside pantry. Each house would have its own back yard, w.c., and ashpit. With regard to the remaining 1,500 for whom accommodation must be made, a great question opened itself out, as some effort must necessarily be made to supply suitable accommodation for the very poorest class. There was great need in Leeds for some really good common lodging-houses, where, for about 4d. or 5d. per day, a person could have the use of a private cubicle to sleep in, and it had been suggested that the corporation should erect such a lodging-house to accommodate about 500 persons. It was proposed to accommodate the remainder of the people displaced in tenement dwellings and specially arranged through houses on the area. The ordinary tenement blocks would not exceed four stories in height. Mr. Carter also described the measures that are being taken with reference to the Camp Field area. Dr. Muntz, of Belfast, said he was pleased with the paper because it showed that, while the Leeds Corporation seemed to be totally behind the age as regarded back-to-back houses, their officers were in the forefront of sanitary information. He was glad to see that the Local Government Board would not permit the corporation to erect back-to-back houses in place of those to be demolished. They would always find it better to take a small area in hand rather than a large one, because they would so reduce the opposition they had to encounter. It was desirable to drive one long street through such an area, but it was a fatal mistake to make it too wide, because if they did so they would spoil it for shop purposes. In one case in which he was concerned they widened a street to 65ft., but it would have been better to make it 55ft., because, when wider, it became practically two different streets. Generally speaking, the main street should be of such a width as to take in a double line of tramway, with sufficient space for ordinary traffic on either side. Dr. A. T. Gordon Beveridge (Aberdeen) said his objection to the corporation scheme was that it was not large enough. If they could remove the displaced population to the outskirts of the city, they could give them better accommodation than would be possible in the centre, and they would avoid the introduction into Leeds of the odious Scotch system of huge tenemented houses. They would also place their scheme on a more sound financial basis. It was a mistake to suppose that the tenants they were going to accommodate were necessarily those they evicted from the slums. In many cases it was found that the artisans who took the new dwellings were of a class higher than those evicted from the slums, and that the slum-dwellers removed into the somewhat better houses vacated by those who went into the new artisans' dwellings. They thus got the whole of the lower stratum of the community lifted up a step. Councillor W. S. Brown (Edinburgh) said that in dealing with a scheme similar to the one now under consideration in Edinburgh, the first step they took was to have a careful supervision of all licensed lodging-houses in the city. They insisted on their being put into proper sanitary condition, and where they were not so they closed them forthwith. They next served notices to acquire the property to be dealt with, and, after trying various methods, they had come to the conclusion that the best and speediest method was at once to put the matter into the hands of the arbitrator appointed by the Local Government Board. A company was formed which purchased a large tenement for a model lodging-house to accommodate upwards of 300 persons. That was five years ago, and up to now they had never paid less than 5 per cent. They charged lodgers 4d. each per cubicle per night, and made a reduction when a week's tickets were purchased. In Leeds, as in Edinburgh, there must be individuals willing to form companies, and in this way, perhaps, relieve the corporation from the burden of putting up common lodging-houses. Councillor Womersley said, with reference to back-to-back houses, that there was no comparison between the older specimens and those more recently erected. He would ask their critics to try and realise what it meant to have to deal with 72 acres of land in the centre of a great city like Leeds, and to house and rehouse 15,000 people. The feeling of the corporation was not to interfere with private enterprise. Ald. Harrison, Chairman of the Health Committee, Sunderland, said that his corporation, in clearing an insanitary area, divided the work into three portions, and proceeded by steps. They instructed the borough engineer to value the whole of the property involved, and then had an independent valuation made by an estate agent. The two were found to correspond very nearly, and the committee therefore placed the matter in the hands of the agent with instructions to acquire the property at as near his own valuation as possible. He secured a considerable amount, some at less, some at the valuation, and some at a little more, and they had now bought the whole property at a fairly considerable sum less than the original valuation. They submitted plans to the Local Government Board, and this placed them in a difficulty, for while on the one hand their effort was to do away with insanitary overcrowding, the Local Government Board insisted that the whole of the people displaced should be provided for on the area cleared, and they were driven to erect those high buildings that none of them liked. Their plans only showed three stories, as against the four required, and the Local Government Board had not yet sanctioned them, because they were unable to house the whole of the people on the area. That was a strong argument in favour of the local authority having absolute discretion in such a matter. Dr. Walter Smith spoke of a similar condition of things at St. Pancras. They had a very large scheme before them, and the Local Government Board refused to allow them to go on unless they rehoused three-fourths of those displaced, and that was absolutely impossible, because every inch of ground for miles around was covered.

THE TREATMENT OF SEWAGE.

In the section of Engineering and Architecture five papers were read on Friday dealing with the treatment and purification of sewage. "The Scientific Basis of Sewage Treatment" was the subject of a paper prepared by Mr. W. J. Dibdin, F.C.S., and Mr. G. Thudichum, F.C.S., and read by the former. In all methods of sewage purification which had been previously employed, final oxidation had been effected, although this had failed to be generally recognised. The best and most natural system hitherto tried—namely, the application of sewage to land—depended for its success entirely upon the fostering and increase of micro-organisms. But the use of crude sewage upon land led to great difficulties, and in consequence previous chemical precipitation had been resorted to. It had not been seen that the same agencies which destroyed the dissolved impurities could, if given the necessary conditions, equally deal with those in suspension. Hence came all the numerous chemical schemes, with their inevitable accompaniment, sludge. With the clear effluent it was possible to deal, although the process, being dependent so much upon local conditions and climatic influences, was always uncertain; but the sludge always remained, the bête noir of all those concerned in sewage disposal. In the recognition of the fact that all processes of sewage purification must be made subservient to the requirements of the various micro-organisms lay the whole secret of success. All sterilising or antiseptic agents must be strictly excluded; a condition of neutrality or slight alkalinity must be maintained; oxygen, anyhow in final stages, must be freely supplied; the temperature must be kept above the freezing-point of water, and the amount of food must be proportioned to the powers of the organisms. The results would be that, firstly, no previous chemical treatment was required; secondly, no sludge was produced; and, thirdly, the quality of the final effluent could be controlled, admitting as it did of being brought to any required degree of purity.

Dr. Sydney Barwise's paper on "The Purification of Sewage" dealt with the filtration process.

A paper on "Storm-water in Relation to Sewage Purification" was read by Mr. E. J. Silcock, F.G.S., borough engineer of King's Lynn. He said that one of the greatest difficulties in connection with the problem of sewage purification was that of dealing with the great fluctuation

n the flow of sewage to be dealt with owing to the admission of storm-waters into the sewers. His object was to endeavour to secure some sort of uniformity in the requirements of Rivers Boards, as to the amount of storm-water which must be dealt with at purification works, or, in other words, the degree of dilution of crude sewage beyond which it should be permissible to discharge through overflows into natural streams. It might be suggested that the solution of the problem was to be found in adopting a separate system of sewerage; but that system had never been carried out in its entirety in any town, and could not be adopted, even apart from the question of cost. In practically all towns of any size the pumping plant, the outfall sewers, and the main intercepting sewers were, to a certain extent, incapable of dealing with the whole of the rainfall, and had to be relieved by storm-water overflows.

Mr. W. Kaye Parry, M.A., of Dublin, presented a paper on "The True Principles of Sewage Purification." He contended that the question was settled by the researches of Mr. Walter E. Adeney since 1887. Mr. Parry summed up the system as follows. Mr. Adeney's method of sewage purification might be briefly summarised in the following terms: (1) Clarification under the best conditions by the use of a precipitant, at once the most effective and economical at present obtainable; (2) purification of the clarified liquid in the simplest possible way by supplying it with a sufficient quantity of oxygen through the agency of nitrate of soda; (3) the production of the minimum of sludge, inodorous and incapable of creating a nuisance.

Professor A. Bostock Hill, M.D., D.P.H., read a paper on "Filtration of Sewage through Coal." In the summer of last year, Mr. Garfield, the manager of the Wolverhampton sewage works, became possessed of the idea to see what effect would be produced by the filtration of sewage through a filter composed of fine coal. With Mr. E. W. T. Jones, public analyst for that town, he carried out experiments with filters constructed in which the media were coal of different degrees of fineness. The result there, and also at Lichfield, proved very satisfactory. In many cases where land of a suitable character could not be obtained, they had in coal a medium cheap and effective, which would produce an effluent as good as, or better than, that which could be obtained from land.

Mr. Donald Cameron, the city surveyor of Exeter, read a paper on "A Year's Experience of the Septic Tank System of Sewage Disposal at Exeter." Mr. Cameron concluded by saying that the Exeter installation, during its twelve months' work, had been subjected to the severest conditions that sewage works had to contend with, and had proved thoroughly reliable in all respects. The trial had been on a sufficiently large scale to give practical results, and was the outcome of experiment, step by step, leading from smaller to larger plants. It had been shown that sewage-disposal works could be designed so as practically to take care of themselves, requiring no more attention than a visit two or three days a week to change or alternate the filters, the work of a few minutes, and a day's work every month or six weeks in tidying the filters. Once a year it might be desirable to remove the deposit from the tank. By proper arrangements this could be done by the one man who acted as caretaker.

THE GROVE FEVER HOSPITAL, TOOTING.

ONE of three large fever hospitals erected by the Metropolitan Asylums Board is that now in course of construction at Tooting Graveney, from the plans and designs of Mr. A. Hessell Tiltman, F.R.I.B.A., selected in open competition. The architect has adopted the "échelon" principle in the disposition of the main pavilions, which are all arranged so that their axes are due north and south, thus obtaining the full benefit of the sun's rays. The general plan of the buildings, which will comprise no fewer than 36 blocks, we gave in the Building News on Aug. 27 last, when we also illustrated a general bird's-eye view of the buildings from the architect's design. To this plan and view we refer our readers for the general arrangement of the buildings, and we confine our present remarks to a few notes of the buildings in progress. The area of site occupies about 27 acres of land between Grove-road on the north and Blackshaw-road on the south, and within a quarter-of-an-hour's walk from Tooting Junction Station of the B. and S.C.R. Eight large pavilions on the échelon system are ranged along the south side of the site, intended for scarlet-fever patients, which accommodate in all 352 beds, each pavilion containing 44 beds. Four smaller pavilions for diphtheria and enteric fever occupy the north side, and will contain in all 112 beds, or 28 beds in each block. These rows of pavilions are of two stories, and are planned parallel to each other. Between them, in the centre part of site, are six isolation blocks for 54 beds in all, for fever cases requiring separate treatment. The several pavilions are connected by open covered ways running along the inner ends of the main blocks, and along the centre of the six isolation blocks. These covered ways are now being constructed with a high subway below for all pipes, and the roof is carried on cast-iron columns at intervals.

Accommodation is provided for medical superintendent, who has a block outside the inclosing road on the north side, and for five assistant medical officers, a matron, and 200 nurses, whose separate blocks occupy the higher and eastern part of site, and contain bedroom, &c., for day and night nurses, with recreation grounds between them. The dormitory accommodation has been well arranged, and is shown on the plan. The laundry and boiler-house block is an important group of buildings, situated at the eastern side of the central isolation blocks, and connected by covered ways with the pavilions. The plan of this building is well considered, and from the laundry boilers proceed mains to all heating chambers, which are all worked from these boilers. The heating arrangements on the low-pressure system have been most skilfully devised by the architect.

We may now refer in more detail to the buildings we have been permitted by the architect to view. To take the large pavilions first. These are separated by airing-courts about 70ft. apart. Each ward is 120ft. long by 27ft. wide, and will contain 20 beds—10 on each side—with windows between. At the south end is the bath and lavatory at one angle, and at the other sink-room and closets, separated by ventilated lobby from ward, and between these two projecting corner buildings, which are carried up as low towers, is an iron escape stairs of two flights, and with ample space of landing. This is made a feature at the ends. At the other and north end are the usual ward offices, scullery, linen-room, and at the extreme end a two-bedded ward, also a nurses' sink, closet, and lavatory, larder, &c. A stone staircase and lift are also provided. Amongst the many details worth mention is an inspection window for the nurse, a portable bath with hot and cold water supply, and a bed-pan cupboard under the window of w.c., which can be pushed out of the lower part of window to await medical inspection. The smaller pavilions for diphtheria cases are similarly arranged, and provide for 12 beds on each floor. Each ward measures about 90ft. by 27ft. The six isolation blocks in the centre of site contain from eight to ten beds and vary in plan; each has its own airing-court and covered approach, the scullery, linen-room, reception-room, bath, and closet being placed between the wards. We notice that all the pavilions are well raised on an open basement about 5ft. above the ground, to secure dryness and ventilation. The walls are of malm facings, with red-brick arches, and in bands and dressings. The roofs are slated, and the ends half-hipped and ventilated. Interiorly we find the floors are on iron girders; the wooden joists are filled with concrete between, and will be boarded with teak-tongued flooring. The walls are plastered with Keen's cement, having all the corners rounded; and the dadoes are of Cliff's salt-glazed brown bricks, with moulded capping of same material. The lavatories have tiled floors. The windows have ordinary sliding sashes, with upper swing-lights to fall inwards, thus forming hoppers when open. The ventilating arrangements consist of square-shaped openings at intervals along the walls about 5ft. above floor of ward, with a hopper inside, which will direct the air-current upwards, and gratings on the outside of wall. The vitiated air will be drawn out of each ward by two large extracting shafts, which go from top to bottom of pavilion, and are lined inside with glazed bricks. These have openings or outlets below the ceilings of ward. The motive power creating draught will be furnished by heated pipes, &c., and the outlet is above roof-level. Two of Hayward's glazed tile open ward stoves are placed in each ward, and there will be radiators round the walls with direct openings for fresh air, one to every other window. The administrative block, which stands at the eastern end of the diphtheria pavilions, next to the laundry, has a store court and covered court, and the kitchen arrangements and offices have been planned with considerable ingenuity. Many new features and points of detail, of great economic advantage in the working of so large an establishment, are shown in the planning of this part, but we have no space to mention these; suffice to say Mr. Tiltman has proved here again, as in other cases, a master of plan, and his design, now nearing completion, begins to assume organic unity. It has been satisfactorily carried out by Messrs. Kirk and Randall, of Woolwich, under Mr. Tiltman's personal supervision, Mr. Thomas Warburton acting as the chief clerk of works. The total cost will be about £223,000. The Architectural Association intend to visit the buildings to-morrow (Saturday) afternoon, and will meet on the site at 3.30 p.m.

HOUSE BUILDING BY RITUAL.

By Cosmos Mindeleff.

THE man who builds a home, be he white or red, appears to be the special target of all kinds of trouble and annoyance; but in the latter case—that is, to the red man—there are certain requirements which make the task even more onerous, while on the other hand there are compensating advantages. The Pueblo tribes of Arizona and New Mexico, alone of all the Indians, build permanent stone houses, quite equal to those of white settlers in that country, and they have developed a peculiar system of building of their own which is of interest to every house-builder.

The Pueblo Indians now number about 10,000 souls, living in 30 villages, principally along the Rio Grande in New Mexico, and several distinct languages are found among them: but their house structures are essentially the same throughout. The largest of the villages, the pueblo of Zuni, which has a population of 1,600, has been often visited, and the seven villages of the Moki, in northern Arizona, are also becoming known through the periodical performance there of the celebrated snake-dance. Both of these groups have been studied for some years by the assistants of the Bureau of Ethnology, and the results of their work are now being published.

The houses of these people consist of groups of rectangular rooms, built of selected stone, or in recent years of adobe brick dried in the sun but not baked. The rooms are arranged in connected rows or clusters. Some of the latter are of huge size, resembling in appearance a gigantic hive and containing several hundred separate chambers. These were at first supposed to be communal structures, but it is now known that while each cluster is the home of a certain clan or combination of clans, the different families who compose it each have their own quarters in it.

The clustering of rooms into huge hive-like structures grows directly out of certain rules of house-building, which are the result of peculiar social conditions under which the people live. Among them descent is in the female line; the children of a marriage belong to the mother and are members of her clan and of her family. As a man is not allowed to marry within his own clan, he loses some of his rights when he takes to himself a helpmate, or, more correctly, when his helpmate takes him, for when he marries he goes to the home of his wife to live, and, to a certain degree, is adopted into her family.

From this it comes about that families in which there are many girls must necessarily increase and spread out over more area, while those in which the children are all boys become extinct in the second generation. But as the house cluster is the home of the clan, when it becomes necessary to erect additional rooms they are invariably added to and connected with those already occupied, and it is not unusual to see houses in course of construction at one end of a row while at the other end, or in an adjoining row, rooms are abandoned and going to decay. This odd condition misled the early explorers, who reported that the tribes were rapidly becoming extinct, whereas they are holding their own or increasing slightly in numbers.

The clans, which are great artificial families—all the members of which claim descent from some mythical common ancestor—are themselves

PUEBLO HOUSE BUILDING BY RITUAL.

subject to change from the same social conditions. Some grow and increase in size, while others wane and eventually become extinct. Thus in the Corn clan there are groups which claim to be of the stalk, leaves, grain, pollen, &c., and should the clan prosper, each of these subdivisions will develop into a full-fledged clan. It all depends on the number of girl children who are born into the clan.

In one of the Moki villages there is a little cluster of four or five rooms standing separate and apart from all other houses. It is the home of the remnant of the Butterfly people, now consisting only of an old woman and her young daughter, besides two sons. As the sons will eventually marry and go elsewhere to live, the future of the clan depends entirely on the young girl.

Should she live to marry and have many girl children, it is quite within the possibilities that the Butterfly clan may spread out and cover the whole village; but should she die unmarried, the clan will become extinct, the house will be abandoned, and in a few years its site will be marked only by a few heaps of stone, for it is the custom under such circumstances for the relatives of the family to tear down the house and re-employ the material.

The position of the women in the tribe is all that any of them could ask. They do no field labour, other than assisting in the harvest, and are free to devote their whole time and energy to their domestic duties and the care of their children. In the house their sway is absolute and undisputed. The crops in the field are considered the property of the man of the house, and he is required to work them; but when they are garnered and brought in they become the property of the woman, who is also the sole owner of the house in which they are stored. The status of the husband is merely that of an honoured guest, and should he misbehave in any way, he can be sent back to his family, or turned adrift to shift for himself. It is hardly necessary to add that the greatest affection prevails in the household, and that such a thing as wife-beating or ill-treatment of women is unheard of in the tribe.

When a family finds it necessary to build additional rooms, notice is sent to the priestess of the clan, who makes the necessary arrangements. This priestess is the social head of the clan, and no business connected with the house can be conducted without her aid. She has also the final say in all proposed marriages, &c. The men of the family are required to bring in the necessary material; broken and dressed stone for the walls, beams for the roof, clay for mortar, &c. As the villages of the Moki are all situated on the tops of the mesas, 600ft. or more above the valley, this is no small task.

When everything is in readiness, announcement is made from the housetops by a crier, for the building of a house is a social function participated in by the friends and relatives of the woman who is to build. As the women own the houses and exercise absolute control over them, they are also the builders. There is always a man or two about, however, to do the heavy work. This duty is generally assigned to some of the male members of the family, and is not always willingly performed.

The chief of the village provides four eagle feathers, with a short cotton string tied to the stem of each. These are sprinkled with sacred meal, and prayers are breathed upon them for the welfare of the proposed house and its occupants, and that the walls may take a firm hold in the ground. The feathers are called nakwa-kwoshi, meaning a breathed prayer, and the prayers are addressed to Masauwu (the sun) and other deities concerned in house life.

The feathers are placed at the four corners of the house, and a large stone is placed over each one. The place where the door is to be is marked by bits of food placed on each side of it, with prayers that there may always be plenty of food within. The lines to be occupied by the walls are then marked by passing around the site from right to left, scattering on the ground particles of bread and other food mixed with native tobacco. This ceremony is accompanied by a song to the sun couched in archaic terms, the meaning of which the people have now forgotten.

After this ceremony, the women proceed to lay up the stones in the walls, the heavier ones being lifted into place by the men, who are there for that purpose. Mud mortar, from a pile nearby previously prepared, is used sparingly, and the stones are laid in it in irregular courses. When the walls reach a height of 7ft. or 8ft., the top is brought to a fair level and the roof beams are put in place.

The roof beams are often brought from great distances, as suitable timber does not grow near the villages. In the Moki traditions it is stated that the beams for the mission buildings erected for the monks in the early part of the 17th century were brought on the backs of men from the San Francisco Mountains, a distance of more than 100 miles. Although the missions were destroyed in the insurrection of 1680, and never rebuilt, some of these old beams were used in other structures, and still can be seen there.

Above the main roof beams, which are about 2ft. apart, there is another series of lighter poles placed across them. Over these a layer of reeds or twigs is placed, and over this grass and brush. A layer of mud is then spread over all, and being covered with dry earth, is trodden down firmly. The women do all this work, and when it is finished, a floor is made inside with a thick coating of mud, trodden down in the same way; in fact, roofs and floors are much the same, and in the upper stories the floors of the rooms were once the roofs of those below. When the floors are done, the walls are plastered with mud, nicely smoothed with the hand. Sometimes they are finished with a wash of white clay, which gives them a very neat appearance. Formerly a custom prevailed of leaving a small space on the wall bare, a belief existing that one of the gods came and finished it; and although the space remained bare, it was supposed to be covered with an invisible plaster.

When the house is completed to this point,

four feathers are prepared, similar to those used under the four corners of the house. These are tied to a short willow stick which is inserted over one of the central roof beams. The feathers are renewed every year at the feast celebrated in December when the sun begins to return northward—that is, at the winter solstice.

The ceremony known as "feeding the house" is then performed. This is an offering to the sun, and consists of placing bits of food among the rafters, with prayers to the sun that he may smile upon the occupants of the house and not hasten the departure of any of them to the other world. After this, the women build a fireplace in one corner of the room under a hole left in the roof, and construct over over it a chimney hood to confine the smoke to the proper exit. A binlike arrangement, or stone trough, is built in another corner, and three flat stones are mounted in it for grinding corn. The house is then ready for occupancy. The door is merely an opening, closed by hanging a blanket over it when necessary, and windows are merely holes left in the walls when they were constructed. In the cold winter weather these are closed by stone slabs, or built up solid with masonry, the filling being removed again in the spring.—*Scientific American.*

ELECTRIC LIGHTING NOTES FOR ARCHITECTS.—III.

By AN ASSOC. INST. ELECT. ENGS.

ELECTRICAL ENERGY.—Attention has already been drawn to the fact that electricity in motion is produced by the conversion of one kind of energy into that of electrical, and the commercial applications of electricity consist in converting electrical energy into mechanical, thermal, or chemical energy. It is, therefore, of the utmost importance to be able to express in suitable units the work done electrically, and also to know the connection between these units and the corresponding ones used to denote mechanical energy.

Now, whenever a current of electricity flows through a circuit, resistance is overcome and work is done, and in all cases energy is given up. We have already pointed out that energy is the capability of doing work, and that energy is measured by the number of units of work done. In mechanics, work is said to be done by a force overcoming a resistance, and it is well known that work is made up of two components: force and distance. Thus to raise 100lb. of water vertically against the force of gravity work must be done, and it is evident that the work done is directly proportional to the force and also to the distance. Among engineers the unit of work is the foot-pound—that is, the work done by a force equivalent to the weight of 1lb. acting through a distance of 1ft. Work, then, is measured by the product of the force and the distance.

So far the time taken has not entered into the consideration of the work done. It is evident, however, that if it takes longer for one person to lift a certain weight through a certain distance than another person to do the same, then the power exerted in each case is not the same, although the amount of work done is the same. Work, then, is not the same as power. Power is the *rate* of working, being defined as the work done in unit time. The term "activity," suggested by Lord Kelvin, is now frequently used in the same sense, so that the activity in a circuit is the rate of doing work. The standard of power adopted by engineers is called the horse-power (H.P.), which is the name given to the rate of doing 33,000ft.lb. of work per minute. The horse-power, then, of a machine is the number of foot pounds of work done per minute divided by 33,000, indicating the rate at which an engine or machine can do work. The relationship between work and power may be stated algebraically as follows:—

work = power × time, and power = work ÷ time.

The principle of work is applicable to electrical energy, and to show the connection between the above unit or rate of working and the unit of electrical power, we shall refer to the dynamo as a means of converting mechanical energy into electrical energy. And from what has been said previously it is known that an electric current results whenever two points in a closed circuit are raised to a difference of potential, so that when a certain amount of mechanical energy is expended in driving a dynamo and a current traverses the external circuit, it is evident that an electrical pressure has been set up, and, therefore, that current strength and electrical pressure (E.M.F.) are the components which make up the electrical energy given in exchange, as it were, by the dynamo for the mechanical energy supplied. At this point it may be mentioned in passing that a dynamo may be designed to give a small amperage at a high E.M.F., or a large amperage at a low E.M.F., and that the same mechanical power expended in driving a dynamo will produce 20 ampères at 50 volts, or 100 ampères at a pressure of 10 volts. And just as the product of the force and distance moved through per minute, or the number of foot pounds per minute, measures the mechanical power expended, so the product of the number of volts and the number of ampères, or the number of volt-ampères, measures the electrical power generated, developed, or absorbed in any part of a circuit. Instead of the name "volt-ampère," the term "watt" is now applied as the name of the unit of electrical power. That is—

$$E \text{ (volts)} \times C \text{ (ampères)} = W \text{ (watts)} \quad (10)$$

Again, the unit of electrical work is the joule; therefore, the watt may be defined as the joule per second. Now, the watt is one of the units most commonly met with in practice, and is usually defined as "the power developed in a circuit when one ampère flows through it under a pressure of one volt." And, although time is not mentioned in this definition, it is clear that this factor (time) is included, since an ampère is a definite quantity of electricity flowing per second. Therefore, to obtain the actual (electrical) work done in joules we have the relationship—

$$J \text{ (joules)} = E \text{ (volts)} \times C \text{ (ampères)} \times t \text{ (seconds)} \quad (11)$$

If a dynamo were driven by a 1H.P. engine, and no energy lost in heat, friction, leakage, &c., then we should receive back 1H.P. of electrical energy, which, determined by taking the product of the volts and ampères given out by the machine, would be found to be 746 watts. Therefore—

746 watts = 1H.P. = 33,000ft.lb. per minute.

Worked Examples.—A few examples will now be considered to show the connection between the different units.

(1) A current of 15 ampères is sent through a circuit of 4 ohms resistance. What power in watts is absorbed?

Now, by Ohm's law $E = C \times R$.

$$\therefore \quad \text{power } W = E \times C = (C \times R) \times C = C^2 R = (15^2 \times 4, = 900 \text{ watts.}$$

(2) Find the H.P. required to feed five hundred 110-volt lamps, the resistance of each being 220 ohms.

$$\text{Power for each lamp} = E \times C$$

$$\text{but} \quad C = \frac{E}{R} \text{ (by Ohm's laws)}$$

$$\therefore \quad \text{watts per lamp} = E \times \frac{E}{R} = \frac{E^2}{R} = \frac{(110)^2}{220} = 55 \text{ watts,}$$

$$\text{and watts for 500 lamp} = 500 \times 55 = 27{,}500,$$

$$\therefore \quad \text{H.P. required} = \frac{27{,}500}{746} = 37 \text{ (nearly).}$$

(3) If a 16c.p. lamp requires 0·7 ampère at a pressure of 110 volts, how many watts does each candle-power require?

$$\text{Watts for each 16c.p. lamp} = E \times C = 110 \times 0{\cdot}7 = 77 \text{ watts}$$

$$\therefore \text{ watts per candle power} = \frac{77}{16} = 4{\cdot}8125 \text{ watts.}$$

(4) How many 16c.p. lamps, taking 4 watts per candle, can be run off a dynamo giving 7 electric horse-power?

Since 1H.P. = 746 watts

$\therefore$ 7H.P. = 7 × 746 = 5,222 watts.

And since 1c.p. requires 4 watts—

$\therefore$ each lamp of 16c.p. requires 64 watts.

$$\therefore \text{ No. of 16c.p. lamps} = \frac{5{,}222}{64} = 81 \text{ lamps.}$$

(5) A dynamo is 100 yards from a house, the conductor has a resistance of 0·002 ohm per yard, and there are 150 30-watt 100volt lamps to be fed. What E.M.F. must the dynamo give?

E.M.F. required = 100 volts for lamps + drop in volts along the mains.

Now resistance of mains = 0·002 × 200 (lead & return) = 0·4 ohm.

Note.—The conductor has to go *to* and *from* the house, and current required for each lamp—

$$= \frac{W \text{ (watts)}}{E \text{ (volts)}} = \frac{30}{100} = 0{\cdot}3 \text{ ampère.}$$

$\therefore$ current required for 150 lamps—

$$= 0{\cdot}3 \times 150 = 45 \text{ ampères.}$$

And since the drop in volts along a conductor = C × R,

$\therefore$ the drop in volts through $0{\cdot}4\omega = 45 \times 0{\cdot}4 = 18$v.

$\therefore$ E.M.F. required = 100 + 18 = 118 volts.

The Kilowatt.—Another unit of power, adopted as a commercial unit, is the kilowatt, which is a secondary unit 1,000 times the size of the watt, i.e.—

1 kilowatt = 1,000 watts.

And since the watt is $\frac{1}{746}$ of 1H.P., it will be obvious that the value of the watt is extremely small, and, consequently, that large and somewhat inconvenient numbers have to be used to denote the power and size of large dynamos when given in watts. For instance, a dynamo supplying 500 ampères at a pressure of 120 volts gives out energy at the rate of (500 × 120) 60,000 watts. Expressed in horse-power, this would be $\frac{60{,}000}{746}$, or 80·4H.P. And it is certainly more convenient to denote its power as 60 kilowatts, or its size as a 60-unit machine. A little consideration will show how the number of kilowatts can be easily turned into its equivalent number of horsepower. 1,000 is slightly more than $1\frac{1}{3}$ times 746, therefore 1 kilowatt corresponds approximately to $1\frac{1}{3}$H.P., from which we get the following rule:—

"The horse-power required for a dynamo is obtained by adding one-third of the number of kilowatts to the number of kilowatts."

Thus, in the above case, the horse-power of the 60-unit machine

$$= 60 + \tfrac{1}{3} \text{ of } 60 = 60 + 20 = 80\text{H.P.}$$

The Connection between Electricity, Heat, and Light.—Now that we are able to express in proper units the electrical energy equivalent to a certain amount of mechanical energy, we are in a position to consider the problem of converting electrical energy into heat and light. In a glow lamp, for instance, a certain voltage and amperage are required to produce a certain amount of light—in other words, to keep a glow lamp burning brightly, a certain number of watts of energy are consumed, and work is done at a *definite* rate. Now, the electrical power absorbed when electricity passes along a conductor is C × E watts, and if this energy is not transformed into mechanical or chemical energy, it is converted into thermal energy, either usefully for producing light, &c., or wastefully by being frittered away as heat. In either case, the heat produced is equivalent to CE watts; but $E = C \times R$ by Ohm's law, therefore the equivalent thermal energy of the electrical energy is $(C \times R) \times C$, or $C^2 R$ watts. So that power may generally be defined as the rate of transformation of one form of energy into another, and in an electrical circuit the heat produced per second is proportional to the number of watts consumed. And as a body becomes luminous and emits light when its temperature is very high, it follows that the light produced is proportional to the energy absorbed, so that glow-lamps giving the same light approximately absorb the same power. As is probably well known, the practical unit of light is the candle-power (c.p.), which is the amount of light produced by a standard candle weighing six to the pound, and burning 120 grains of spermaceti wax per hour.

Now, a well-constructed incandescent lamp absorbs from 3·5 to 4 watts per candle-power, from which it is evident that an ordinary 16c.p. lamp of first-class make requires from 56 to 64 watts. It may be mentioned here, although we shall have to consider many interesting points respecting details of lamps at the proper time, that it is usual and convenient to mark on the lamp the voltage required to send the necessary current through a lamp to make it burn brightly, and to designate the lamps 60, 100, 110, 200, or 220-volt lamps as the case may be. If we know the voltage and amperage required by a certain lamp, the necessary horse-power to light a given number of lamps is found by dividing the product

of the number of lamps, voltage, and amperage by 746, that is—

horse power =

$$\frac{N\ (\text{No. of lamps}) \times E\ (\text{volts}) \times C\ (\text{ampères})}{746} \quad .. \quad (12)$$

Board of Trade Unit.—Another unit—the legal quantity fixed by the Board of Trade for the purpose of public supply—or the Board of Trade Unit, may now be considered. Technically it is called the *kilowatt-hour*, and as this name implies, it is the product of a rate of doing work into a period of time, and is the measure of an action lasting a certain time. Thus a consumer has received one B.O.T. unit, or one B.T.U., when the product of the electrical rate of working in watts and the number of hours during which the supply lasts equals 1,000, and the number of B.T.U.'s is found by dividing the product of the volts, ampères, and hours by 1,000. Thus ten 100-volt lamps taking one ampère each require a supply one B.T.U. if placed in a circuit supplying energy at this rate for one hour. The following equivalents of the Board of Trade are useful, and the student is advised to verify the same.

1 B.T.U. = 1,000 volt-ampère hours.
= 3,600,000 joules.
= 3,600,000 coulomb-volts.
= 1·34H.P. working for one hour.

The average charge by electrical companies for electrical energy is 6d. per unit for lighting purposes, so that it is evident 50 glow lamps taking 60 watts each would cost 1s. 6d. per hour; whilst if 4d. per hour be the charge for motive power, then the cost of an electrical horse-power for one hour is 3d.

Worked Examples.—(1) What would it cost to light 250 220-volt 16c.p. lamps for 100 hours, if the lamps take 60 watts each and the charge be 6d. per Board of Trade unit?

$$\text{Each lamp takes} = \frac{60\ (\text{watts})}{220\ (\text{volts})} = \frac{3}{11}\ \text{ampères.}$$

And number of B.T.U.'s

$$= \frac{N\ (\text{No. of lamps}) \times E\ (\text{volts}) \times C\ (\text{amps.}) \times T\ (\text{hrs.})}{1{,}000}$$

$$= \frac{250 \times 220 \times \frac{3}{11} \times 100}{1{,}000} = 1{,}500.$$

∴ cost at 6d. per unit = 1,500 × 6d. = £37 10s.

(2) A dynamo gives 40 ampères at 2,000 volts. How long will it take to deliver one B.T.U.? What will be the income per hour if charge be 6d. per unit?

$$\text{The output of the machine} = \frac{40 \times 2{,}000}{1{,}000}$$

= 80 kilowatts = 107·2H.P.

and since there are 3,600 seconds in 1 hour, the No. of B.T.U.'s delivered per second—

$$= \frac{80}{3{,}600} = \frac{1}{45}\ \text{B.T.U.}$$

∴ 1 B.T.U. would be delivered in 45 seconds.

And since the output is 80 kilowatts—

∴ in 1 hour 80 B.T.U.'s would be delivered,

and income per hour = 80 × 6d. = £2.

That is, 107·2H.P. would be supplied for 1 hour for £2—that is at the rate 4½d. per H.P. per hour.

(3) Determine whether it is more economical to use (*a*) 16-candle-power lamps taking 3 watts per candle and having a life of 600 hours, or (*b*) 16-candle-power lamps taking 3·5 watts per candle and having a life of 1,000 hours. Given cost of electrical energy as 6d. per B.T.U., and cost of renewals as 1s. 3d. in each case.

The comparison may be made by assuming that the two kinds of lamps are used for 3,000 hours and the total cost of energy used and cost of renewals determined for each kind; but a better way is to determine the total cost per candle-hour for each lamp, as follows:—

(*a*) Total cost per candle-hour of lamps using three watts per candle.

Quantity of energy in B.T.U.'s per candle for one hour— $= \frac{3}{1000} = 0{\cdot}003.$

Cost of energy per candle-hour—

= 0·003 × 6 = 0·018 penny.

Cost for lamp renewals per candle-hour—

$$= \frac{15}{16 \times 600}\ \text{penny} = 0{\cdot}00156\ \text{penny.}$$

∴ Total cost per candle-hour—

= 0·018 + 0·00156 = 0·01956 penny.

(*b*) Total cost per candle-hour of lamps using 3·5 watts per candle.

Quantity of energy in B.T.U.'s per candle for one hour— $= \frac{3{\cdot}5}{1000} = 0{\cdot}0035.$

Cost of energy per candle-hour—

= 0·0035 × 6 = 0·021 penny.

Cost for lamp renewals per candle-hour—

$$= \frac{15}{16 \times 1000}\ \text{penny} = 0{\cdot}0009375\ \text{penny.}$$

∴ Total cost per candle-hour—

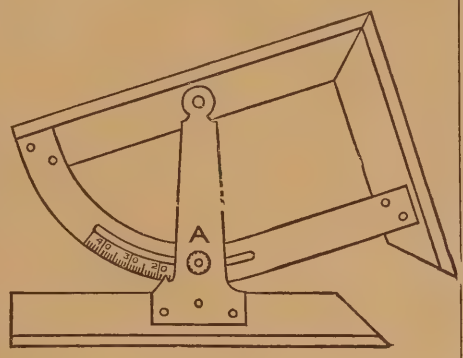
= 0·021 + 0·0009375 = 0·0219375 penny.

Therefore the lamp (*a*) is the more economical.

(*To be continued.*)

AN ADJUSTABLE SET-SQUARE AND PROTRACTOR.

MR. WILLIAM V. COOK, of 12, St. Margaret's Plain, Ipswich, has invented and is making a handy adjustable set-square and



protractor for use with the T-square in the same way as the ordinary set-square.

It is more especially suitable for purposes in connection with which lines are required inclined at angles other than those given by ordinary set-squares. For setting out roofs, staircases, batters, &c., it will be found especially useful. It can be adjusted to any angle and firmly fixed by means of the clamping-screw A. Lines can then be drawn at this angle inclined both to left and right upon the paper, and also perpendiculars to them, without resetting.

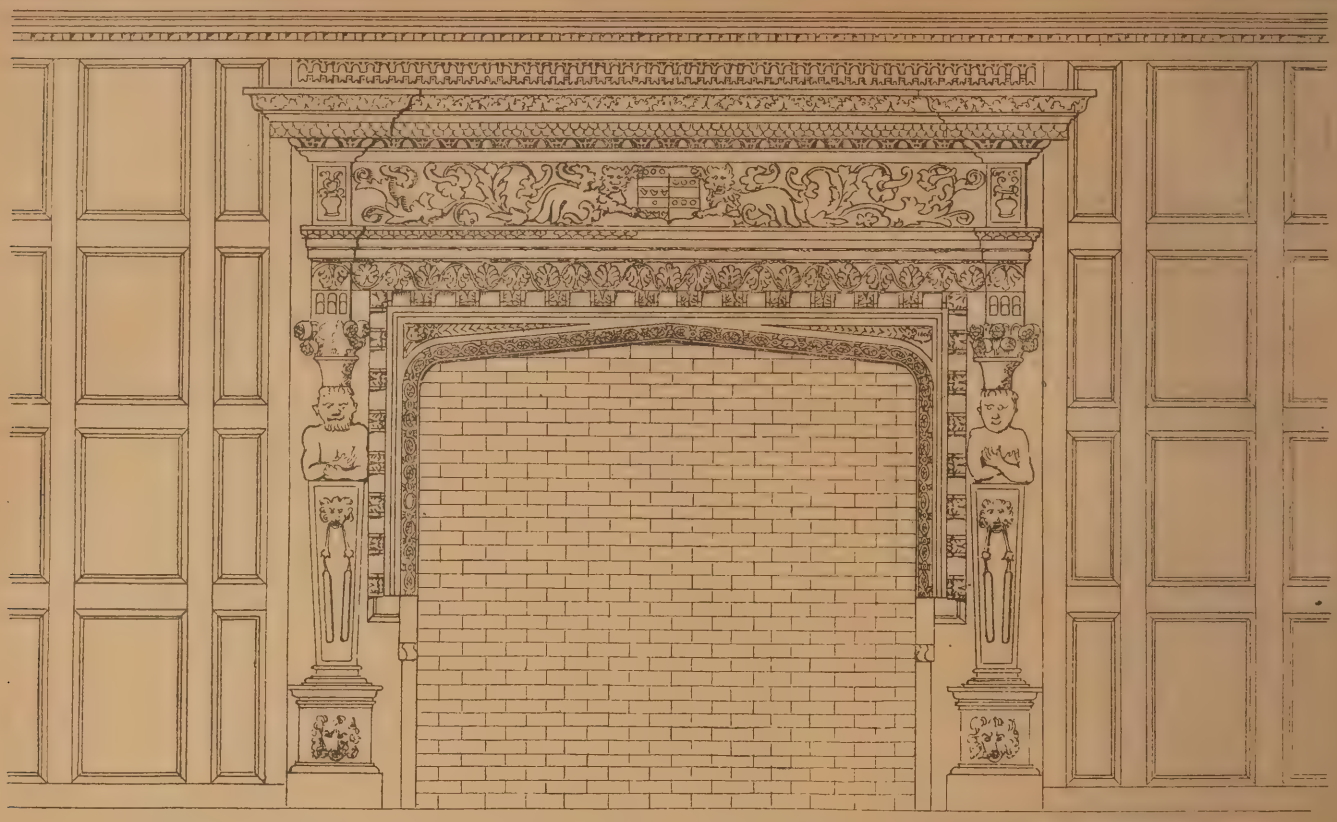
No other set-square is needed if this is used, and as a protractor it will be found quick and convenient. Once set to the angle wanted, lines can be drawn anywhere on the paper without further trouble. It is made in polished mahogany with ebony edge and electrum mounts for 7s. 6d., or post free 7s. 7½d.

CAIRNBULG CASTLE.

THE ancient Castle of Cairnbulg, near Fraserburgh, on the north-east coast of Aberdeenshire, has just been restored, enlarged, and rendered habitable from plans by Messrs. Marr and Jenkins, of Aberdeen. The castle was and is purely Baronial in style. The north portion is in the form of a square tower, while the south is flanked by a low circular tower. These two prominent landmarks were the almost only remaining portions of the building, the intervening space, which had formed a square block in keeping with the general style of the building, having been for a century in ruins. The castle was built on a knoll 20ft. in height, immediately to the south of the Water of Philorth. The basement of the square north tower, which was in modern days known as the dungeon, is now to be used as a cellar. The next flat, the great dining-hall of the old lairds, will probably at some future time be converted into a billiard or dining room. A new wooden spiral staircase of 96 steps leads from the first floor to the summit. The two flats above the great hall will be occupied as bedrooms. At the top of the tower the parapet has been finished with embattlements, and a promenade has been made, from which an uninterrupted view can be had from all points of the compass of the surrounding land and sea. A flagstaff is erected on the highest point of the structure. The basement of the round tower at the south end of the castle is fitted up as a cloakroom, above which is an octagonal business-room. The business-room is floored with pitch-pine and polished. In the fireplace a dog-grate has been inserted, with tile linings at the backs and sides, built in the shape of bricks. Cut above the fireplace and on the chimney panel is the inscription, "Remove not the ancient landmark." The ceiling has the beams displayed below, the interstices being filled with plaster work. The ornamentation of the ceiling has been carried out in black and gold, bestudded with stars. The woodwork is stained and polished dark oak. There are several arched recesses for bookcases and the like, and the windows are also all circular-headed. Above the business-room there is an octagonal bedroom, while above that is the library, comprising two flats in the old tower, and having a total height of 17ft. The beams are shown in the ceiling the same as in the business-room. The conversion of the two flats into one has been accomplished by cutting into the floor of the upper flat, so as to form an octagonal opening to the room below, leaving a platform or balcony 3ft. wide all round the upper portion. The ceiling of the balcony is formed with moulded linings of cypress wood. Both divisions are shelved for the reception of books, and the balcony is connected with the floor by means of a stair; this stair, as also the balcony, has an oak rail with turned balusters. From the library a stair ascends to the flat roof of the round tower.

The more modern part of the building is that which has been entirely rebuilt—the space intervening between the two towers. It has a frontage of 66ft., and contains the principal rooms of the castle. The ground floor is occupied by the kitchen, scullery, servants' hall, and bedrooms, larder, pantries, store-rooms, &c. At the back of the northern part of the building is the kitchen court, and extending in the same direction is the old keep. On the first floor are the dining-room and drawing-room, each 23ft. by 18ft., both entering from the corridor on the east side. The dining-room floor is of polished pitch-pine wood, with a border round the whole, laid separately. The ceilings are panelled in plaster, the woodwork is dark oak, and the chimneypiece of a Doric type. The drawing-room is practically the same as the dining-room, with the exception that the woodwork is enamelled white and the chimney-piece ornamented with designs of flowers. In these rooms, as well as the hall and corridor, the lower sashes of the windows are of plate-glass, the upper being leaded lights in small squares. Most of the windows have panes of the old-fashioned type, in which "knots" are the predominant feature. On a number of the panes of glass in the windows of the dining and drawing rooms are designs of all classes of sea-going vessels, from the oldest periods to the present day. There is also inscribed on one part of a window the names of the successive proprietors of Cairnbulg estate and Castle.

There are two entrances to the castle—one of secondary importance, near the back of the square tower, and the other at the south-east side of the main building. The latter is the principal entrance. There does not appear to have been any regular drive to the castle in the olden times, but it must have been approached from about the same point as the new avenue is formed—namely from the south side of the Bridge of Philorth, on the Cairnbulg-road. At the entrance to the avenue a lodge will be erected, and the drive will be continued in a curving sweep to the castle, the ground within the curve being planted with a variety of trees which will withstand the sea winds. The entrance will be from a circular gravelled space at the south side. Leading to the outer door there is a flight of steps, seven in number, giving a staircase of about 7½ft. wide; and inside is a hall, divided from the corridor by another flight of steps and a glass door. Passing along the corridor, the entrances to the dining and drawing rooms are found in juxtaposition, while from the hall stairs lead to the business-room and the garden. One flight of steps outside are of Corrennie granite, with handrails on each side of the same colour of stone. The outer door is of teakwood, studded with inch-headed nails. In front of the business-room door there is a platform which can be used as a rostrum from which to address an audience underneath in the hall. The ceiling of the hall is 17ft. high, and the walls are panelled with cypress wood to the height of 8ft. all round. The main stair which leads to the upper story is skirted with a massive handrail of oak, moulded, with carved and moulded posts, also of oak, and heavy turned balustrades. This flat is occupied by a suite of bedrooms, six in number, bathroom, &c., the floors of which are all stained and polished. To



FREESTONE CHIMNEYPIECE (A.D. 1601), LOWER COURT FARM, UPPER LANGFORD, SOMERSET.

the bathroom hot water is circulated through copper pipes from a cylinder in the scullery. A drying-loft occupies the upper flat, and a lift is constructed from the scullery to the dining-room pantry. A speaking-tube connects the nursery with the kitchen.

Following closely the style of the old building, every gunport and loophole has been reproduced, and the ancient square turret has been renewed on the north side. The bell-pull at the entrance door has a crank about 8ft. from the entrance platform, and suspended from it is a square rod with a massive oval bronze handle or pull attached to the end of the rod by a piece of chain, the pull being about 4ft. long. The building is fitted with electric bells throughout. Outside the castle the grounds will be decorated, so far as the surroundings will lend themselves to richness. The slope on the east side will be terraced, and the whole space inclosed and planted with trees and shrubbery. The garden, which has been well known in the district for many years back, has been inclosed with new walls, in keeping in every way with the style of the castle. The remains of the old moat are to be formed into an ornamental lake. A noteworthy fact lies in the discovery having been made, while the reconstruction was going on, that the courtyard was paved with stones taken from the beach.

Internally the house will be lighted by electricity—a mode of lighting hitherto unknown in the locality. The dynamo will be revolved by an oil-engine, and all the fittings have already been laid. Provision is also made for having the castle lighted by gas. The cost of restoration has been over £5,000, and the beautifying of the surroundings will run into another four figures. A fresh supply of water has been introduced from a spring, locally known as the Camp Well, situated upon the lands of Cairnbulg, and which is to be pumped up by means of a windmill. The principal contractors were Messrs. Brebner and Jenkins, builders, Fraserburgh.

FREESTONE CHIMNEYPIECE, LOWER COURT FARM, UPPER LANGFORD, SOMERSET.

THIS elaborately-carved chimneypiece is in a wainscoted bedroom on the first floor of the house, which belongs to General Sir Lintorn Simmons, G.C.B. The chimneypiece bears the date 1601 on a small shield in the right-hand spandrel, and the initials R. I. K. on a shield in the left-hand spandrel. The male and female figures on either hand are supposed to represent Adam and Eve, bearing on their heads baskets of pomegranates. It will be noticed that the figures are not placed symmetrically under the uprights they support. A shield in the centre of the frieze, supported by crocodiles, bears a coat-of-arms, whose charges appear to be dominoes and martinets. The bed-mould of the cornice has a curious variety of egg-and-tongue enrichment, turned upside down, and very deeply undercut.

T. Bradford Ball.

THE CONDITION OF THE PARTHENON.

IN a letter on the Parthenon which appeared in yesterday's *Times*, Dr. Wilhelm Dörpfeld states that the temple is by no means yet "doomed," as was asserted by another correspondent some six weeks since. The condition of the structure is, he adds, "certainly not satisfactory. Earthquakes and fire, rain and sun, frost and heat, several bombardments, and more especially the unfortunate explosion of the Turkish powder magazine by the Venetians under Morosini in 1687, have all contributed to annihilate entirely large portions of the temple and severely to injure those still preserved, and even to de troy in many places the beautiful white marble. One has only to read the reports of the three distinguished European architects—the Englishman, F. C. Penrose, the German, T. Durm, and the Frenchman, T. Magne—on the state of the temple in order to satisfy himself that the structure has indeed suffered severely and that the condition of certain portions is even dangerous. But, according to the undeniably authoritative opinion of those architects, the damage is not so serious as has been described, and, on the contrary, the preservation of the existing structure for hundreds, and perhaps thousands, of years is still possible. One thing only is necessary—viz., that the proposed repairs shall be carefully and expeditiously carried out. The same conclusion has been arrived at by the committee of Greek and foreign architects and archæologists to whom the Greek Government has intrusted the task of superintending them. As the opinion of all these experts with regard to the mode of restoration shows few divergences, the work might be taken in hand at once, those repairs being undertaken first upon which all the experts are agreed. Last winter a solid scaffolding was erected along the western portion of the temple in order first of all to replace the specially-damaged epistylium beams of the opisthodomus by new ones. The stones required for this purpose had in part been already brought from Pentelicon to the Acropolis and the machinery obtained for raising these huge blocks, and work was about to begin when war unhappily broke out and arrested the progress of operations. The funds for the work of restoration were granted by the Greek Archæological Society, which derives its revenues from a lottery sanctioned by the State. This year, unhappily, owing to the disastrous war, the lottery has hardly produced anything, and the society has consequently no funds at its disposal to prosecute the works. The repairs have, therefore, been temporarily interrupted, and who knows when they may be resumed?" Professor Dörpfeld urges that it would be advisable to place the remaining portions of the frieze in a museum, and to replace it on the temple by a copy. In conclusion, the Professor refers in terms of high approval to the care now bestowed upon the antiquities of the country. This, he says, is due in part to the Greek Archæological Society, but chiefly and in the first place to Mr. P. Kavvadias, the Director-General of Antiquities, especially since he has combined the secretaryship of the Archæological Society with the direction of the Antiquities Department of the Ministry.

THE CAUSE OF ARSENICAL POISONING BY WALL-PAPERS.

IT has long been recognised, says Mr. Thomas Bolas, F.C.S., writing in the *Society of Arts Journal*, that arsenical wall-papers do serious mischief; but the work of Gosio and of Emmerling seems to have cleared up that mystery which has surrounded the matter. Certain moulds, including the very common *mucor mucedo*, have a remarkable property of decomposing arsenical compounds with the evolution of volatile products containing arsenic, and the highly poisonous character of volatile arsenical compounds, coming into the system by way of the respiratory organs, is well known. Arsenious acid is, even in small quantities, a highly antiseptic substance, and poisonous to moulds, so the throwing off of the arsenic in a volatile form may be an effort of nature to cast out the poison. The arsenical copper greens, and other colouring matters containing arsenic, are still used, and, paradoxical as it may appear, it is by no means improbable that the most dangerous wall-papers are those containing a mere trace of arsenic, as when the quantity is large the moulds cannot exist. Traces of arsenic may come into wall-papers from the imperfect

washing of vessels used to contain the more highly arsenical colours. Now that boric acid is very cheap, the old, and perhaps forgotten, suggestion of Bolley to use a precipitated borate of copper as a green pigment in place of the arsenical green deserves attention. Bolley's green is prepared by taking two parts of blue vitriol (crystallised cupric sulphate) and three parts of borax in separate quantities of cold water and mixing, after which the precipitate is washed and dried. Dyed and printed fabrics now very frequently contain traces of arsenic.

CHIPS.

A movement is on foot at Burton-on-Trent to place a memorial in St. Paul's Church to the founder, the late Mr. M. T. Bass, and his wife. It is proposed that the memorial should take the form of a lectern.

It was resolved at the monthly meeting of the Halifax School Board, on Monday, that plans be invited from Halifax architects for the proposed new school at Sunnyside, to show accommodation for 300 mixed and 200 infants, to be built first, and other 500 places when required.

After many unsuccessful efforts, the Greek Archæological Society has obtained possession of the thickly-inhabited quarter of Athens known as Anaphiotika, lying immediately under the Acropolis. The inhabitants, who will receive compensation, will be deported to the suburbs, and excavations which promise a rich yield of interesting discoveries will shortly begin.

The extension of the Victoria Station of the Great Central Railway in Sheffield, to provide for the increased traffic which will result from the opening of the through line to London about twelve months hence, is making good progress. The station is situated at a considerable level above the street, and the first work has been to erect piers to carry the railway along the whole length of the extension. The River Don will be spanned by huge girders nearly 100ft. in length. Girders will also be used to bridge ever the canal. The other piers, which number some 15, are nearly completed.

The French engineers have just completed the construction of a military tunnel on the Alpine frontier. This is through the peak of Parpaillon, at a height of over 9,000ft., and will establish communications between Fort Tournous and the position of Embrun. The length of the tunnel is about five hundred yards, and five years have been occupied in its construction; but this protracted period is explained by the fact that work could only be carried on in that elevated region during four months of the year.

A stained-glass window has just been erected in the parish church of Lundie, N.B. The window was designed by Sir Edward Burne-Jones, and supplied by Messrs. Morris and Co., Merton Abbey, Surrey. It measures 11ft. by 3ft., and bears the figures of the Evangelist John in the attitude of enforcing the doctrine of the opening words of his Gospel, which are written on a roll held up by his right hand:—"In principio erat Verbum, et Verbum erat apud Deum, et Deus erat Verbum." The figure is surmounted by an eagle, below the figure is the name "S. Johannes," and at the base is the inscription.

On Tuesday in last week, the chapel in her Majesty's prison, Northallerton, was reopened and rededicated, after internal reconstruction. A portion of the right side has been partitioned off for the accommodation of 20 female prisoners, while the remainder has seating for 90 males. Church furnishings of a suitable kind have been provided.

At a meeting of Peterhead Harbour Trustees held on Monday, it was resolved to send Mr. Barron, their engineer, to negotiate an additional loan of £21,000, being £15,000 to complete the North Harbour Improvement Scheme, and £6,000 for the reclaimed ground on the South Bay.

The house named Sandycombe Lodge, at St. Margaret's, Twickenham, in which J. M. W. Turner, R.A., resided for many years, was sold on Tuesday by Messrs. Chancellor and Sons at the Mart, Tokenhouse-yard. This house, which for a time was called Solus Lodge, is believed to have been built from the designs of Turner himself, and, according to Mr. Ruskin, he occupied it from 1808 till 1827, although other writers give the time as from 1814 to 1826. At that period the house faced the river, but now several modern villas have been erected opposite. The house contains four bedrooms, dining and drawing rooms, library, and the usual offices, nothing having been altered, except by the addition of a bath-room, since Turner left it. A garden surrounds the residence. Bidding began at £1,000, and proceeded slowly until £1,200 was reached, at which the property was sold, the rental being £65 per annum.

OBITUARY.

The death of Mr. Thomas Gough, surveyor and architect, of Knighton, took place last week, in the 59th year of his age. He had held the appointment of surveyor to the Knighton Highway Board, and subsequently to the Rural District Council, for 25 years. He also carried on an extensive practice as an architect in the town and neighbourhood, and was highly respected throughout a wide district. He was a Wesleyan, and for many years was an appointed local preacher. He had also acted as political agent to the Conservative party.

Mr. W. Clapham, the well-known Lancashire landscape gardener, of Bramhall Park, Stockport, died on Friday, after a very short illness, at New Brighton, aged 65 years. He was connected with the Tower Grounds at that resort from their commencement, and to him is due the credit for the formation of the central lake and the utilisation and improvement of the natural beauties of the property. His *tour de force* was the construction of the cycle and running tracks and football ground (said to be the best in England) in less than two months, employing about 1,000 men in the task, and superintending them night and day with unflagging energy. He did much for the Tower at Blackpool and also the Winter Gardens there, and his work is well known in many of the ancestral seats of Yorkshire, Lancashire, and Derbyshire.

Mr. Arthur P. Cotterill, builder and contractor, of Crewe, and alderman of that borough, died on Thursday in last week at his residence in Nantwich-road, Crewe. Mr. Cotterill had built up a most successful business. He constructed the Crewe Cattle Market, he built the Royal Hotel and the Hotel Extension, St. John's Church in Stalbridge-road, and many other public edifices. He was a man held in the highest esteem for his business probity and his high character. He was a Liberal in politics. He took a great interest in the town's affairs back in the old local board days, and when the charter of corporation was obtained he was one of the first elected councillor. Many years ago he was elected an alderman. As a builder his services were peculiarly valuable to the council, more especially years ago, when new streets were being laid out and new works undertaken. He has not been able to attend the meetings of the council for some time. About five years ago his eyesight was affected, and for the past two years he had been quite blind.

The death of Mr. Alfred W. Ayers, J.P., occurred at his residence, 13, Priory Hill, Dover, on Tuesday in last week after sixteen days' illness. Since recovering from a long illness, Mr. Ayers had devoted himself with his usual zeal to his public duties as town councillor, magistrate, and guardian of the poor, although not without some premonitions of serious weakness. The announcement of the death was made in the Town Council on the day of his death, and as a mark of respect for the deceased the meeting immediately adjourned without transacting any business. Mr. Ayers was born in Dover 61 years ago, and had been engaged in that town with his late father in conducting important works connected with the barracks and fortifications of the Western Heights. For eighteen successive years they had building contracts there, and amongst the works which they carried out was the building of the South Front Barracks. Mr. Ayers commenced public life in November, 1873, entering the Town Council as a representative of the Town Ward; but at the end of his term of three years he was not re-elected. After that the Town Council saw him no more for sixteen years, and during that interval he penetrated to the interior of Australia. Returning to Dover he again engaged in the building business, and in 1883 was elected a member of the Dover Board of Guardians in succession to his father, who had for many years filled the same office. Mr. Alfred Ayers continued to hold the same seat up to the time of his death. Mr. Ayers entered the Town Council for the second time in May, 1892, and continued a member till his death. By his death Dover loses an impressive and an aggressive individuality.

After much controversey as to the merit of various sites suggested for the central post office for Aberdeen, the Postmaster-General has given his decision in favour of the one in Crown-street.

Building Intelligence.

Glasgow.—Cambridge Buildings, a new block of business premises now in course of erection in Sauchiehall-street (and which when extended as contemplated will complete the corner with Cambridge-street), will have a frontage to Sauchiehall-street of 94ft. 6in., and a depth of nearly the same. The buildings are five stories in height, with a basement floor, and the Italian style has been adopted, the stone used being Locharbriggs red freestone, enriched in parts with Peterhead granite. The entire buildings will be occupied by Messrs. Thomas Muirhead and Co., warehousemen. The street and first floors will be used as a retail drapery and silk warehouse, while the upper floors will consist of show-rooms, work-rooms, &c. There will be a passenger lift, and the whole premises will be lighted by electricity. The work is being carried on from the designs of Mr. James Thompson, architect, F.R.I.B.A., 88, Bath-street, Glasgow, who is also the proprietor.

Newcastle-under-Lyme.—A contract for the pewing of St. Giles's Church has been made with Messrs. Jones and Willis, of Birmingham, and for the present seating accommodation of chairs, which have served that purpose since the opening of the church in 1875, there will be substituted a permanent seating of open benches in oak, the design being in harmony with that of the fine church, which is one of the last examples of the late Sir Gilbert Scott's work. The present contract includes the pewing of the nave, three stalls of special design being provided on the south side for the use of the corporation during their visits to the church. The seat for the Mayor is appropriately distinguished among these. The work is being carried out from the design of Mr. J. Lewis, architect, of Newcastle. The side chapel will also be reseated in oak.

Preston.—The new Technical School in Corporation-street, which has been built out of funds provided by the trustees of the late Mr. E. R. Harris, on a site given by the corporation, was opened by the Countess of Derby on Friday. It has been built from the designs of Messrs. Cheers, Aspinwall, and Smith, and has cost, exclusive of furnishing, about £15,000. It comprises a weaving shed—one of the largest in the country—a large spinning shed, a textile museum, a lecture hall, classrooms, and every provision for teaching the staple trades of the district. Special rooms are set apart for classes in mechanics and engineering, machine and building construction, carpentry and joinery, plumbing, &c. Active steps are at present being taken to equip the building with machinery and all the most modern appliances for teaching the various industrial processes.

St. John's Wood, N.W.—Considerable alterations have been carried out at the east end of the chapel of ease at St. John's Wood, in order to afford more accommodation to the choir, and to widen the approach to the sacrarium; for which purpose the high pulpit has been moved more forward, towards the west, involving the removal of some of the seats. The smaller pulpit has been cleared away, and part of it utilised as a reading-desk and a credence table. Formerly the choir seats were on a level with the floor of the church, but to give greater prominence to the musical part of the service they are now raised upon platforms. The organ, which was formerly in the west gallery, has been remodelled and brought down to the rear of the choir, under the north gallery. These alterations have been carried out by Mr. Forsyth, of Finchley-road, from plans prepared by Messrs. Forsyth and Maule, architects, of 16, Great Marlborough-street, W.

At Wye, South-East Kent, on Wednesday week, the foundation-stone was laid of master's residence that is being added to Thornhill Charity Schools by private donors. Mr. Henry J. Jeffery, of Ashford, is the architect, and Mr. G. F. Davis, of the same town, the builder.

At King's Heath, Birmingham, the foundation-stones of a new Baptist chapel were laid on Friday. The building will be faced with Leicestershire bricks, with Hollington stone dressings, will measure 72ft. by 43ft., and will seat 450 persons. At the rear will be vestries, ladies' room, and school-room or lecture-hall, seated for 450. Mr. Arthur Harrison is the architect, and Messrs. J. Moffat and Sons are the contractors; the outlay will be about £7,000.

Engineering Notes.

CENTRAL LONDON RAILWAY.—The first junction of the tunnels between Holland Park and Notting Hill-gate Stations was successfully made on Saturday night. The following junctions will be made before the end of the current year—viz.: Shepherd's Bush Station and Woodhouse Park (the generating station), Shepherd's Bush and Holland Park Stations, and Queen's-road and Westbourne Stations, and in February, 1898, the last junction of 1, 2, and 3 contracts will be made between Notting Hill-gate and Queen's-road Stations.

LYNTON AND BARNSTAPLE RAILWAY.—This line, which was commenced two years ago, will be opened for traffic next Easter. It is about 19 miles in length, starting from a joint station with the London and South-Western Railway within the town of Barnstaple and terminating on the hill about three-quarters of a mile from Lynton. Five intervening stations are provided, at Chelfham Mills (for Goodleigh, Stoke Rivers, and Loxhore), Bratton, Fleming (for Challacombe), Blackmore Gate (for Ilfracombe, Combmartin, and Kentisbury), Parracombe, and Martinhoe Cross for Wooda Bay, Martinhoe, and Trentishoe. The 2ft. guage is adopted. The road has now been cut throughout, and the greater part of the permanent way has been laid, while most of the station buildings have also been practically completed. Leaving the new joint station at Barnstaple the line at once enters the valley of the Yeo, which it follows for about six miles, in its course traversing a viaduct at Chelfham, then skirting for several miles the Bratton valley, and then, rising to its highest point, Blackmore, where from the height of 1,000ft. the first glimpse of the Bristol Channel is caught. The line descends from Wooda into the valley of the West Lynn by an easy gradient till the terminus of Lynton comes into view. The rails weigh 40lb. to the yard, with sleepers 3ft. apart; the sharpest curve being five chains, and the deepest gradient is 2 per cent. Mr. Frank Chant is the engineer of the line. The engines are by Manning and Wardle, of Leeds, and the rolling stock is supplied by the Bristol Waggon Works Company.

NEW YORK.—The proposal to erect a bridge over the East River between New York and Brooklyn has reached a definite stage towards actual execution, as separate tenders are invited by the commissioners for its erection for the construction of the two anchorages. These anchorages are about 150ft. by 180ft. each, and 100ft. above high water, the foundation being piles and timber grillage. They contain about 50,000 cubic yards masonry each. They will be faced with granite. Each anchorage will require about 1,600 tons of steel girders, eye-bars, and pins. The estimated cost is about £145,000 sterling. The time allowed for the work is 16 months. The tenders were to be opened on Wednesday in this week, the 22nd inst.

NORTH CORNWALL RAILWAY.—The report of the engineers, Messrs. Galbraith and Church, presented to the shareholders at their meeting yesterday (Thursday), states that the staking out and preparation of the plans of the extension to Padstow, 5½ miles in length, were proceeded with directly the arrangements for the construction were completed. The contractors, Messrs. Curry, Reeve, and Co., commenced work at Little Petherick Creek, in February last, and as further land was obtained, started on other parts of the line. The present state of the work is as follows, viz.:—Possession of land has been obtained for a length of 4½ miles, a considerable portion of which has been fenced; excavation is proceeding in twelve cuttings, and a commencement has been made with the masonry bridges, one of which is nearly completed. The temporary timber viaduct over the part of Little Petherick Creek to be bridged has been completed, and the embankment brought up to one end. The permanent iron viaduct has been let, but the erection cannot be commenced until the remainder of the embankment has been finished. Arrangements are being made to proceed shortly with the station building at Padstow.

PROPOSED LIGHT RAILWAY TO INVERARY.—The Light Railways Commissioners held an inquiry at Tarbet on Monday into an application by the West Highland Railway Company for permission to construct a light railway between Arrochar, Loch Long, and St. Catherine's, opposite Inverary on Lochfyneside. The length of the line will be 18 to 19 miles, and the estimated cost £110,000. Mr. Cooper, Edinburgh, who appeared for the promoters, pointed out in his opening statement that Inverary was at present absolutely cut off from railway communication with the outside world. A number of witnesses were examined, and the evidence showed that feeling in the district generally was very greatly in favour of the scheme. Two proprietors, through whose grounds the line will pass, strongly objected to its being unfenced. Mr. Westland, partner of the firm of Blyth and Westland, civil engineers, Edinburgh, the engineers of the railway, stated that the steepest gradient was one in fifty, and the sharpest curve eight chains. The gauge was the ordinary 4½ft. gauge. At St. Catherine's a pier was to be constructed at a cost of £5,000, and would end in 10ft. of water. The line began 160ft. above sea-level, and rose to 860ft. The only point of difference with the landowners was the question of fencing. The company were prepared to fence arable land, but he thought it would be needless to fence moorland. The trains would go at within 15 miles an hour. If they were to fence all, the cost would be about £300 per mile. At the close, the Earl of Jersey, who presided, said the Commissioners were prepared to recommend the granting of an order for the line, but would delay decision on the question of fencing in the mean time.

CHIPS.

In the current issue of the *Western Figaro*, our old correspondent, Mr. Harry Hems, of Exeter, graphically and humorously describes his recent "Wanderings in Brittany and Finisterre." Six weeks were spent in a tour to St. Malo, up the pretty river Ranch to Dinan, by rail to Brest, diligence to Du Conquet, and by steamer to Ushant, returning by the same route.

The corporation of Aberdeen have adopted as the site for the statue of Hygeia, about to be erected to the memory of Miss Duthie, a point just above the Lower Lake in the Duthie Park.

The corporation of Tunbridge Wells are contemplating spending from £80,000 to £100,000 in municipal buildings. The local Improvement Association have passed a resolution begging the corporation not to intrust the work piecemeal to the officials, but to invite competitive designs from architects, offering three substantial premiums for the selected plans.

The Devonshire County Council finally adopted at their meeting last week a scheme for the future maintenance of main roads submitted by a committee. Under this the county will be divided into three districts, for each of which a county surveyor, three assistant surveyors, and five foremen will be appointed.

At Wemyss Castle, N.B., a private memorial chapel has been constructed and fitted up in the basement from designs by Mr. R. S. Lorimer, architect, of Edinburgh. A monument to the late Mrs. Erskine Wemyss has been built into the north wall; it is surmounted by a panel showing a swan supporting a shield, on which is carved the lion rampant—the crest of the family. Here will be placed a recumbent effigy of the late Mrs. Wemyss, which is being executed by the Princess Louise. The windows are to be filled in with stained glass illustrating the life of St. Margaret of Scotland.

A recreation ground of 5¾ acres, provided by the corporation of West Bromwich, for the benefit of the inhabitants of the Hill Top Ward, was opened by the mayor on Monday. The grounds, which adjoin the highway between West Bromwich and Wednesbury, have been laid out, from plans by the borough surveyor, Mr. A. D. Greatrex. The foundation-stones of the various buildings, including free library, fire, and police stations, which are to occupy a portion of the property, were also laid by the mayor. They will also be built from Mr. Greatrex's designs, and the contract for their erection has been taken by Messrs. Smith and Son, of Hill Top, at £3,200.

The pavilion and a cluster of smaller buildings, including a refreshment-room, shops, shelters at the seaward end of Southport pier, were burned down on Saturday night, and some thirty or forty yards of the wooden "deck" of the pier was destroyed. The damage is put at about £5,000. The pavilion, which was built nine years ago, was 70ft. by 50ft., with a height of 35ft., and was seated for an audience of over 400. The structural loss is covered by insurance. Already the directors have consulted an engineer with the view to preparing plans for a larger pavilion and other buildings and the general improvement of the pier.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

GLASGOW ARCHITECTURAL ASSOCIATION.—On Tuesday evening, the 14th instant, the vice-president, Mr. G. S. Hill, A.R.I.B.A., in the chair, Mr. Jas. A. Morris, F.R.I.B.A., I.A., the honorary president, delivered a lecture on "Attainable Ideals." Mr. Morris had on the walls a unique collection of working drawings which he had specially obtained from some of the leading English architects, including the late John D. Sedding, John Belcher, Ernest George and Peto, Ernest Newton, C. F. A. Voysey, R. Schultz, Balfour and Turner, and Dunn and Watson. The lecturer, after expressing his gratefulness for the honour done to him by the Association in electing him as its honorary president, took the drawings around him, which he said were better than many lectures, as his theme. He said: "The good influence of John Sedding for purity and gentleness, love of his art and mankind, and all that goes to the making of a true and simple artist will not 'be interred with his bones.' His drawings upon our walls show abundantly his vivid imagination, his keen desire for perfection and the infinite labour he gave in seeking it, his nervous directness of touch, his refinement, breadth, simplicity, and power." He was sorry that he had no drawings by Norman Shaw, who had written him that drawings were only a sort of alphabet with which to instruct the builder, and when he was done with them they should be burnt as apt to mislead people. The lecturer maintained that high ideals and noble thoughts would elevate and ennoble an architect's work, however great the influences restraining him were. He advised his hearers to study from nature; to learn the subtle beauty and strength of the human figure, which was a mine of purest gold, inexhaustible in its richness; to seek dignity among the mountains and by the sea. From these they would learn that the greatest dignity was ever the simplest. "And," he said, "if you once receive that truth and become imbued with it, your buildings, be they great or little, must ever also partake of the same power. The desire for this unseen perfection, this subtle excellence and beauty so near and yet beyond our grasp, this wisdom, this mystery, inspires alike the artist, the poet, the scientist, and the seeker in all walks after truth." The old fairy tale of the "Ugly Duckling" was capable of many adaptations, and the time might be near when architecture, like that unfortunate fowl, driven from pillar to post, jeered at, misunderstood and despised, because often ugly and ungainly, might once again become the beautiful swan. Mr. Alex. McGibbon proposed a vote of thanks to the lecturer. The Chairman, after expressing the sincere gratefulness of the Association to the architects who had lent their drawings, seconded the vote of thanks, which was heartily accorded. Through the appreciated kindness of their senders, the drawings remained on exhibition till Saturday.

FISHPONDS ASYLUM.—The following resolution was unanimously carried at the last meeting of the Bristol Society of Architects:—"That this society regrets to learn that the committee of the Bristol City and County Lunatic Asylum have appointed a clerk of works instead of an architect to carry out the proposed extension to the asylum. It seems that the committee are sanctioning an expenditure much above what is usual in this class of building, and that the amount per bed will be practically double what it should be, considering that the administrative buildings are already erected. This society considers it is not in the interests of the ratepayers that for a building involving such a large expenditure of public money the services of a properly-qualified architect should not have been retained."

A step is now to be made in connection with the development of Seascale. A Llandudno gentleman has bought land on which to erect a high-class hotel, the contemplated expenditure being about £20,000

An art exhibition was opened on Monday at the Hull Royal Institution, and is intended to remain open for the next month. It is of a loan character, and contains a large number of pictures by local artists, many being of considerable merit. The promoters are working with the object of ultimately establishing an art gallery of a permanent kind in Hull, and have on two previous occasions held exhibitions like the present.

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ILLUSTRATIONS.

PASSMORE EDWARDS FREE PUBLIC LIBRARY, ST. GEORGE'S IN THE EAST.—COUNTRY HOUSE, BATH.—WALL-PAPER DECORATIONS, BY MESSRS. JEFFREY AND CO.—HOGHTON TOWER, LANCASHIRE.—YORK UNION BANK, HULL.—OFFICES, YORK STREET, GLASGOW.—THE PALAZZO PESARO, VENICE (A.D. MDCLXXIX).

Our Illustrations.

PASSMORE EDWARDS PUBLIC LIBRARY, ST. GEORGE'S IN THE EAST.

On Wednesday next, Michaelmas Day, the Right Honourable C. T. Ritchie, M.P., President of the Board of Trade and late Member for the Tower Hamlets (St. George's), will lay the foundation-stone of this new building, which is in course of erection, at the cost of Mr. J. Passmore Edwards, on a corner site in Cable-street with a return frontage in Prospect-place. We gave the plan when the architect's Royal Academy view of the library was published in the BUILDING NEWS for May 21 last. The accompanying illustration is reproduced from the half-inch scale detail of the elevation. Portland stone is being used for the entrance, &c., with Messrs. Lawrence and Sons' No. 4 red facings for the brickwork. The first floor is to be finished in lime stucco with oak oriel windows, over which a pent, in steel and concrete, will give an effective shadow. The quarry glass is to be by Messrs. Aldam Heaton and Co., the fireproof flooring and staircase by Messrs. Homan and Rodgers. Messrs. W. Johnson and Co., of Wandsworth, are the builders, and Mr. Maurice B. Adams, F.R.I.B.A., is the architect.

COUNTRY HOUSE, BATH.

This house is in course of erection at Bath, from a design by Messrs. T. B. Silcock and S. S. Reay, of Bath. The walling consists of Combe Down stone range-work and dressings, and the roof was originally intended to be covered with Whitland Abbey slates. A small stable, with a billiard-room over, has been added to the office wing, but does not appear on the illustration. The work, so far, has been excellently carried out by Mr. William Webb, of Bath, and under the able supervision of Mr. J. Bowden, clerk of works. The drawing here reproduced was exhibited at the recent Royal Academy Exhibition.

MURAL PAPER DECORATIONS.

The accompanying sheet illustrates some new designs made this year by Messrs. Jeffrey and Co., of Islington, in a variety of choice and artistic colourings. "The Diana" frieze, from the pencil of Mr. Ingram Taylor, is a spiritedly-drawn composition, with running figures introduced, intermingled with a boldly-patterned scroll running in an opposite direction, and rising from a sufficiently broad band of delicate leafings, which furnish a ground line for the figures and mask the starting points of the scrolls. The right-hand wallpaper, called "The Aberdeen," is designed by Mr. H. W. Batley. The central one, "The Montrose," is by Mr. Sidney Haward, in a Persian mode of treatment, and "The Haarlem" is a more naturalesque rendering of flowers. These, however, are nicely conventionalised, and very prettily drawn.

HOGHTON TOWER, LANCASHIRE.

This building is being altered and renovated just now under the direction of Mr. Oliver, an architect who, from all accounts, has an appreciation of the charm of the old mansion with which he is dealing. We published some measured drawings of the hall shown in the accompanying sketch on the 3rd inst., and on August 20 last another point of view was chosen for a photograph. Mr. H. Harrington's pen and ink drawing now given represents the other side of the quad, and the archway leading out of it. The notes already given concerning the house, when we recorded the late visit of the Architectural Association, leave nothing to add on this occasion.

THE YORK UNION BANK.

This building was completed some short time ago, and was built for the York Union Banking Company. It is built of Ancaster stone, with a polished red granite base. The roofing is of Staffordshire tiles. The site being a corner one, the main entrance is the feature of the building; this has a large amount of carving, which was executed by Mr. Gilbert Seale, of London. The contractor was Mr. F. Blackburn, of Hull. Messrs. Smith, Brodrick, and Lowther, of Hull, were the architects.

OFFICES, YORK STREET, GLASGOW.

This block of offices is being built in York-street, near the river, for Messrs. P. Rentoul, Son, and Co., the stone used being from Locharbriggs, Dumfriesshire, the roof being covered with Elderwater slates. The builders were Messrs. Alex. Mawson and Sons, and the architect is Mr. W. F. M'Gibbon, 221, West George-street, Glasgow.

THE PESARO PALACE, VENICE.

These details, so carefully delineated, which we illustrate this week, show the canal front portals with their steps down to the water from the famous Pesaro Palace, Venice, one of the most beautiful of the whole series of buildings left us of the Later phase of Venetian art. It is certainly distinctly a typical example devoid of any marked blemishes, with nothing added to its façade for mere display, though some have described it as being over-ornamented. It is a remarkably elegant and handsome specimen of palatial work varied in rich and appropriate design from water-line to the cornice. The basement stage is exceedingly refined, and, possibly, would have gained by a more sturdy treatment. The need for this hardly asserts itself in the partial elevation which we give. The drawings will be valued for their fidelity and care. They are taken by permission from the singularly comprehensive work lately issued by Mr. Ernst Wasmuth, of 35, Markgrafenstrasse, Berlin, under the title of "Palast-Architektur von Oberitalien and Toscana," a fine folio of photographs and specially-prepared drawings made under the direction of Mr. Otto Raschdorff, architect, of Berlin.

Most serious damage has occurred, says *Indian Engineering*, to the palace at Cooch Behar, built from designs by Mr. E. J. Martin, F.R.I.B.A., and extensive rebuilding is unavoidable.

The Duke of Norfolk, as Lord Mayor of Sheffield, has arranged to open the newly-erected quarters for aged couples at Sheffield Workhouse on Oct. 6. This work completes the important scheme of workhouse reform carried out by the Sheffield Guardians. The pauper children do not come in contact with the workhouse, but are brought up by foster parents in homes scattered about the city suburbs. The quarters of the old couples are to resemble, as nearly as possible, their own homes.

The largest clinical amphitheatre yet built in the United States is said to be that just erected for the Medico-Chirurgical Hospital at Eighteenth and Cherry-streets, Philadelphia, for the purpose of affording opportunities of clinical instruction to medical students. Messrs. Frank Miles Day and Brother were the architects of the building, and Messrs. Francis Brothers and Jellett (Inc.), of Philadelphia, were the consulting engineers for the mechanical features. The building is constructed of fireproof materials throughout, the flooring being of concrete arches on I-beams. The floors and wainscots are of marble. All the plastering is finished in enamel, and woodwork has only been used in the doors and windows. The seating capacity of the amphitheatre is about 500.

COMPETITIONS.

Rugby.—At the meeting of the urban district council on Thursday night in last week, plans were adopted for the municipal buildings to be erected in High-street, on the site of the Old Shoulder of Mutton Inn, which, together with £4,000, was left to the town by the late Mr. G. C. Bain for the purpose. The designs accepted were prepared by Messrs. North and Hawk, architects, Battersea, and a Mr. Parnell said they were pre-eminently the best of the thirty-nine sets of plans sent in. The plans to which the second premium was awarded were prepared by Mr. D. Bird, of Manchester.

Dukinfield.—At a meeting of the building committee for the erection of a new Town Hall, it has been decided to invite competitive designs and offer premiums for the best plans. The cost of the new building is to be from £7,000 to £8,000. It is to be erected on the market ground in the centre of the town, with a frontage to the principal thoroughfare. This scheme, in conjunction with the new recreation ground recently determined upon, represents the town's commemoration of the record reign.

CHIPS.

Extensive alterations are being made to the King's Arms in the Mile End-road, at a cost of about £2,000, from plans by Mr. Herbert Riches, of 3, Crooked-lane, E.C., architect.

It is announced in the *London Gazette* that the adjudication in bankruptcy against Henry Adams, of Tunbridge Wells, builder, has been annulled.

At Radstock, Somerset, the Working Men's Hall is being converted into a Jubilee Institute at a cost of £1,100. Mr. Joseph Bird, of Radstock, is the contractor.

The mansion of Pitthedden, near Aberdeen, is being enlarged and redecorated under the direction of Mr. Williamson, of Bendauch.

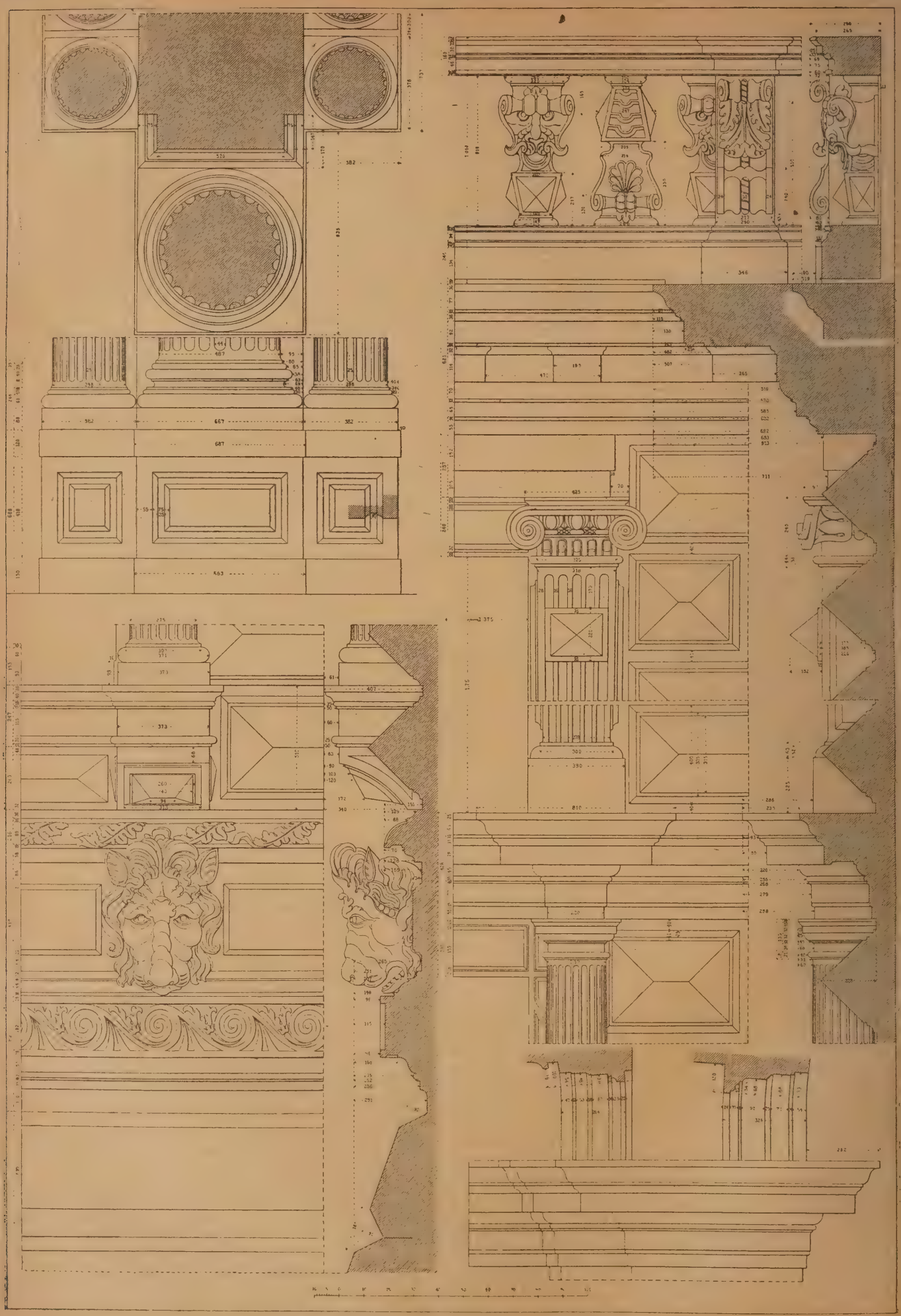
The great extensions of the railway station at Crewe, which are now being pushed forward at the Stafford end of the station, are giving employment to a large number of men. Tunnelling the railway is now about to be undertaken, a tunnel right underneath Crewe station having to be formed so as to give more room for the conduct of passenger traffic through the station without the interference of goods trains. The work is expected to last over three years, and the total cost is said to be likely to total up to £300,000.

Professor Hubert Herkomer, R.A., proposes to paint a large picture for exhibition at the Royal Academy of the Gorsedd ceremony, with the arch-druid Hwfa Mon wearing his official robes on the Maen Llog, and the other officers in their new robes and hoods which have been designed by Professor Herkomer. The bards, druids, ovates, musicians, and several of the honorary members of the Gorsedd are to be invited so as to make the gathering as representative as possible, and they will meet in the grounds of Plas Coch, near Llanfair P.G., Anglesey. The ancient cromlech in the grounds of Plas Coch is to form a background for the scene, and unhewn stones will be provided to form the druidical circle.

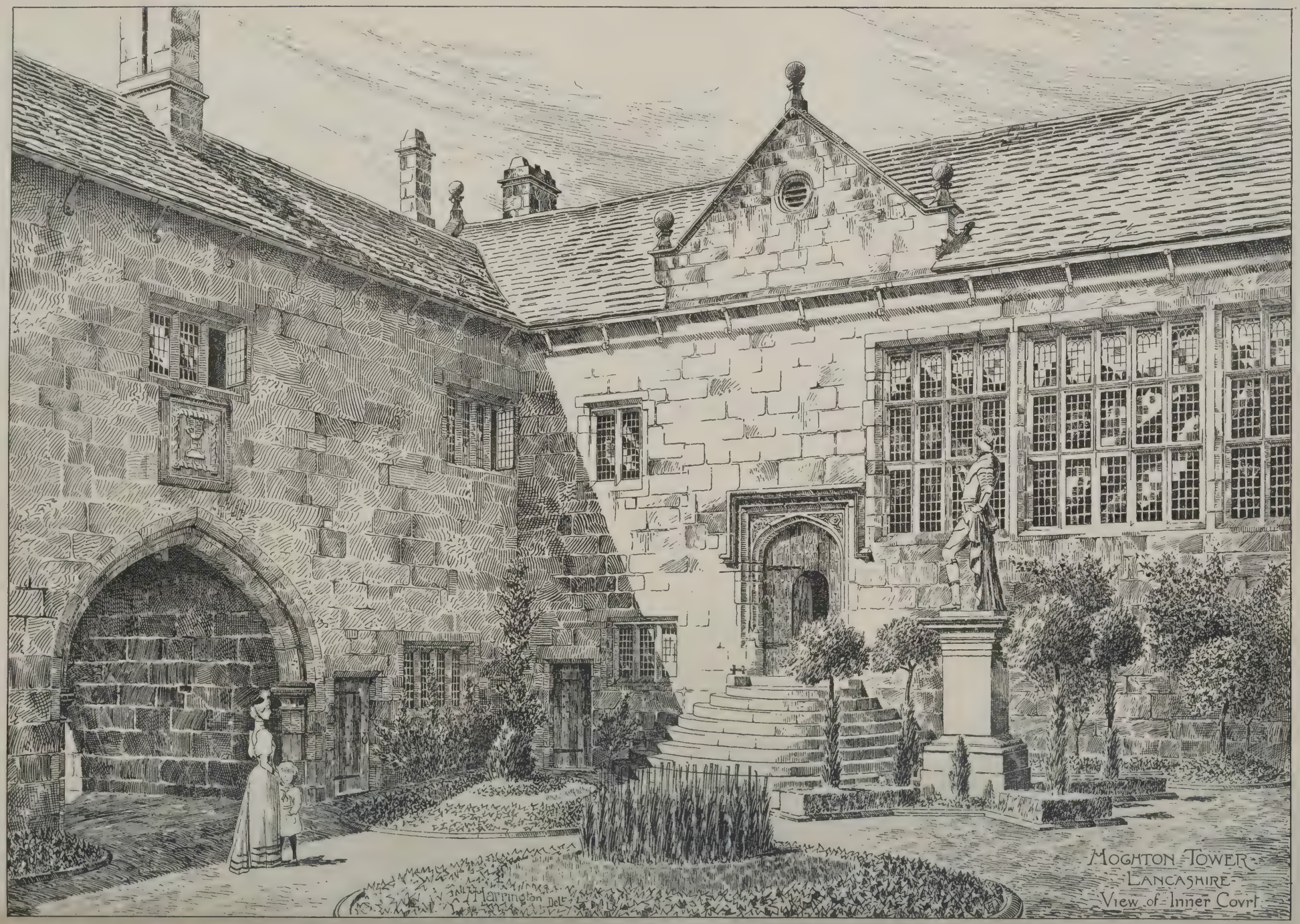
The Hon. Walter Rothschild formally opened the new synagogue in Mare-street, South Hackney, on Sunday. The buildings comprise, on the lower ground floor, a hall convertible into nine classrooms for the teaching of religion, provision being made for 300 children. The ground floor contains the main body of the synagogue, and the first floor is devoted to the ladies' galleries. There is seating accommodation in the synagogue for 900 souls. The external design is carried out in red brick and artificial stone. The interior is painted in pure white, the woodwork being in imitation of old oak. The cost of the freehold site and of erecting the building, which was built from the designs of Mr. Delissa Joseph, F.R.I.B.A., amounted to about £8,000.

On Saturday a new font, pulpit, and bells, that had been added to the church of St. Paul, which Sir Charles Seely has built for the new parish of Daybrook, were dedicated by the Bishop of Derby.

In the course of the excavations which are being carried out at Furness Abbey, a bulla, or leaden seal, which must have come from Rome during the 13th century, was found at the south-western corner of the ruins, near where the great hall stood, and where the Bull to which it was attached was probably kept. It is almost circular in shape, about the size of a crown piece of the present day, but somewhat thicker. Five Bulls were received at the Cistercian establishment during the reign of Pope Innocent IV., and whilst William de Middleton was Abbot of Furness.



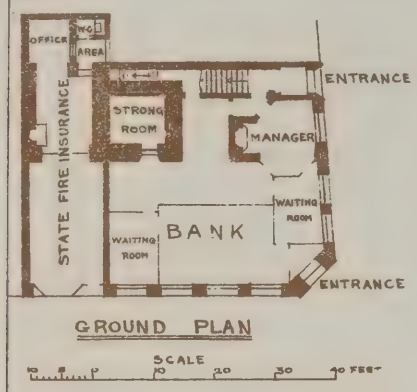
THE PESARO PALACE, VENICE.



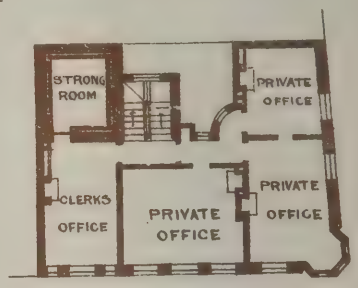
MOCHTON TOWER
LANCASHIRE
View of Inner Court

Photo Lithographed & Printed by James Akerman, 6, Queen Square W.C.

York Union Banking Co., Limited: Premises: Hull:



GROUND PLAN



FIRST FLOOR PLAN

Smith, Brodrick & Lowther Architects.

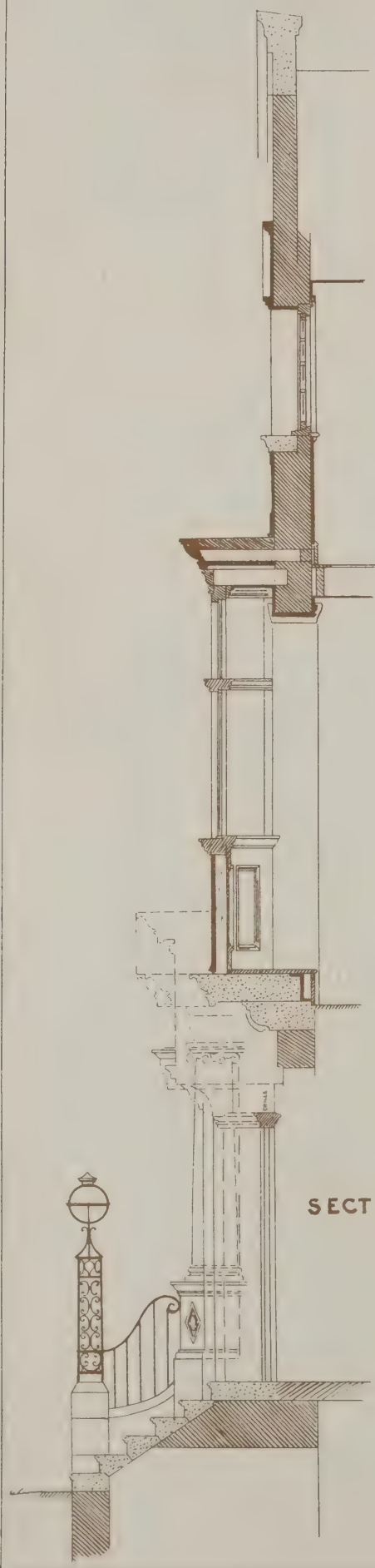
"PHOTO-TINT" by James Akerman 6 Queen Square London, W.C.

PASSMORE EDWARDS

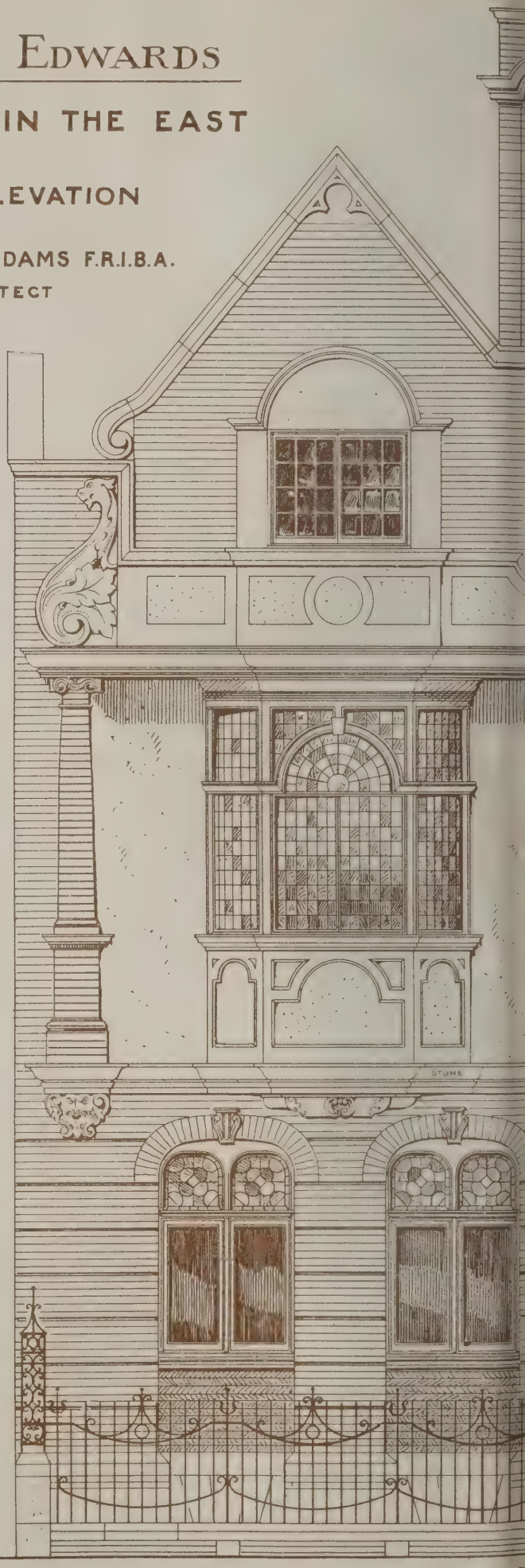
ST GEORGES IN THE EAST

DETAIL ELEVATION

MAURICE B. ADAMS F.R.I.B.A.
ARCHITECT



SECTION



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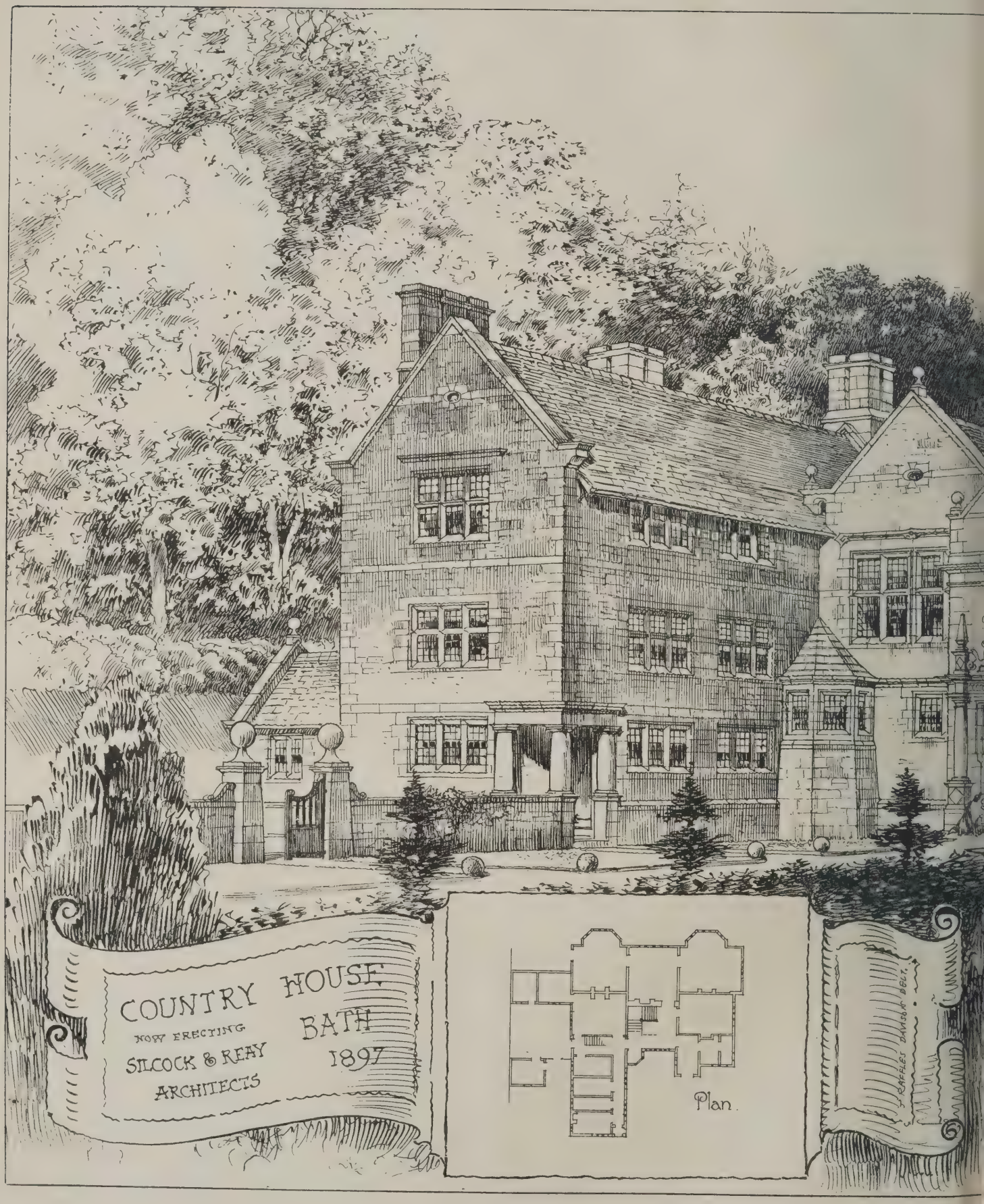
COUNTRY HOUSE
NOW ERECTING
BATH
SILCOCK & REAY
1897
ARCHITECTS
Plan.

SEPT. 24, 1897.

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"THE DIANA" FRIEZE & OTHER WALL-PAPER DECORATIONS MADE BY MESSRS JEFFREY & CO

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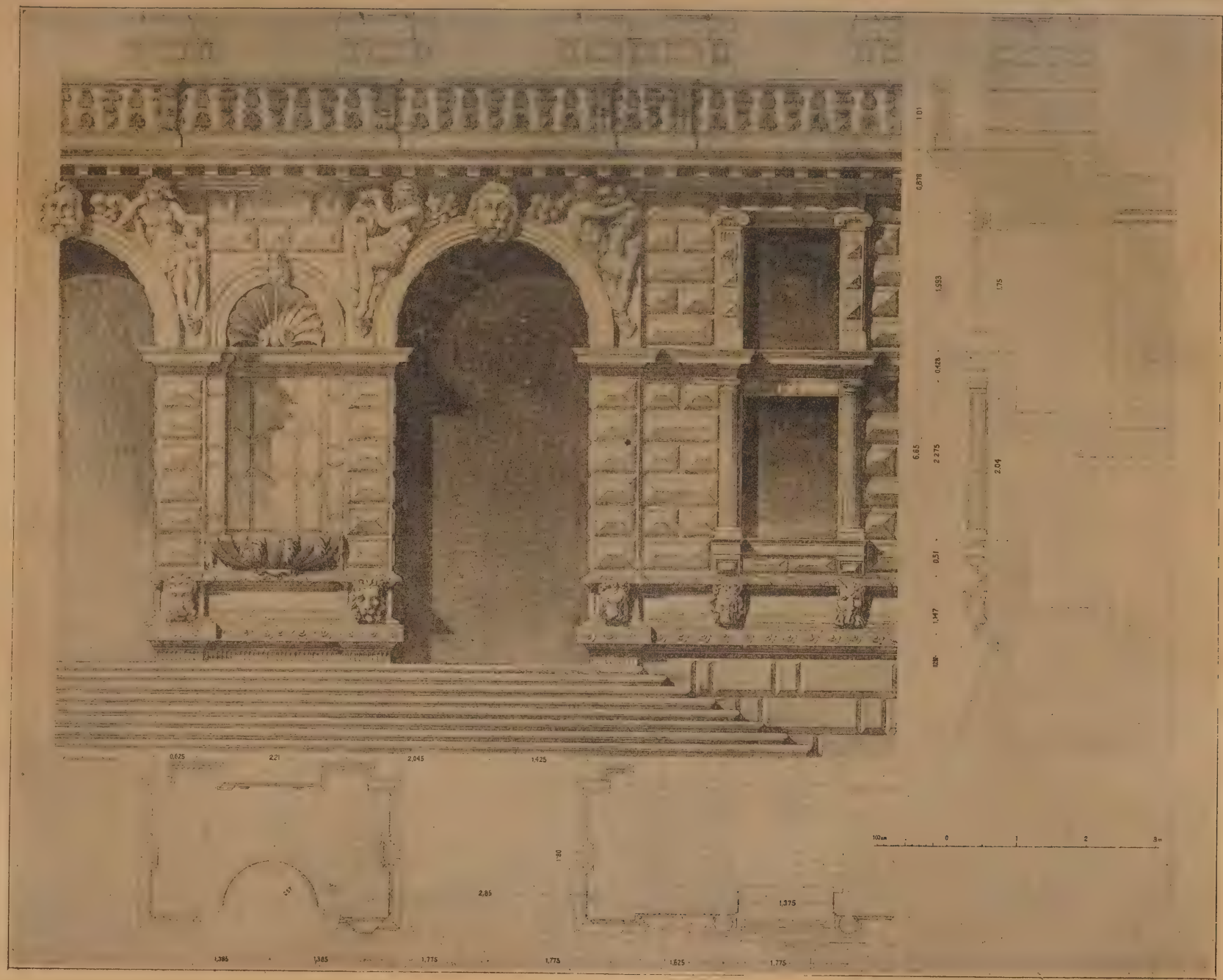

THE PESARO PALACE, VENICE.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

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The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and Sixpence for every eight words after. *All Situation Advertisements must be prepaid.*

NOTICE.

Bound copies of Vol. LXXII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

S. S. RAYLEIGH, R. G. L., E. G., AND OTHERS.—When reviewing in our issue of the 27th ult. "The Art of Tracing," by E. W. Fritchley, architect, we omitted to mention that it is published at the Education Society's Steam Press, Bombay. It is a thin duodecimo of 54 pages, bound in stiff cloth boards; no price is named. We do not recall a book exclusively dealing with the subject published in England.

RECEIVED.—W. S. B.—L. T. D.—H. G. D.—S. S. and Co.—R. K. N. and Son.

Correspondence.

POOR MORTAR.

To the Editor of the BUILDING NEWS.

SIR,—Your correspondent, "A. H.," (BUILDING NEWS, September 3, says of clayey earth in a mixture of sand and lime to make mortar, that "the particles are soon dissolved by the action of rain and disintegrated by frost." This does not accurately describe what happens when mortar made with such materials is exposed to the weather, for alumina (clay) is insoluble in water. This mortar is first disintegrated by frost, and the clayey particles are subsequently carried away in suspension by rain-water. If the lime happens to be burnt from some nearly pure limestone it will be dissolved gradually by the lime, but lime is sparingly soluble in water. Your correspondent goes on to say, "If only clean, sharp sand, be used, free from clay, then the bricklayer cannot cheat the mortar of its proper quantum of sand." I presume he means that the bricklayer cannot cheat the mortar of its proper quantum of lime, which is a very different thing; again, he says, "Take care of the cleanness and sharpness of the sand, and the (quality of the) lime will take care of itself." Here, he evidently means the quantity of the lime, for the addition of sand, clean or dirty, in large or small quantity, can in no way affect the quality of the lime, which remains the same in any case, though the quality of the mortar does not. Without any desire to be critical, it appears as if your correspondent's letter was the outcome of a confusion of ideas, assuming there are no printer's errors in it.

On page 398, BUILDING NEWS, September 17, another correspondent, writing on the same subject, says: "Limestone, when burned, becomes oxide of lime (CaO), chemically called 'calcic oxide.'" There is no such substance as "oxide of lime," lime, as your correspondent immediately adds (and subsequently) being itself the oxide of calcium. He explains that the setting of lime mortar is due to the reconversion of its slaked lime into the limestone from which that lime was derived by calcination, and, having partially explained this phenomenon, he proceeds to say that the setting is due to the simultaneous formation of silicate of lime which binds the particles of sand together apparently with an intensity in proportion to the quantity of silicate formed. The value of this explanation is, to some extent, discounted by the introduction to it, which says that the interaction of the lime and sand is "something on this basis." Will your correspondent kindly give your readers the result of his analysis of some "old Roman" mortar? This will determine to what extent lime becomes recarbonised after 2,000 years, and what proportion of sand combines with lime to form silicate of lime? Your correspondent's meaning is obscure when he says the early fresco painters put lime in pits "so as to cause it to lose its causticity by the gradual expulsion of the CO_2." He has already stated that lime is "CaO." Where, then, does the CO_2 come from, which this lime is supposed to lose in the pits?

This method of writing is unfortunately a characteristic of too many writers on building matters when they touch on scientific subjects. For instance, a recently-published voluminous work on "Plastering" contains the following valuable piece of information: "Sand is the most widely distributed substance in nature, not only in the mineral, but also in the animal and vegetable kingdom." If, for sand, silica is understood, the first portion of the sentence is unobjectionable, not otherwise. Taking man as the highest type of animal, and a fitting representative of the animal kingdom, one is at a loss to know where sand is widely distributed in him. Men sometimes are afflicted with gravel, which is only a coarse kind of sand; but, that a man of fourteen stone weight should have about seven stone of sand "in the belly of him," as Carlyle would say—that is, to make it the most widely distributed substance in him, seems almost incredible. Not being a physician, the writer cannot say more than express the belief that such a case would be a very critical one indeed. With regard to the vegetable kingdom, one can only ask, Do the vegetables grow on the moon, that burnt-up cinder, or on Mars, or Jupiter, with sand widely distributed in them? for they certainly do not grow on this planet. Our vegetables have carbon for their most widely distributed substance, and this they obtain from the atmosphere by the decomposition of its carbon dioxide. Again, in a very valuable book, on "The Trees of Commerce," we are gravely informed that oak-trees are particularly abundant in the Isle of Portland, in the limestone known as "Portland stone." Now, it is difficult to determine if the writer refers to the "dirt bed," which is remarkable for its numerous tree stumps, and was once classed as a "Portland" rock, though now it is considered to be the base bed of the Purbeck seris, or to the underlying "Portland" beds; in ether case, there is not a single oak-tree found fossil in them, for the simple reason that oaks were not "invented" at the time. They are first found (probably some million years later) in the Middle Eocene rocks. The Jurassic architect must then have been content to build with the auracaria and one or two other conifers of no importance, for even Memel, Dantzic, and Riga fir, let alone Baltic timber, or that from the White Sea, had not yet been put upon the market! The following interesting information is given in a book on building, published many years ago, and is too good to be lost to your readers. "Jabal was the first that wrote on this subject" (geometry), and which he performed with his brethren, Jubal, Tubal Cain, and Naahmah, who, together, wrote, in two columns, the arts of geometry, &c.," which were found (after the flood of Noah) by Hermarines, "a descendant from Noah," and probably the founder of the horse marines! Abraham was also a geometer, and when he went into Egypt he taught Euclid the science of geometry!" Whether this Abraham was the "father of the faithful," or the Abraham after whom the celebrated heights outside Quebec are named, the writer does not say; but he might have condescended to inform his readers how Abraham, if he was of that ilk from Canaan, and who died 2,000 years before Christ, could possibly have taught Euclid, who was born only about 300 years before Christ.—I am, &c.,

W. E. M.

CHIPS.

Arrangements have been practically completed for the removal, next month, of the Government laboratory from Somerset House to the new premises, near Clare Market, off the north side of the Strand.

At the annual prize distribution of the Liverpool School of Science, Technology, and Art, held on Friday, it was reported that in the Liverpool School of Art and the School of Architecture and Applied Arts, conducted by Professor F. M. Simpson, the total in day and evening classes last session was 630 students.

Mr. Andrew Carnegie has offered to provide a technical school for Dunfermline and district, and a meeting of the Burgh School Board will be held shortly to consider his offer of £7,000 for the purpose of carrying out the object in view.

A new fountain is to be erected by Mr. Astor in the grounds at Cliveden. It is to be composed of marble from Naples, a dozen blocks, each weighing about 12 tons, having been landed from barges at Maidenhead.

The will of Miss Jean Ingelow, the novelist, of 6, Holland Villas-road, Kensington, who died on July 20, has been proved by Mr. Benjamin Ingelow, F.R.I.B.A., of Carlton Chambers, Regent-street, the brother and sole executor, the value of the personal estate being £6,018.

The organ in the well-known Saxon and Early English church at Barnack, Northants, was reopened last week after having been rebuilt by Messrs. Walker and Sons, of London.

At the Mansion House Justice-room on Saturday, William T. Hooker, aged 53, a builder at Shirley, near Southampton, was charged with publishing a libel on Sir Walter Prideaux, clerk and solicitor to the Goldsmiths' Company. The prosecution arose out of a dispute between the complainant and the Rev. Canon Jones on the one hand, as trustees of some property at Shirley, and the defendant on the other, and it was stated that the latter had subjected them to a course of persistent slander and abuse. Alderman Sir H. Knight remanded him, agreeing to take bail.

Some months ago a considerable portion of the plaster on the north side of tower of Wren's church of St. James, Garlickhithe, E.C., was stripped off owing to the heat to which it was exposed by a fire on the opposite side of the street. Upon examination, it was found that the original masonry of the tower remained practically intact, and that at some period the whole had been covered with plaster. The remainder of the tower is now being cleared of plaster.

An inquest was held last week at the Swan Inn, Fradley, Staffs, on the body of William Henry Wright, 31, of 40, Lombard-street, Lichfield, and manager for the firm of Messrs. Joseph Wright and Sons, builders, whose body was found in the canal at Fradley Junction on the previous Saturday morning. A verdict of suicide whilst of unsound mind was returned.

Colonel Slack, of the Local Government Board, held an inquiry at Wilmslow on Friday respecting the application of the Wilmslow Urban District Council for sanction to borrow £3,000 for further sewerage works, and £400 for fire-brigade purposes. About £23,000 has now been borrowed by the council for their sewerage works.

A fire broke out early on Sunday morning in a timber yard and saw mills belonging to Mr. J. Thompson, situated in Bacon-street, Bethnal Green. The mills and timber were nearly destroyed, and a house that was occupied by Mr. Thompson was seriously damaged. A building, about 30ft. by 30ft., used as cabinet makers' workshops by P. Levy, was severely damaged.

Col. W. L. Coke, M.Inst.C.E., an inspector of the Local Government Board, held an inquiry at the Town Hall, Chester, on Thursday in last week, as to an application by the corporation for sanction to borrow £20,000 for electric-lighting purposes, £4,100 for the purchase of 20 acres of land at Beech House for sewage disposal, £2,340 for the completion of the Foregate-street improvement. There was a further application for approval of the appropriation of sums amounting to £4,770 to be received upon the sale of corporate lands or consolidated stock towards the cost of erecting buildings at the Cross, and of purchasing the Dee Mills.

Intercommunication.

QUESTIONS.

[11790.]—**Fences.**—Will any of your readers kindly state whether any rule or custom exists to distinguish the ownership of garden fences? Should the heads or the points of the nails for fixing the palings be on the side of the owner of the garden?—R. W. H.

[11791.]—**Building By-Laws.**—Can any of your readers inform me if there is any legislation defining the respective rights of building and adjoining owners of party-walls in districts outside the County of London, in a similar manner that Part 8 of the London Building Act governs such cases inside the county? I can find no reference to any such legislation in any local by-laws.—P. H. A.

[11792.]—**Architectural Book.**—I have in my possession a work on design published in London in 1755, called "Architecture improved in a collection of modern, elegant, and useful designs, in the taste of Inigo Jones, Mr. Kent, &c., all curiously engraved on 50 copper plates, octavo. Designed by Robert Morris, surveyor, late of Hyde Park-street, London. Sold by Robert Sayer, opposite Fetter-lane, Fleet-street. M.D.C.C.L.V. (Price, 7s. 6d.)" I should be glad if any reader could inform me whether this book is of any value, on account of either its age or rarity as an architectural curiosity?—INIGO.

[11793.]—**Portland Cement.**—I saw in the BUILDING NEWS of last week some matter upon "Plasters, Cements, and Mortars," which is very useful, and I should be extremely obliged if "H. C S." would kindly inform me upon the following:—How to intensify the setting and impermeability of Portland cement so as to render it weatherproof, for use on flat roofs, fall 1in. in 10ft.? I am trying diluted silicate of soda, applied on the surface while the cement is setting; but am anxious to know whether there is anything still better.—MUCH INTERESTED.

REPLIES.

[11781.]—**White Plaster.**—In the construction of walls, plaster of Paris is used in that city externally as well as for inside uses; but for half-timber work, the kind of plaster known as "rough-cast" should be used. The wall should be first pricked up with lime and hair, and a second coat applied. During the process of this second coat, rough-cast should be applied, which adheres to the wet coating just put on. It is made of pure lime and water in a half-liquid state, and small well-washed gravel is mixed with it. This mixture is thrown from a pail on to the wall with a float. Of course, any colour can be given to the coat.—G. H.

[11784.]—**Office Routine.**—The best way of learning this is in an office. Building accounts have been treated in a recent book, which was noticed in the BUILDING NEWS some time ago, but I forget the name. The filing of correspondence is not a very difficult matter, letters should be classified and indexed, and every architect and surveyor has his own way of doing this. I am not aware of any books treating this subject.—A STUDENT.

[11787.]—**Damp-Course.**—There are several kinds of damp-course—vitrified glazed ware with perforations laid in thin slabs, slates in cement, thin lead, asphalte. To insert a damp-course in an old brick house, I should advise cutting out a course of bricks a foot or two at a time, and inserting either a layer of 4lb. milled lead, or, better still, Taylor's damp-proof course of stoneware, perforated. These slabs are made for 18in., 14in., and other thicknesses of wall. Jennings has also a patent sleeper block of earthenware.—G. H. G.

CHIPS.

The foundation-stone of a parish room for Christ Church, St. Alban's, Herts, was laid last week. Mr. H. E. Hansell is the architect, and the building is of grey bricks with dressings of red Corsehill stone. The chief room will be 42ft. 6in. by 27ft. Messrs. J. and W. Savage, of Lattimore-road, St. Alban's, are the builders, and the cost will be about £800.

For the office of surveyor of highways to the rural sanitary authority of Cheadle, at a salary of £150 per annum, there were 26 candidates. The voting at the last meeting of the council resulted in the election of Mr. W. P. Inskip, of Cheadle.

The Bishop of Gloucester has fixed Wednesday next (Michaelmas Day) for the reopening of the Lady-chapel of the cathedral which has been restored at a cost of £10,000. Evensong will be sung unaccompanied, the choir being placed in the minstrel galleries, which have not been used for such a purpose for 400 years.

Thanks to the liberality of Mr. C. D. E. Fortnum, the collection of fictile ivories which was the result of Professor Westwood's life-long researches has been acquired for the Ashmolean Museum at Oxford.

On Monday a memorial bust of the late Dr. Gilbert Ward, of Blyth (1805-95), was unveiled in the hall of the Thomas Knight Memorial Hospital, at Blyth. The bust is composed of white marble, and stands upon a pedestal of green marble. The work was done in Venice, from a photograph, by Antonio Frilli.

The memory of the late Archbishop of Canterbury, Dr. Benson, has been honoured in Dunluce Parish Church, Bushmills, where he administered his last Communion a week before his sudden death, by the erection of a new chancel, which was dedicated on Thursday evening in last week by the Primate of Ireland, Dr. Alexander.

LEGAL INTELLIGENCE.

BREACH OF BUILDING BY-LAWS.—Charles Grant and James Grant, of the Waterloo Sawmills, Burslem, were summoned to the Burslem Police-court on the 14th inst. for a breach of the borough by-laws in allowing two new dwelling-houses, situate in Furnival-street, Burslem, to be occupied without obtaining a certificate from the surveyor certifying the houses to be in every respect fit for human habitation on the 3rd and 9th of August, and on subsequent dates. Mr. A. Ellis, town clerk, appeared for the prosecution, and Mr. Abberley for the defendants. Mr. Joseph Boulton, building inspector, proved the case. Mr. Abberley pleaded guilty to a technical offence, and explained that Messrs. Grant complied with all the requirements of the buildings inspector with the exception of one matter—viz., the provision of a certain down-spout. The foreman omitted to inform Messrs. Grant on the Stokes Wakes Saturday, when the matter was mentioned. The tenants had been given permission to go into the houses for their own convenience in Wakes week, and they did not commence to pay rent until some time afterwards. Fined 10s. and costs—£1 4s. altogether.

CASE UNDER THE BUILDING ACT, SECTION 74 (2).—The case of A. Payne, District Surveyor of East Hackney (South) and North Bow, versus Simpson and Cove, builders, was heard before Mr. Dickinson at North London Police-court, Sept. 16. Defendant had made alterations and additions to a public-house, Devon Arms, 53, Morning-lane, Hackney, exceeding 10 squares in area, and had formed an approach from the back leading to the bar and the staircase for the use of the dwelling-house without fitting the opening between the said approach and the bar with fire-resisting doors. The defendants replied that they were carrying out the instructions of the architect, who said the doors were not necessary. The defendants were fined 10s. and 12s. costs, with an intimation that they would be liable to a further penalty if the doors were not placed there. This agrees with recent decisions on the point.

THE LIABILITY OF LANDLORDS.—CLARKE V. LONDON.—Mr. R. E. Clarke, builder, 16, Finsbury-pavement, brought an action, in the City of London Court on Friday, before Mr. Commissioner Kerr, against Mr. F. London, 170, Edmund-street, Birmingham, to recover the sum of £10 2s., work done at and materials supplied to 85, Finsbury-pavement. The solicitor for plaintiff said that Messrs. Tillett and Yeoman had the premises in question in their hands to manage for the defendant. The premises had been vacant, and Tillett and Yeoman obtained a tenant who was prepared to take the premises subject to certain repairs and alterations being done. Thereupon the plaintiff was supplied with a specification by Tillett and Yeoman of the work which was to be done. That amounted to £85. During the progress of the work one of the sanitary inspectors of the City came to view it, and he insisted upon certain other work being carried out beyond that which appeared in the specification. Of course the plaintiff was bound to do the work, and he now claimed £10 2s. for it. Mr. Aldous said the defendant had paid the £85 originally agreed upon for work which he had ordered to be done. He gave no order for the work amounting to £10 2s., and therefore he did not see why he should be called upon to pay for that which had been done without any authority on his part. His Honour did not think it mattered whether the defendant had given the order or not. If, he said, the sanitary inspector required work to be done, then the landlord could not help himself. Mr. Aldous: We cannot be made liable for the work unless we give the order. His Honour: Yes, under the Sanitary Acts, you can. Mr. Aldous argued that, as soon as the sanitary inspector required extra work to be done, the plaintiff surely should have communicated with the defendant, and asked whether the work was to be done or not. His Honour said the sanitary inspector would have taken the defendant before a magistrate, and the magistrate would have made the order. It was useless to oppose things of that sort. Mr. W. H. Gathercole, one of the sanitary inspectors under the Commissioners of Sewers, was called, and spoke to visiting the premises in question. He said he gave the plaintiff to understand that the extra work which had been done was necessary. He could not have passed the work specified for without requiring the extra work to be done. In cross-examination, he admitted that he had served the defendant with no written notice requiring the extra work to be done. That was because the work was done without his having to proceed to the length of giving a written notice. Mr. Aldous submitted that the owner of property was not liable for repairs ordered by a sanitary inspector until written notice had been given. His Honour said the written notice was not necessary. The inspector went to Messrs. Tillett and Yeoman, and told them that the extra work must be done. Messrs. Tillett and Yeoman were the agents of the defendant, and therefore they had authority to get the work done. The defendant could not get out of it. Judgment was entered for the plaintiff, with costs.

WATER SUPPLY AND SANITARY MATTERS.

FARNBOROUGH.—The Thames Conservancy Board have applied for and obtained summonses against the urban district council of Farnborough, Hants, for polluting the river Blackwater by their sewage farm. Mr. Radford, C.E., about twelve months ago prepared plans for a thorough system of drainage, and for dealing with the sewage on the confines of the district instead of in the centre, where the present small and inadequate farm is situated. This scheme, which was adopted, was estimated to cost £30,000. It was opposed by some of the council, but the Local Government Board, after an inquiry, agreed to grant a provisional order. At the last election, however, the Anti-Drainage Scheme party obtained the victory. They refused to proceed with the order, and they have since been experimenting with different systems. They have obtained a report on a septic system, and negotiated with the inventor for a scheme which he offered to carry out for about £4,000. But the Chairman of the Council, who was on the Bench when the summons was granted, gave an assurance that another scheme would be adopted that night at the meeting of the Council, and on this assurance the Chief Inspector of the Conservancy agreed to hold over proceedings for another three months. This scheme is by Messrs. Martin, Wells, and Co., contractors, of Aldershot, who agree for between £2,000 and £3,000 to lay down tanks for septic treatment, to take the whole responsibility of the management of the existing farm for three years, and to produce an effluent that shall be satisfactory to the Conservators. A plan is to be also prepared for the drainage of the large portion of the district which is at present undrained.

MANCHESTER AND ITS SEWAGE-DISPOSAL DIFFICULTIES.—A special meeting of the Manchester City Council was held on Friday to consider the expediency of promoting a Parliamentary Bill to authorise the corporation to construct a culvert to convey the effluent of the sewage of Manchester, after chemical treatment and precipitation, from the works of the corporation at Davyhulme into the river Mersey at Randale's Sluices, a distance of sixteen miles, at an estimated cost of £258,000. The matter was discussed at length, some of the opponents of the scheme arguing that the expenditure was much under-estimated. It was intimated that a statement had been made on behalf of Liverpool that no opposition would be forthcoming from that quarter provided the effluent was chemically treated, as proposed. On a vote being taken, the scheme was adopted by 49 votes to 9. Subsequently a formal objection was lodged by one of the city elective auditors, on the ground that the scheme had not been sanctioned, as required by the Borough Funds Act, 1872, by an absolute majority of the whole council. A second meeting of the City Council will therefore be held on October 6th to confirm the adoption of the scheme.

COVENTRY.—The General Works Committee of the City Council have negotiated an agreement with Mr. James Mansergh, M.Inst.C.E., for his employment as engineer for the sewage scheme. Mr. Mansergh is to prepare plans, sections, specifications, &c., and supervise the execution of the work for a commission of 5 per cent. on the actual cost, exclusive of lands and easements. He is also to take out the quantities, to prepare and print bills of quantities and specifications, and provide copies for the use of tenderers, and copies of working drawings and specifications for contractors, for a further commission of 1¼ per cent. on the amount of the accepted tenders. The city engineer is to act as resident engineer, unless and until the corporation, with the approval of Mr. Mansergh, otherwise determine. In any such case the corporation are to appoint and pay a resident engineer approved by Mr. Mansergh. The corporation are also to appoint and pay such inspectors as may be required, such inspectors being either nominated or approved by Mr. Mansergh. The agreement has been confirmed by the corporation.

A public library and reading-room are about to be built for the parish of St. George the Martyr, Southwark, and towards the cost Mr. J. Passmore Edwards has promised the sum of £6,000 conditionally. Messrs. C. J. Phipps and A. Blomfield Jackson, of 26, Mecklenburg-square, W.C., are the architects.

The foundation-stone was laid last week of a Welsh Methodist chapel in Marten-place, Canton, Cardiff. The style of the building is Gothic, one of the principal features being a tower and turret at the north-west angle of the building. The materials used are Newbridge stone with Bath stone dressings, and the internal woodwork is of pitch-pine. The edifice, which will accommodate 650 people, will cost about £2,360, and the work is in the hands of Messrs. Cox and Bardo, contractors, Elm-street, Cardiff. The architects are Messrs. Habershon and Fawckner, of Cardiff and Newport, architects to the Tredegar estate.

Our Office Table.

The annual report on the British Museum states that the number of visitors to the library again declined, owing, it is believed, to the growth of local libraries in the Metropolis, and there has also been a slight reduction of the total number of visitors to the several departments. No very large works have been undertaken on the fabric of the Museum; but the substitution of skylights for windows in the Egyptian and Babylonian rooms on the upper floor, commenced two years ago, is in progress, and when completed will add materially to the wall-space available for exhibition cases, and will improve the light in the several rooms. The rearrangement of the sculptures from the site of the Temple of Diana at Ephesus has been almost completed. Excavations have been carried on, with means placed at the disposal of the trustees by the bequest of Miss Emma T. Turner, at Enkomi, near Salamis, in Cyprus, on the site of a cemetery of the Mycenæan period. The antiquities discovered are both numerous and important, including a large proportion of gold ornaments. The operations of this year have exhausted the Turner bequest. The sum of £2,000, so generously bequeathed by Miss Turner, has enabled the trustees to undertake, since 1893, three successful excavations in Cyprus—viz., at Amathus, at Curium, and at Enkomi, with the result that the Museum collections have been enriched by most valuable and interesting remains. Among the more important purchases are enumerated a series of Egyptian sculptures of extreme antiquity, dating back to about 3700 B.C.; a remarkable sarcophagus of terracotta, painted with battle scenes from Glazomenæ, in Ionia, of the 6th century B.C.; a MS. copy of the Gospels, called "The Gospel of St. Grimbald," written and ornamented early in the 11th century in the Monastery of Newminster at Winchester; a drawing by Michelangelo Buonaroti, one of the finest extant works of the master. No opportunity of enriching the Library by purchases on an extensive scale occurred during the year, and the additions of chief importance were early productions of the Press. The most remarkable of these is Macho's French Bible, or rather abridgement of the Scriptures, printed at Lyons about 1477; one of the rarest of old French books, says Dr. Garnett, and the first containing woodcuts, the first in which the place of imprint is specified, and preceding the first actual translation of the Bible into French by more than forty years. A proposal made by the committee of the Huxley Memorial Fund to place a statue of the late Professor Huxley, by Mr. Onslow Ford, R.A., in the Natural History Museum has been agreed to by the trustees.

The 58th annual report of the Deputy Keeper of the Public Records, just issued, states that the number of applications for the production of records, State papers, &c., in 1896 were, in the legal search room 14,228, and in the literary research room 32,634. The work of preparing a systematic calendar of the Patent rolls is proceeding. The object of the scheme is to provide an English calendar to these invaluable documents from the reign of Edward I. to that of Henry VII. inclusive. Mr. R. P. Mahaffy, B.A., has begun a calendar which will deal with Irish papers in the Public Record Office during the reign of Charles I. and the Commonwealth, and during the earlier part of the reign of Charles II. Those of subsequent date fall within the scope of the calendar of State Papers, Domestic, and the calendar of Home Office Papers. As to buildings, the new block of the Public Record Office, facing Chancery-lane, having been completed in 1895, as stated in the last report, the House of Commons voted a sum of £20,000 for the financial year 1896-97 towards the erection of another block, which will connect it with the portion erected between 1850 and 1871. The cost of this fourth instalment of the General-Repository of Records is estimated at £50,000. The site having been cleared by the demolition of Rolls House and Rolls Chapel, the work was begun in the month of February, 1896.

Traffic on Buchanan-street, Glasgow, between St. Vincent-street and West George-street, has been suspended during the earlier part of this week to allow of the laying down of a new sort of paving by way of experiment. The material is a kind of asphalte, is the patent of an American company, and is named alcatraz. Its chief constituents are a quartz sand found on the coast of California, fibre, and bitumen. Although new in this country, the alcatraz paving has been in use in America for a considerable number of years, and it is alleged to stand wear admirably, and also extremes of heat and cold. The workmen engaged in laying the pavement have been brought from America, and are mostly men of colour. In putting it down they are assisted by a small and very rapid steam road-roller, and throughout the day the operations attracted large crowds. The asphalte is laid on the top of concrete to a depth of 3in. The pavement is to be upheld by the company for five years, free of cost to the Glasgow Corporation.

A correspondent calls attention to an advertisement in the Birmingham newspapers for a surveyor of highways, inserted by the East Elloe Rural District Council, who offer the munificent salary of £62 10s. a year, to include all travelling expenses. In return for this splendid salary the "person appointed must be fully competent to perform all duties appertaining to the office, keeping accounts prescribed by the Local Government Board and the council, give a guarantee fidelity bond for £100 for the faithful discharge of the duties, and be responsible for the repairs and keeping in order everything connected with a length of 115 miles of roads, to find and keep his own horse, and devote the whole time to the duties of his office." Our correspondent asks whether the members of the East Elloe R.D.C. believe that for such a sum they can obtain the services of a "competent surveyor." Surely this is a case where the Municipal and County Engineers and Surveyors' Association might, with effect, make representations to the Local Government Board.

The work of excavating the site of the Grey Friars Monastery within the grounds of Cardiff Castle, undertaken by the Marquis of Bute, and executed under the superintendence of Mr. C. B. Fowler, architect, of Cardiff, proceeds apace, and interesting discoveries continue to be made. Lord Bute recently gave orders for the removal of the whole of the accumulated earth, the dumpings of refuse by generations of Cardiffian scavengers, from the floor of the church of the monastery. At the depth of about 4ft. from the modern surface that floor was uncovered, and in the north aisle the stone foundation of a tomb was laid bare, with a portion of the stone plinth in situ. This tomb was found to contain the skeletons of two persons, and is believed to be the burying-place of Sir William Flemming and Llewelyn Bren, who were interred here in the middle of the 14th century. They were buried side by side, under a stone tomb, which was in existence about the year 1530. In addition to the tomb and its contents, there has been discovered the connecting passage between the church and the cloisters of the monastic buildings. Arch-stones of the nave arcade have been unearthed, while on the south side several yards of orignal floor have been laid bare, one of the tiles, representing the arms of England—three lions and a shield—being in situ. Several coins have been picked up, amongst them being a silver penny struck at York in the reign of Henry I. or II., a Dutch coin of much later date, and an Abbey copper token of about the time of Henry V.

The fourth annual report on the changes in wages and hours of labour in the United Kingdom has just been published as a bulky green-book of 274 pages by the Labour Department. During the year dealt with, 1896, the net result of all the changes recorded has been, Mr. H. Llewellyn Smith, the Commissioner for Labour, reports, a rise of wages amounting in the aggregate to nearly £27,000 a week. This increase, although shared by all the important groups of trade except mining, was chiefly accounted for by a general rise in wages in the engineering and shipbuilding trades. The average weekly increase per individual affected was 10½d. The average percentage of unemployed members of trade unions making returns was only 3·4 in 1896, compared with 5·8 in 1895, 6·9 in 1894, and 7·5 in 1893. In the building trades, taken as a whole, no fewer than 88,946 workpeople received an increase of wages, averaging 2s. 0¾d. per head per week, as compared with 24,431 in 1895 (when the rise was 1s. 8¼d.), 32,993 in 1894 (1s. 5d. rise), and 44,538 in 1893 (rise 1s. 5¾d.), showing more than a maintenance of the steady augmentation shown during the last four years. The changes in the hours of labour affected a far larger number of people than in any of the preceding years, the net result being a decrease of nearly three-quarters of an hour weekly per individual. The numbers for 1896 were, however, unduly swollen by the inclusion of building operatives in London, whose hours of labour underwent a very slight increase in connection with the readjustment of working rules. The advance in wages in the building trades were next in importance to those in the shipbuilding and engineering trades, and of the total increase under the first head of £9,141, no less than £5,373 is due to the general advance in the London building trades that took place during the spring of 1896. As might be expected, the chief gainers by the rise in these trades were the carpenters (38,576) and bricklayers (27,075), the net weekly rise being £3,954 in the former case and £2,838 in the latter. In London the only class who did not share in the increase were the house painters. Changes, affecting over 1,000 workmen, also took place in Leeds, Manchester, Liverpool, The Potteries, Aberdeen, Edinburgh, Glasgow, and Dublin.

The Local Government Board have just decided a question of some importance as affecting the powers and rights of the smaller town councils. The Blandford town authority gave a tradesman permission to bring out his shop window over the pavement some 15in. to 18in., to be in a line with like windows on either side. The county council, who contribute towards the maintenance of the highway, demanded that the projection should be put back, as being an encroachment on the public footway. The town council refused to comply, considering that their powers and rights in this connection had not been abrogated by alliance with the county council for the purposes of the maintenance of main roads. The latter body thereupon withheld the sum of £31, due in respect of the portion of the highway in question, until the window was displaced. The result of the dispute was an appeal to the Local Government Board, who have supported the town council and ordered the county authority to pay the sum withheld and the cost of the inquiry.

An exhibition of art work done by the students at the South-West London Polytechnic, which is situated in the Manresa-road, Chelsea, Mr. C. L. Burns being the head master, was opened on Saturday in the gymnasium. The principle classes are for decorative designs in black and white, wood-carving, cut and embossed leatherwork, embroidery and decorative needlework, drawing, painting, and modelling, and spinning and weaving. Mr. F. R. Wilkins was awarded a bronze medal for his design for a wood panel, and Mr. W. F. Blagg takes a silver medal for his design for a cabinet. The same student has also gained a silver medal for a colour-printing design, and takes a bronze medal for decorative wall-paper. Mr. Moller has a design for a metal hand-mirror, and Mr. Townsend contributes a model of a horse. A bronze medal is awarded to Mr. F. A. Browne for a stencilled frieze with a fruit subject; and other exhibits commended are Mr. E. Pomeroy's dishes in hammered copper, Mr. Kemp Welch's pastel studies, Miss Anna Griffin's water-colour, "A Rainy Day, Chelsea," Miss G. Gaudet's water-colour studies, Mr. H. E. Compton's sunset scene at Finstral Bay, Cornwall; Miss S. Collett's miniatures, and Miss Simons's needlework. The exhibition remains open to-day and to-morrow.

Efflorescence on brickwork may, according to Professor Günther, of the University of Rostock, come either from the bricks or from the mortar. While incrustations of calcium carbonate do no harm beyond spoiling the appearance of the work, soluble alkali salts repeatedly dissolve and recrystallise in the cracks, ultimately producing disintegration. To prevent these incrustations, pyrites and sulphates can either be removed by the slow process of seasoning the clay by prolonged exposure to the weather before making up into bricks, or by adding barium salts to the clay before burning, so as to produce the insoluble barium sulphate. Another remedy is the prevention, in continuous kilns, of the oxidation of the sulphur present in the clay or coal beyond the stage of sulphurous acid, which may be effected by limiting the air supply. Finally, the bricks should be very thoroughly burnt, since in this state they are less disposed to absorb the moisture necessary for the extraction of the soluble salts.

"A Winter Resident on the Riviera" draws attention in the *Times* to the sanitary condition of most of the houses let to visitors. On arrival at his destination on the Riviera he found he was in a house of an expensive character being built in a very good situation. In the middle of it, in the

basement, was a great pit. Inquiring the object of this, he was told it was the "fosse" or cesspool for the whole house. The pipes that led into it from the closets were very large and of rough earthenware, with very imperfect joints, and they were all inside the house. A friend who had an examination made of a house he proposed to take was told it was in the best sanitary condition, so much so, indeed, that "not a drop of sewage could escape outside the house." Examining a house himself later on with a view to hiring it for the year, the "Winter Resident" found the cesspool partly outside and partly under the house, the soil-pipes coming down inside the house of the very roughest construction, and no pretence of a siphon trap. An inch or so of water in the pan was supposed to provide all necessary security against the admission of sewer-gas. The owner was indignant at being told this was all wrong; the English, he said, were mad about microbes; he had always let the house, and he would do nothing. The English doctor stated that 99 houses out of 100 were no better. He concludes by remarking that the same people who insist on excessively stringent tests before taking a house in London go gaily into such a house as he has described on the Riviera.

THE authorities of the Water Department at Chicago have been endeavouring to secure a device that will prevent the theft of water from the city main by manufacturers who, it is alleged, tamper with the meters and draw water through the by-pass around the meter. Mr. Alexander Prussing has patented an electrical device for this purpose, which will allow the dials of meters all over the city to be kept in a single room in the City Hall, where they can be watched, and where the ringing of an electric bell will give notice of any attempt to tamper with the meters of factories. Mr. Prussing claims that the cost of the control system will be small, as the council already has plenty of wires to all parts of the city and the right to use the conduits and poles of several companies. He estimates that the local wiring will be inexpensive, while the recorder costs but little, and will save much of the cost of inspection under the present methods.

The Intermediate and Technical Schools at Llanelly were opened on Tuesday. The new buildings occupy a commanding site near the hospital, on Marble Hill, overlooking the town. They have been built from the designs of Mr. W. H. D. Caple, Cardiff, by Mr. E. Groom, contractor. Accommodation is provided both for boys and girls, the total cost being £5,200. The equipment of the workshops, laboratories, laundries, &c., has entailed an additional expense of £2,000.

The refuge hut on the Zugspitze, the highest mountain in Germany (10,000ft.), near Garmisch, in the centre of the Bavarian Highlands, was opened on Sunday last. It stands on the Grat between the east and west peaks, affords accommodation for 22 guests, and is built of stone, tied together and fixed to the rock by steel bars. The interior is lined with cork and felt. The architect is Herr Wenz, of Gross-Hessenlohe, and the cost, £2,000, has been met by the Munich section of the Alpen-Verein.

Steady progress is being made with the extension from London Bridge to Moorgate-street of the City and South London Railway. At present the principal undertaking is the shoring up of Hawkesmoor's Church of St. Mary Woolnoth, Lombard-street, in order to build beneath it a City station. The south wall of the church will be entirely supported on steel girders, and the north wall partially. A new foundation is essential for the twelve stone columns, which support the arcade and roof above. The engineers for the new railway are Sir Benjamin Baker and Mr. David Hay, while Mr. James Forgie is the resident engineer. Messrs. John Mowlem and Co. are the contractors.

An inquest was held at Chadderton, near Manchester, on Monday, regarding the death of John Greenwood (30), steeplejack, Oldham. Robert Calvert, Oldham, a steeplejack, said he was engaged on Friday with a man named Bowden and deceased to put up scaffolding to remove the terracotta coping off the top of the chimney of chemical works in Haig-lane, Chadderton. While removing the terracotta a portion of the chimney slipped and fell on to the scaffold, which gave way, and Greenwood was precipitated to the ground, a distance of about ninety yards. Witness got on to the ladder, and Bowden clung to a portion of the top of the chimney which remained intact. Gavin Torrence, foreman for Mr. Ball, chimney repairer, said was common to find cracks in terracotta work at the tops of chimneys. A verdict of "Accidental death" was returned.

MEETINGS FOR THE ENSUING WEEK

SATURDAY (TO-MORROW).—Visit to the Grove Fever Hospital, Tooting. Train from Ludgate Hill to Tooting Junction at 2.54, or Victoria to Balham, 2.38 p.m.

THURSDAY.—King's College, Strand. Conversazione and Distribution of Prizes by Sir Henry Harben to the students of the Architectural and Building Construction Classes, the Architectural Studio, and the Wood-Carving Classes at King's College, Great Titchfield-street and Kensington. 8 p.m.

THE ARCHITECTURAL ASSOCIATION.

The CLASSES COMMENCE on the 11th OCTOBER at 6.30 p.m., and the STUDIO OPENS on the 12th OCTOBER at 6.30 p.m.

Nomination Forms, together with a pamphlet containing full particulars of the Studio, Lectures, Classes, and School of Design, may be obtained on application to the Hon. Secs., at 56, Great Marlborough-street, W.

E. HOWLEY SIM, G. B. CARVILL, } Hon. Secs.

THE SURVEYORS' INSTITUTION

(INCORPORATED BY ROYAL CHARTER).

Temporary Address—
SAVOY STREET, VICTORIA EMBANKMENT, W.C.

EXAMINATIONS, 1898.

PRELIMINARY EXAMINATION.

Notice is given that the Preliminary Examination for the admission of Students will be held on the 19th and 20th of JANUARY NEXT.

It is proposed to examine Candidates from the counties of Lancashire, Cheshire, Yorkshire, Durham, Cumberland, Westmoreland, and Northumberland, at Manchester. Candidates from other counties in England and Wales will be examined in London.

Irish Candidates will be examined in Dublin.

PROFESSIONAL EXAMINATIONS.

Notice is also given that the Annual Professional Examinations for Land Agents, Valuers, and Building Surveyors (held under the provisions of the Charter), qualifying for the Fellowship and Associateship of the Institution, will commence on the 21st of MARCH NEXT.

English Candidates for the Professional Examinations will be examined in London.

Irish Candidates will be examined in Dublin.

Particulars as to subjects, course of examination, prizes, scholarships can be obtained of the Secretary.

All applications for the Professional Examinations, Divs. II., III., IV., and V., must be sent in before the 31st of OCTOBER, and applications for the Students' Preliminary Examination before the 30th of NOVEMBER. The necessary Entry Forms for the various Examinations can be obtained of the Secretary.

CHIPS.

The Cawood, Wistow, and Selby light railway has just been completed and opened.

The trustees of the Sydney Art Gallery are making arrangements for an exhibition of Australian pictures in the Grafton Galleries in April next. Miss Eadith Walker, of Sydney, has given £700 towards the expenses.

Alterations are being made to the stables of Messrs. Barclay, Perkins, and Co.'s Brewery, Southwark, embracing the ventilation, which will now be carried out on the Boyle system.

The urban district council of the modern railway-works town of Eastleigh, near Bishopstoke, have decided to provide themselves with a town hall and public offices at a cost not to exceed £4,500.

The West Cornwall Women's Hospital Committee have held a special meeting of subscribers at Redruth, at which Mr. J. Passmore Edwards's offer to erect a wing for children at his own expense was accepted.

The Bristol Town Council discussed for three hours on Tuesday, a resolution requesting the Docks Committee to take steps so that a Bill might be promoted in the coming session authorising the construction of new docks to accommodate the largest class of vessels, and an amendment in favour of deferring action for twelve months. The amendment was lost by 36 votes to 21, and then the resolution was carried without a division.

The new church of St. Mark, Brithdin, near Dolgelly, was consecrated last week. It is built of local gray granite, in the style of a North Italian country church. Messrs Sedding and Wilson are the architects.

The foundation-stone was laid on Friday of the Working Man's Institute and Free Library about to be erected in one of the principal streets of Canterbury, out of the bequest of £10,000 left to the city by the late Mr. J. G. Beany, M.D., of Melbourne, Australia, a native of Canterbury, to whose memory a cenotaph was placed a few years ago in the nave of the cathedral.

At the last meeting of the City Court of Common Council, Mr. Burnett brought up a report from the City Lands Committee on a reference to consider and report what steps should be taken to remove the present unsightly structure disfiguring a large part of the front of the Guildhall. It was recommended that the consideration thereof should be adjourned for twelve months. An amendment that the committee should be instructed to consider and report upon the sbbject at an early date was, however, carried.

The cathedral at Wakefield is being ventilated by means of Shorland's patent exhaust roof ventilators and special inlet tubes, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

LATEST PRICES.

IRON, &c.

	Per ton.		Per ton.
Rolled-Iron Joists, Belgian	£5 15 0	to	£6 0 0
Rolled-Steel Joists, English	6 0 0	,,	6 10 0
Wrought-Iron Girder Plates	5 15 0	,,	6 10 0
Bar Iron, good Staffs	7 0 0	,,	8 0 0
Do., Lowmoor, Flat, Round, or Square	17 0 0	,,	17 0 0
Do., Welsh	5 15 0	,,	5 17 6
Boiler Plates, Iron—			
South Staffs	7 17 6	,,	8 5 0
Best Snedshill	10 0 0	,,	10 10 0

Angles 10s., Tees 20s. per ton extra.

Builders' Hoop Iron, for bonding, &c., £6 15s. 0d. per ton.

Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.

Galvanised Corrugated Sheet Iron—

	No. 18 to 20. Per ton.		No. 22 to 24. Per ton.
6ft. to 8ft. long, inclusive gauge	£10 15 0	...	£11 0 0
Best ditto	11 5 0	...	11 10 0

	Per ton.		Per ton.
Cast-Iron Columns	£6 0 0	to	£8 10 0
Cast-Iron Stanchions	6 0 0	,,	8 10 0
Cast-Iron Sash Weights	—	,,	4 2 6
Cast-Iron Socket Pipes—			
3in. diameter	5 10 0	,,	5 15 0
4in. to 6in.	5 5 0	,,	5 10 0
7in. to 24in. (all sizes)	4 15 0	,,	5 5 0

[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]

Pig Iron—	Per ton.
Cold Blast, Lilleshall	105s. to 110s.
Hot Blast, ditto	57s. 6d. to 62s. 6d.

Wrought-Iron Tubes—Discount off Standard Lists f.o.b.			
Gas-Tubes	75p.c.	Fittings	77½p.c.
Water-Tubes	70	,,	72½
Steam-Tubes	62½	,,	65
Galvanised Gas-Tubes	60	,,	62½
Galvanised Water-Tubes	55	,,	57½
Galvanised Steam-Tubes	45	,,	47½

	10cwt. casks. Per ton.		5cwt. casks. Per ton.
Sheet Zinc, for roofing and working up	£20 10 0	to	£20 15 0
Sheet Lead, 3lb. per sq. ft. super.	15 5 0	,,	15 15 0
Pig Lead, in 1cwt. pigs	14 5 0	,,	15 5 0
Lead Shot, in 28lb. bags	17 0 0	,,	18 0 0
Copper Sheets, sheathing and rods	60 0 0	,,	61 0 0
Copper, British Cake and Ingot	51 10 0	,,	52 0 0
Tin, Straits	61 17 6	,,	62 7 6
Do., English Ingots	65 5 0	,,	65 10 0
Spelter, Silesian	17 10 0	,,	18 0 0
	Per ton.		Per ton.
Cut Clasp Nails, 3in. to 6in.	£8 15 0	,,	£9 15 0
Cut Floor Brads	8 10 0	,,	9 10 0

Wire Nails (Points de Paris)—

0 to 7	8	9	10	11	12	13	14	15	B.W.G.
8/6	9/0	9/6	10/3	11/0	12/0	13/0	14/9	16/9	per cwt.

TIMBER.

Teak, Burmah	per load	14 0 0	,,	15 10 0
,, Bangkok	,, ...	10 10 0	,,	15 0 0
Quebec pine, pitch	,, ...	—	,,	—
,, yellow	,, ...	2 0 0	,,	4 0 0
,, Oak	,, ...	5 10 0	,,	6 10 0
,, Birch	,, ...	4 5 0	,,	6 0 0
,, Elm	,, ...	4 0 0	,,	5 5 0
,, Ash	,, ...	3 5 0	,,	4 10 0
Dantsic and Memel Oak	,, ...	2 10 0	,,	3 10 0
Fir	,, ...	2 5 0	,,	4 5 0
Wainscot, Riga p. log	,, ...	1 10 0	,,	3 15 0
Lath, Dantsic, p.f.	,, ...	4 10 0	,,	5 10 0
St. Petersburg	,, ...	5 0 0	,,	6 10 0
Greenheart	,, ...	8 0 0	,,	8 10 0
Box	,, ...	£4 10 0	to	£15 0 0
Sequoia, U.S.A.	...per cube foot	0 1 8	,,	0 1 10
Mahogany, Cuba, per super foot 1in. thick		0 0 5	,,	0 0 6½
,, Honduras	,, ...	0 0 5	,,	0 0 6½
,, Mexican	,, ...	0 0 4	,,	0 0 5
Cedar, Cuba	,, ...	0 0 4½	,,	0 0 5
,, Honduras	,, ...	0 0 4	,,	0 0 5
Satinwood	,, ...	0 0 7	,,	0 1 0
Walnut, Italian	,, ...	0 0 3½	,,	0 0 7

Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 11in.:—

Quebec, Pine, 1st	£20 10 0	to	£26 10 0
,, 2nd	15 0 0	,,	17 10 0
,, 3rd	7 10 0	,,	11 0 0
Canada Spruce, 1st	10 10 0	,,	12 0 0
,, 2nd and 3rd	8 0 0	,,	9 0 0
New Brunswick	7 10 0	,,	8 0 0
Riga	6 10 0	,,	7 10 0
St. Petersburg	8 10 0	,,	12 10 0
Swedish	9 0 0	,,	15 10 0
Finland	8 0 0	,,	8 10 0
White Sea	9 10 0	,,	16 0 0
Battens, all sorts	5 0 0	,,	20 0 0
Flooring Boards, per square of 1in.:—			
1st prepared	0 8 6	,,	0 15 6
2nd ditto	0 7 0	,,	0 12 0
Other qualities	0 5 0	,,	0 6 6
Staves, per standard M:—			
Quebec pipe	—		—
U.S. ditto	35 0 0	,,	42 10 0
Memel, cr. pipe	230 0 0	,,	240 0 0
Memel, brack	200 0 0	,,	210 0 0

OILS.

Linseed	per ton	£15 2 6	to	£15 12 6
Rapeseed, English pale	,, ...	28 0 0	,,	28 5 0
Do., brown	,, ...	26 10 0	,,	26 15 0
Cottonseed, refined	,, ...	16 10 0	,,	17 10 0
Olive, Spanish	,, ...	28 0 0	,,	30 0 0
Seal, pale	,, ...	23 10 0	,,	24 0 0
Cocoanut, Cochin	,, ...	28 10 0	,,	29 0 0
Do., Ceylon	,, ...	22 5 0	,,	22 10 0
Palm, Lagos	,, ...	22 0 0	,,	23 0 0
Oleine	,, ...	18 15 0	,,	19 15 0
Lubricating U.S.	per gal.	0 6 3	,,	0 7 6
Petroleum, refined	,, ...	0 0 4½	,,	0 0 4¾
Tar, Stockholm	per barrel	1 2 0	,,	1 5 0
Archangel	,, ...	0 12 6	,,	0 15 0
Turpentine, American	per ton	21 0 0	,,	21 10 0

LIST OF COMPETITIONS OPEN.

Blaenau Festiniog—County Police Buildings	£15 15s.	J. Morris Jones, County Surveyor, Trawsfynydd, Merioneth	Sept. 25
Skipton—Cottage Hospital (16 beds, £2,500 limit—no assessor)	£15, £5	W. H. Dawson, Hon. Sec. to Committee, Skipton	,, 30
Merthyr Tydfil—Second Floor to Dowlais Board School	£10	E. Stephens, Clerk, Merthyr Tydfil	,, 30
Skegness—Clock Tower (£300 (!) limit)	£7 10s., £2 10s.	W. Pillsworth Hiley, Garfield House, Skegness	,, 30
Morecambe—Sewerage Scheme	£100	Jno. Bond, Surveyor, U.D.C., Morecambe	Oct. 1
Ludlow—Electric Lighting Scheme	£20 (merged)	John R. Williams, Town Clerk, Ludlow	,, 1
Lower Bebington—Sewerage Scheme	£50, £35, £20	Joseph Young, Surveyor U.D.C., 72, Stanley-terrace, New Ferry	,, 1
Leeds—Wholesale Dead Meat Market and Abattoir	£100 (merged), £50, £25	John Harrison, Town Clerk, Municipal Buildings, Leeds	,, 8
Dorking—Workhouse Infirmary (65 beds, £4,000 limit)	(No first) £15, £5	Geo. Scales, Clerk, High-street Dorking	,, 13
Colne—Technical School, Free Library, and Public Hall (£5,500 limit)	£50, £35	Alfred Varley, Town Clerk, Town Hall, Colne, Lancs	,, 20
Wolverhampton—Free Library (selected Architects)		The Town Clerk, Wolverhampton	,, 28
Eastcote and Northwood, near Ruislip—Sewerage Scheme	£40 for Combined Scheme, £15 for Eastcote, and £25 for Northwood.	C. Woodbridge, Clerk, R.D.C., 33, High-street, Uxbridge	,, 30
Southend—St. Alban's District Church	No premium offered; no Assessor named	Rev. E. C. Kimber, Avenue-terrace, Southend-on-Sea	Nov. 20
Mexico—Legislature Palace (1,500,000dol. limit)	15,000dol. Mex.	Secretary Public Works, Mexico City	,, 30
Cardiff—Town Hall and Law Courts (A. Waterhouse, R.A., Assessor—£200,000 limit)	£500 (merged), £300, £200	J. L. Wheatley, Town Clerk, Town Hall, Cardiff	Dec. 4
Carlton, Victoria—Children's Hospital	£100, £50, £25	J. Nicholson, Hon. Sec., Pelham-street, Carlton, Australia	(1898) Jan. 30
New York—Sun Dial (Plaster Model)	500dol., 250dol.	Sec. National Sculpture Soc., 215, West 57th-street, New York	(1898) Feb. 28
Newcastle-on-Tyne—New Infirmary (local Architects)	(No first) £150, £100, £50	Secretary, Building Committee, Newcastle	(1898) Mar. 1
Brighton—Artisans' Dwellings (local Architects only)	£75, £25	F. J. Tillstone, Town Clerk, Brighton	—
Lewisham—Free Library (£4,000 limit)	25gs.	Edward H. Oxenham, Clerk, Town Hall, Catford, S.E.	—
Boscombe—Hospital Enlargement, Shelley-road		J. Pratt, Assistant Sec., 126, Christchurch-road, Boscombe	—
Carlisle—Board School (530 places)	£20, £10	S. Cartmell, Clerk, 27, Lowther-street, Carlisle	—
Tottenham—School Board Offices		J. F. Adams, Clerk, School Board Offices, Tottenham, N.	—
Forest Hill—Free Library (£4,000 limit)	25gs.	Edward H. Oxenham, Clerk, Town Hall, Catford, S.E.	—
Bexhill-on-Sea—Promenade Pier and Garden		Secretary, Pier Co., 7, Sackvill-road, Bexhill	—
Blackburn—R.C. Infant School, Dean-street	(No first) £5	The Rector, 48, Islington, Blackburn	—
Lichfield—Nursery Home and Invalids' Kitchen	£10, £5	R. R. Redmayne, Secretary, 22, Dam-street, Lichfield	—

LIST OF TENDERS OPEN.

BUILDINGS.

Castleford—Brick Machine-Shed, Boiler-House, and Chimney, 133ft. high	Healdfield Brick Company	R. M. McDowall, Architect, Carlton-street, Castleford	Sept. 25
Westbury-on-Severn—Police Station	Gloucestershire County Council	E. T. Gardener, Clerk, Shire Hall, Gloucester	,, 25
Bovey Tracey—School at Heathfield		J. W. Rowell and Son, Architects, Newton Abbot	,, 25
Blackburn—St. Barnabas's Schools	Building Committee	Fred J. Parkinson, Architect, 9, Richmond-terrace, Blackburn	,, 25
Arlaw Banks—Farmhouse	Rev. Hy. Lonsdale	F. H. Livesey, Architect, Market-place, Bishop Auckland	,, 25
Padgate—Hospital Alterations, Industrial Schools	Warrington Board of Guardians	W. Owen, F.R.I.B.A., Cairo-street, Warrington	,, 25
Richhill, Armagh—Additions to Course Lodge		R. C. Parkinson, Architect, College-street, Armagh	,, 25
Dymock-on-Severn—Police Station	Gloucestershire County Council	E. T. Gardener, Clerk, Shire Hall, Gloucester	,, 25
Ebchester—Sixteen Houses	Owners of Hamsterley Colliery	Hamsterley Colliery Offices, Ebchester, R.S.O.	,, 25
Emsworth—Alterations to Malt-kiln		Kinnell and Hartley, The Brewery, Emsworth	,, 25
Stratford-on-Avon—Stores, Sheep-street	Co-operative Society	C. G. Hains, Architect, Redditch	,, 25
Great Yarmouth—Two Houses, Wellesley-road	Joseph Ellis	Chas. G. Baker, Architect, Town Hall Chambers Great Yarmouth	,, 25
Forres—Additions to Cluny Hill Hydropathic Establishment		John Forrest, Architect, 129, High-street, Forres	,, 27
London—Lunatic Wards, Infirmary, High-street	Guardians of Lewisham Union	H. C. Mott, Clerk, Union Offices, Lewisham	,, 27
Wislaton—House and Offices	R. Mawston	W. Allen, Architect, 16, Ryton Village, Ryton-on-Tyne	,, 27
Forres—Five Artisans' Dwellings in Market-street	John Mackenzie	Davidson and Leask, Solicitors, Forres	,, 27
Liverpool—Additions, Lodge-lane Baths	Corporation	W. R. Court, Engineer, 15, Great George-square, Liverpool	,, 27
Pudsey—Cabinetmaker's Workshop at Occupation-lane		William Davey, 27, Brunswick-road, Pudsey	,, 27
Lewisham—Lunatic Wards at Workhouse Infirmary	Board of Guardians	H. C. Mott, Clerk, 236, High-street, Lewisham	,, 27
Wislaton—House and Shop	Robert Hurst	W. Allen, Architect, 16, Ryton Village, Ryton-on-Tyne	,, 27
Pembury, Tunbridge Wells—Boiler House Enlargement	Waterworks Committee	W. C. Cripps, Town Clerk, Tunbridge Wells	,, 27
Pencoed—Chapel		Rev. Stephen Jones, Coychurch, Bridgend	,, 27
Masborough—Six Houses, Sarah-street	B. Smith	E. Hutchinson and Son, Surveyors, 18, Howard-street, Rotherham	,, 27
Barry—Twenty Villas and Fifty-two Cottages	Barry & Windsor Building Compy	Charles Clarke, Secretary, 12, Westgate-street, Cardiff	,, 27
Keighley—Fence Wall at Marley	Corporation	W. H. Hopkinson, A.M.I.C.E., Borough Engineer	,, 27
Leicester—Excavating and Foundation, Additions to Borough Asylum	Committee of Visitors	George T. Hine, F.R.I.B.A., 35, Parliament-st., Westminster, S.W.	,, 28
Kirkmichael—Additions and Alterations, Aldchlappie Hotel		John Leonard, Architect, Pitlochry	,, 28
Ormskirk—Board Room and Offices	Guardians	Alfred Dickinson, Clerk, Ormskirk	,, 28
Bradford—Seven Houses and House and Shop, Lidget Green		Samuel Robinson, Architect, 15, Cheapside, Bradford	,, 28
Featherstone—Nineteen Houses	W. Anderson, Leeds	Garside and Keyworth, Architects, Pontefract	,, 28
Chadwell Heath—Foundations, also Lodge, Lunatic Asylum	West Ham Town Council	Fred E. Hilleary, Town Clerk, Town Hall, West Ham	,, 28
Lumphanan—Public Hall		Clerk to the Parish Council, Lumphanan, N.B.	,, 28
Pershore—Casual Wards	Board of Guardians	Jos. Martin, Clerk, Pershore	,, 28
Humberstone, Leicester—Additions, Borough Asylum	Leicester Corporation	Jas. Bell, Clerk to Visitors, Town Hall, Leicester	,, 28
Keighley—Residence and Stabling, Hollins-lane		Jas. Ledingham, F.R.I.B.A., District Bank Chambers, Bradford	,, 28
Tadcaster—Four Villas	Tadcaster Brewery Co.	Bromet and Thorman, Architects, Tadcaster	,, 28
Hilderthorpe—Ten Houses and Premises, Fairfield-road	W. Battle	J. Earnshaw, M.S.A., Architect, Bridlington Quay	,, 28
Huddersfield—Offices and Extensions to Mill	B. Vickerman and Sons	J. Berry, Architect, 9, Queen-street, Huddersfield	,, 29
Trealaw—Fifty Cottages		T. R. Phillips, Architect, Old Bank Chambers, Pontypridd	,, 29
Birmingham—Epileptic Block at Workhouse Infirmary	Guardians	W. H. Ward, Architect, Paradise-street, Birmingham	,, 29
Borough-road, S.E.—Free Library	Vestry of St. George the Martyr	A. J. Johnson, Clerk, Vestry Hall, 81, Borough-road, S.E.	,, 29
Pellon—House on Blackwood House Estate		C. F. L. Horsfall and Sons, Architects, Lord-street, Halifax	,, 29
Loughlinstown—Cemetery Buildings	Rathdown Board of Guardians	J. D. Cope, Clerk, Loughlinstown, Ireland	,, 29
Pontardawe—Infants' School	Llanguicke School Board	W. W. Williams, Architect, Island Chambers, Swansea	,, 29
Burnley—Memorial Fountain, Queen's Park		Borough Surveyor, Town Hall, Burnley	,, 29
Rotherhithe, S.E.—Shelter at South Wharf	Metropolitan Asylums Board	J. Duncombe Mann, Clerk, Norfolk-street, Strand, W.C.	,, 29
Harpenden—Police Station	Herts County Council	Urban A. Smith, County Surveyor, 41, Parliament-street, S.W.	,, 29
Aviemore Junction—Eight Houses	Highland Railway Co.	Wm. Gowenlock, Secretary, Inverness	,, 29
Hemsworth—Additions to King's Head Hotel		R. and W. Dixon, Auctioneers, 5, Eastgate, Barnsley	,, 29
Loughlinstown—Three Cottages	Rathdown Board of Guardians	J. D. Cope, Clerk, Loughlinstown, Ireland	,, 29
Durham—Continuous Brick-kiln and Chimney 110ft. high	City and Shincliffe Brick Co.	John Curry, Manager, Chilton Moor, Fence Houses	,, 30
Bargoed—Alterations to Groesfaen Farmhouse	Glamorgan County Governing Body	W. E. R. Allen, Glamorgan County Offices, Westgate-street, Cardiff	,, 30
Ipswich—Business Premises	Industrial Co-operative Society	Eade and Johns, Architects, Cornhill Chambers, Ipswich	,, 30
Bridlington—Alterations and Repairs to Shop		Hardwick and Sons, Quay-road, Bridlington	,, 30
Nunthorpe—Detached House	J. J. Brotton	R. Moore, Architect, 7, Albert-road, Middlesbrough	,, 30
Bootle—School for 1,000 Children, Gray-street	School Board	F. K. Wilson, Clerk, Balliol-road, Bootle	,, 30
Seaford—Alterations at Sewage Pumping Station	Urban District Council	W. H. Pawson, Clerk, Seaford	,, 30
Barry—Alterations and Additions to Intermediate School	Glamorgan County Council	T. Mansel Franklen, Clerk, Westgate-street, Cardiff	,, 30
Redditch, Wales—Police-Station and Petty Sessions Court	Worcestershire County Council	Mr. Henry Rowe, County Surveyor, Worcester	Oct. 1
Rathdrum—Boarding Floor, Workhouse	Board of Guardians	B. Manning, Clerk, Bound-road, Rathdrum	,, 1
Southampton—Boiler House and Chimney Shaft	Board of Guardians	E. T. Westlake, Clerk, Portland-street, Southampton	,, 1
Arklow—Dispensary and House	Rathdrum Board of Guardians	B. Manning, Clerk, Workhouse, Rathdrum	,, 1
Hawarden—County School		Grayson and Ould, Architects, 31, James-street, Liverpool	,, 2
Magheragall—Additions to Parish Church	Select Vestry	J. Blount, Architect, Waring-street, Belfast	,, 2
Walton, Felixstowe—Shop and House, High-street	I. and E.S. Freehold Land Society	Secretary, Freehold Land Society, Princess-street, Ipswich	,, 2
Aldershot—Dust Destructor and Chimney, Norris Bridge	War Department	Royal Engineer Office, North Aldershot	,, 2
Banbridge—Stationmaster's Office at Station	Gt. Northern (Ireland) Railway Co.	T. Morrison, Secretary, Amiens-street Terminus, Dublin	,, 4
Halifax—Drapery Warehouse, Rawson and Powell-streets		Jackson and Fox, Architects, 22, George-street, Halifax	,, 4
Rotherhithe—Chimney Shaft, 150ft. high, Bull Head Dock	Vestry	J. J. Stokes, Clerk, Town Hall, Lower-road, S.E.	,, 4
Clones—Platform Roofs at Station	Gt. Northern (Ireland) Railway Co.	T. Morrison, Secretary, Amiens-street Terminus, Dublin	,, 4
Writtle—Classroom, Highwood School	School Board	A. P. Lindsell, Clerk, Writtle, Chelmsford	,, 4
New Tredegar—Six Houses, Tir Phil-road		W. Jenkins, Elliot Offices, New Tredegar	,, 4
Frongoch—Cottage	Bala and Festiniog Railway Co.	Geo. Boxall, Secretary, G.W.R. Offices, Paddington Station, W.	,, 4
Bethnal Green, E.—Band Stand, &c., Boundary-street	London County Council	C. J. Stewart, Clerk, Spring-gardens, W.	,, 5

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ALL-ROUND MEN AND SPECIALISTS.

BUILDINGS are now so complex and varied that it is only by devoting himself to two or three kinds of structure that the architect can hope to meet with any success. A superficial knowledge of architecture is of value; to know what has been done in the various branches of practice, to be able to plan and advise on domestic buildings, homesteads, hospitals, schools, churches, libraries, and other works is of absolute importance to the young architect who is hoping to find his way into a lucrative practice of some sort; but we do not think that a general and varied practice is the best way to achieve success in any profession. In law and medicine we know that the man who sticks to one class of practice is he who makes a name, and in the artistic professions the same rule holds good. If we just for a moment try to remember the leading architects of the present generation, we shall find they have all followed some particular line; they have been great as church builders, as designers of residences, experts in the design of hospitals, or baths, or town halls. We can hardly think of one eminent in the profession who has been highly successful in both ecclesiastical and domestic work, or who has been an adept in the planning of hospitals as well as other kinds of buildings. And it is not difficult to seek the explanation. Each of these occupations is enough to occupy the mind for a lifetime, if it is followed in the true spirit. Look at what house-planning and design entails, to take an ordinary and perhaps one of the most common branches. The plan of a house only looks simple to the ignorant and the novice, who thinks one house can be planned like another in any situation; but the student of house-planning and design knows better. He finds it a study for every individual client and for every set of new conditions. What may do for Mr. Smith will not suit Mr. Jones. What does in the London suburb will not do in the country. But these differentia are not understood, and never will be by the average builder of estate houses, or the average tenant who occupies them. They are for the architect only to know and study them if he will. Again, the possibilities of design are as varied as the individuals. To try and make one type of house the receptacle of every kind of human beings as if there was no difference in human nature and habits, is like applying a Procrustean rule to every condition of society. And yet our great towns are really following this rule in house building for the million, because the great mass of the public want to be housed. Have our great social ameliorators ever thought of the injustice of the proceeding, the product of leasehold tenure? But the economic law of multiplying the same house or article of use, whatever it is, has stamped out every artistic instinct. The study of sanitation, of a hundred things which minister to the health and comfort and pleasure of the dweller, are quite sufficient to occupy a lifetime. In short, the architect who has made himself a master of domestic arrangements in all its varied requirements could have little time left to think of any other development of building.

How impossible it is for him to leave his house-planning and design for, say, a building like a hospital, where he would have to learn everything anew, and where the conditions of habitation are so different. Imagine such a one turning from the study of a plan for a large residence to a ward plan—comparatively a stranger to the task. Is it practicable for him to disengage his mind so completely as to contemplate an aggregate of human beings suffering under a certain kind of malady with requirements of a special sort, in which a large medical staff, a number of trained nurses and servants, are concerned?—to apply his knowledge of domestic offices to the planning of such a complicated block as administrative buildings, laundry, boilers, and the hundred details of a large hospital establishment. No; certainly not. Those who have devoted themselves to hospital arrangement and design, simple as it is when made a special study, find it quite impossible to turn their attention to other kinds of buildings of very different character. It is a labour of years to collect the best types of hospitals; to have read the leading treatises on the subject written by medical men as well as experts; to have fathomed the perplexities of the blue books and regulations of the Local Government Board; to have gone through the pages and examples of Oppert, or have read the works of Mr. Saxon Snell, or of Sir Douglas Galton; it requires further experience of practical work to plan a hospital with attention to all that has been said on the Continent and in America. The planner of a hospital must keep pace with all that has been done; he ought to know every important building, and the points that have been approved or condemned by the medical and nursing professions, before he can hope to make any progress. Whatever a student in his earlier years may do in the study of building arrangements, it does not follow that a professional man can do the same. He gets accustomed to one class of work, and it requires a prolonged effort to throw himself into another groove. We are speaking chiefly of planning, and of the many special details which belong to a particular class of building like hospitals. There is to arrange questions of engineering, such as laundry work, the heating system to be employed, how the wards are to be heated and ventilated, all of which must be devised and specified. Then again, hospital design can scarcely be said to fit a man to undertake such a work as a large hotel or block of offices. Although one is intended to house a number of persons in disease or sickness, and the other to house a number of persons in health; the control and administration in the two cases require very different structural arrangements. Again, the hygienic conditions of a hospital require separation to be carried to an extreme; the individual is under a rigid discipline, in the other he is allowed ease and comfort and social intercourse. On the same grounds, simplicity and plainness are as essential to the first, as art and sumptuary arrangements are required in the other. The man who has occupied many months or years in planning wards and offices will find himself rather awkward in turning his hand to design more costly and ornamental buildings. In short, each kind of building needs a special training; what the mind and hand have been accustomed to grows into a habit, and the architect who turns his attention from one to a totally dissimilar kind of structure at almost a moment's notice discovers his own awkwardness. The change was good in his student days; but when practical work has to be done the labour of relearning and adapting oneself is hard. The "all-round" man finds, despite his facility of adaptation, a difficulty in persuading his clients that the house he has designed, or the farm-buildings he has planned, are quite what they should be. If a church, or a school, or a public library falls to his lot, he does his best; it passes muster in his locality. But there is sure to be something about it which somebody finds out that is wrong, and not critically correct. Or he is dissatisfied himself with his work after seeing other buildings designed by specialists. It is the sort of experience one buys dearly.

Nowadays architecture is no longer an abstract question of design which anyone who has an artistic faculty can pursue. It may have been so once when all the buildings ranged themselves into two great classes—ecclesiastical and domestic; but now it is mainly the science of devising plans to modern requirements, of arranging baths, hospitals, laboratories, schools for various purposes, libraries, and a host of other uses, and he who can command a large experience and knowledge of a few buildings has the advantage. It is hardly a matter of speculation that in the near future the profession will have to devote themselves more to special "lines" if they want to succeed, and the "all-round" practitioner will find it better to confine his attention more and more to the commonplace duties which lie on the circumference of his profession—surveys, valuations, quantities for buildings, and the general superintendence of small properties. At least, this is the natural drift of competition in all professions—a general "levelling-up" in special departments—and unless the younger men see this and shape their practice accordingly, they will have to be content with following a long way behind. In speaking of this specialisation of study, the questions of art and style cannot be left out. There will always be those capable of giving artistic expression to their work, whatever it may be. The specialist in plan will always find his proper level, even though he may have to call in a "ghost" to assist him. It is better, however, that he should learn to be independent of all extraneous kinds of help, and trust to his own judgment and sense of proportion to produce honest architecture, which has invariably been developed in this way. Affectation and a desire to produce "artistic" buildings has been generally the snare. He knows his strength and ability up to a certain point, and then it deserts him when he begins to think of his elevations. He employs someone to "lick his plan into shape"; it adds expense and disappointment. That "nice perspective" cost him dearly. To make the plan presentable the draughtsman undertakes to remodel the design, with infinite injury to its merits. But a man strong in plan is in no danger of wrecking his design by allowing such interference; it is rather the man with superficial ideas of plan who leaves his work to be mutilated by the draughtsman. Having rather indefinite views himself, he is not very particular as to any suggestions: his first desire is to produce a design of some merit artistically. He hands his crude sketches over to the "artist," for him to put into shape—with the result that it is so transmogrified, that he hardly knows it when he sees it.

A word may be said about style, another bugbear to the professional architect. Is it permissible to practise in more than one style? An architect naturally gets acquainted with a particular school or treatment, and it is hard for him to think of anything else. Can he do so with any conscientiousness or consistency? The old architects only had one in which they worked; but the modern is allowed to practise half-a-dozen if he choose. What we have said about plan applies with as much force to style. Directly a man tries to design in a style he is ignorant of, he fails. We have numerous instances to prove this, one of the most conspicuous being the late Sir Gilbert Scott's work in Whitehall. The proper and only real style a man can use is that which naturally comes to him, and in which he has been brought up. It is his own language or mode of expressing himself; and when he tries another language he is sure to do something that is second rate. In these days it is the custom to hand over the plans

of an expert to someone who will make them either Gothic or Classic, whichever is in the ascendency. The designs for the Houses of Parliament were in this way turned into Late Gothic by Pugin, an admirable reproduction of the style, though ill-adapted to the London atmosphere. This example has been followed in the Government Offices, and in many other buildings with even less success. If there is good in specialism in plan, specialism in style has certainly quite as much to be said for it; yet we hardly think it honest for one architect to make the plan and another to design the elevations in any style that may be selected. But to this pass has our architecture come—it is no longer one man, one style—but a dozen or more styles which he undertakes to work in. Let an architect limit his practice to a few kinds of building which he has made a study, and with it will come a style of treatment which is both true and natural.

DIVISION OF BUILDINGS.

It is a pity those who drew up the London Building Act did not clearly state that every building used "in part for purposes of trade or manufacture and in part as a dwelling-house" should be provided with a separate entrance and staircase inclosed with walls of fire-resisting materials to the dwelling-house portion. Instead of which, the builder is left to understand that no distinct entrance is required if "the means of approach to the dwelling-house portion are constructed throughout of fire-resisting materials." But the "means" may make all the difference. As a matter of fact, the builder ought to comprehend what is intended; but it is convenient for him to take advantage of any ambiguity in the section of the Act. One of the most ordinary building operations in London is the division of a building into parts—one for business, and the other for dwelling, as, for example, making one portion, generally the largest, a sort of warehouse or shop, and the upper portion into rooms for living and sleeping. Most of the large business establishments in all parts of the Metropolis are thus divided into shops and dwellings, and it was to secure the safety of those who have to sleep in the upper stories of these premises that section 74 of the Act of 1894 was framed. The former enactment (18 and 19 Vict. c. 122, section 27) was certainly very inadequate, and the repealed section is intended to insure the separation of the two portions; but it does not appear to have done so. There is an inveterate desire to plan buildings on the old lines, to make approaches and staircases in the most temporary way to that part or division of the building which is intended for private use.

A very large and important class of buildings in London are those intended for restaurants and public bars. To obtain as much room as possible for the public, the whole ground floor is utilised, and a very small space is given up to the approaches to the upper stories, especially if these are private. We see very often merely a wooden partition or a thin wall made to shut off the bar from the private rooms or staircase. As a case in point, a recent decision by Mr. Hannay on an appeal at the Marlborough-street Police-court in connection with a rebuilding of a tavern situated at the corner of Windmill-street and Tottenham Court-road, deserves notice as typical of a large number of houses used as public bars. The ground floor was planned as a bar and was open to both streets, while the first floor was set apart for a large billiard-room, out of which rooms the staircases were contrived—a very common plan. The architect's plans showed a single staircase approached from the bar leading to the billiard-room on the first floor; it was inclosed by a 4½in. wall, and a door with glass panels giving access to the billiard-room. From this landing, separated from the latter room and from the staircase by a 9in. wall, a staircase led to the upper stories, used for sleeping-rooms. The objection made by the district surveyor was that the building would exceed the statutory ten squares in area, and that the two portions were not separated by walls and floors of fire-resisting materials, but that the staircase intended would be common to both parts entered from the bar, and without any separation from either part; that the 4½in. brick wall on the first story with the glass panelled door was not a proper wall of fire-resisting material between staircase and landing. The appellant contended that the inclosure of the staircase up to the first story, and of the landing, so as to separate the ground-floor stairs from billiard-room, was not prescribed by the section; but that it was sufficient to have a staircase from the billiard-room upwards inclosed by a brick wall and fire-resisting door.

It was argued that the builders' construction did not satisfy the section, which, though clumsily worded, required the approach to the dwelling-house portion to be entirely separated from the trade portion. As shown on the plans, the dwelling-rooms could not be entered except by coming through the bar from either street. The bar, in fact, it was argued, was the means of approach to the dwelling portion. To comply with the Act, a separate approach entirely walled off from the bar by a 9in. wall leading from one of the streets to the staircase was necessary, and the billiard-room required to be separated from the staircase by a similar wall. It is needless to say the magistrate confirmed the district surveyor in his requirements. The fault here was in proposing to make the bar the only approach to the dwelling-house above, so that if the bar was rendered impassable by fire, the occupants on the upper floors would be cut off. They, in fact, would only be able to reach the billiard-room floor.

In buildings of this kind with two frontages, the only safe plan is to build a walled staircase and lobby accessible from one street entrance, with a fire-resisting door between it and the bar which could be closed in case of fire, and this inclosure of walls should go straight up to the dwelling-house floors with doors leading into them. The walls, of course, should be of 9in. thickness. The bar would thus be entirely separated from the entrance lobby, also the billiard-room. Or there could be a separate communication between bar and billiard-room connecting the two, independent of the dwelling staircase, which could be used by the staff and players. The object is to economise space, however, and to make as little encroachment as possible on the bar, which generally occupies both frontages. What is worse is that these public bars are full of inflammable materials in the shape of wooden partitions glazed, counters, casks of spirits, &c.; then there is the greater risk of fire by numberless gas-burners and the intense heat, which would cause a small accident or any ignition to quickly spread. With only the wooden partitions to close off the staircase in the centre or inner side of the bar, the superstructure would stand very little chance. If the section in the Act had been more explicit; if, for example, the tavern had been mentioned as one of the buildings exposed particularly to danger, and it had been provided that not only should there be a separate entrance from the street to the dwelling-house, but that the construction of the ground story should be fire-resisting, and have a floor that was incombustible between it and the upper stories, a great deal of uncertainty might have been saved. What precautions have many of these highly-heated and lighted bars against the spread of fire? Quite as dangerous is the large drapery shop or warehouse full of gas-burners, and with cotton and lace fabrics hung up for view near the ceiling. Are these large drapery establishments constructed in such a way as to prevent the spread of flames to the upper stories? Have they in all cases the separate wall-inclosed staircase and entrance with proper doors on each landing cut off from the shop? How many lifts which connect the upper show-rooms of large stores of inflammable goods are inclosed by walls and have iron flat doors to cut off connection in case of need? These are questions which make it imperative to adminster the law. But there are still the technical enemies of statutory regulations; those who take exception to the area of a building by asserting it is under the "ten squares," or that a separate approach to each part of a building was not distinctly stated, or it may be some trivial objection under section 150, which enables the builder or owner, if dissatisfied with the objection of the district surveyor, to appeal to a petty sessional court within fourteen days.

LISKEARD CHURCH TOWER.

A CONSISTORIAL COURT, presided over by Mr. Robert M. Paul (Chancellor of the Diocese) assisted by Mr. C. E. Ponting, F.S.A., of Marlborough, as architectural assessor, was held on Sept. 23rd at Liskeard Town Hall to hear evidence in support of an unopposed petition made by the vicar and churchwardens of Liskeard Parish Church for the granting of the faculty to enable them to demolish the present tower and rebuild it. The large hall was crowded. The proceedings were followed with interest, and the emphatic declaration of an opinion that it was expedient to remove the tower and build another in its place, in preference to restoring the existing structure, was always the signal for general applause. Mr. Borlase Childs explained that in 1876 a movement was set on foot which had for its object the restoration of the parish church. Mr. R. Coad, who was engaged in the office of Sir Gilbert Scott, was employed to prepare the plans, and one of his first points of inquiry was as to what should be done with the ancient tower. He expressed the opinion that for about £200 the structure could be restored. After the roof of the church had been taken off it was found that the defects in the tower were so extensive, and its foundations so faulty, that it was hopeless to attempt to restore it. The same conclusion was arrived at by Mr. Lang, the contractor for the works, and he was directed to make the ground good, as far as he could, with a view at some later date of rebuilding a tower worthy of the parish and the church. The estimated cost of rebuilding the tower then given was £3,000. In 1890 Miss Pedlar died, and under her will gave a legacy of £1,000 to be applied to the rebuilding of the church tower provided £2,000 was subscribed independently; if within ten years the tower was not rebuilt the legacy would revert to the Truro Cathedral building fund, certain conditions being complied with. Four years later a committee was appointed at a vestry-meeting to consider what should be done in regard to the matter. An independent expert, Mr. G. H. Fellowes-Prynne, F.R.I.B.A., was called in to advise the vestry, and he prepared a report in which he stated that he had made a careful inspection of the tower, which was evidently built for a much smaller Norman church, the main lines of the old roof of which were still traceable on its eastern wall. It seemed probable that the defects of the tower showed themselves at an early date, possibly about the time the old Norman church was removed, and the present 15th-century one erected. The walls were built of rough rubble work, and its main defects were a large and serious crack on the east side; the south-west angle had a crack, indicating undue pressure; the north-east angle and the north side generally were bulging out. It was, Mr. Prynne reported, perfectly possible to repair and restore the church in a satisfactory manner, and if undertaken thoroughly, he should estimate the cost at £700 or £800, including the expense of rehanging the bells. It was evident, Mr. Childs continued, that at that time Mr. Prynne had not examined the foundations of the tower, as he remarked in his report that the work should commence with a thorough examination of them. With such restoration he thought the tower could be sufficiently

strengthened to last for several generations, and its architectural and archæological features would be preserved. The vestry, however, came to the conclusion that restoration would not be satisfactory, as, from the character of the material, the appearance of the tower would be greatly changed. There was very little Norman work to be seen in it now, and included three windows on the north side, which were all that could be introduced into the new tower. The walls of rough rubble could not be rebuilt, and that on the south side was covered with upright slating, on which cement had been put. It was beyond question that at some time the tower was raised, as there were indications in the interior of the existence of a Norman spire, probably of wood. There was also a small window, which now looked into the body of the church, but which was formerly above the height of the roof. Having decided in favour of rebuilding, the vestry advertised for competitive plans, naming the condition that there were to be introduced as far as possible the architectural features of the present tower, consistent with the architecture of the church. Twenty-seven sets were sent in, and Mr. E. Sedding, who was intrusted with the work of selecting the best, recommended the acceptance of one to which was attached the pseudonym "Moonstone." This proved to be Mr. Sampson, of Liskeard, who was associated with Mr. Coad in the work of restoring the church 20 years ago. He had had introduced into it every stone and bit of work which, in his judgment, were capable of reproduction. On January 29 last Mr. Sedding reported upon the condition of the tower, and wrote that it was rent in various directions by numerous cracks, evidently in consequence of faulty foundations. There could be no doubt that the present structure was in a precarious condition, and should be promptly prevented from further dislocation, which would cause the fabric to collapse. Any method short of rebuilding would be but temporary, for the tower needed a foundation. Under the circumstances he would not recommend its being restored, as it would be attended with considerable danger. Mr. Childs said they applied for the faculty because they were satisfied from the expert evidence that the church could not be restored. The tower must be taken down, not with a view to its destruction, but for carrying out a scheme of conservative reconstruction. Unless it was removed it would settle the matter for itself by tumbling down. Although a poor parish, Liskeard had done much for its church, having during a lifetime raised and expended £7,000 on works of restoration. Without the £1,000 legacy it would be beyond their power to collect sufficient to build a replica of the present tower; but given the faculty they applied for, he was confident the remaining £2,000 would be forthcoming. In conclusion, he referred to a letter which appeared on the subject in the *Western Morning News* on the previous day from the Royal Institute of British Architects, and said whoever caused it to be published went very close to committing contempt of Court.

The Chancellor remarked that he agreed in the opinion that it ought not to have been published.

Mr. Childs said it was most improper. The two Plymouth papers were read by almost everyone in Cornwall, and this was an unjust attempt to influence public opinion throughout the county.

Evidence was then given in support of the foregoing statements by Mr. R. A. Courtney, who acted as joint secretary of the Tower Committee in 1877; Mr. W. T. Hancock, vestry clerk; and Mr. Thomas Lang, contractor. The last-named witness stated that when carrying out repairs to the church in 1878 he opened the foundations of the tower 4ft. below the surface, and found it was simply built of hedging, the stones being placed edgeways, and without any trace of masonry. Under Mr. Coad's instructions he filled it in with cement concrete, and several of the cracks which were apparent in the tower were concealed in a similar manner. It was now in a very much worse condition than it was twenty years ago, and was leaning against the church. In his opinion the tower could not be restored, and the only thing that could be done was to pull it down and rebuild. No amount of bracing could make the present structure secure, as there was absolutely no foundation to it. Mr. Edmund Sedding, architect, of Plymouth, reiterated the opinions he expressed in his two reports to the committee, and said what he proposed was to rebuild according to the plans adopted, using every old stone that was possible, both for the internal and external facings, and have an entirely new internal tower bonded to the old. He had made a further careful inspection of the tower that morning, and the foundations were such as he had never seen before. The stones were laid together loosely, in herring-bone fashion, and were not capable of carrying the tower. In answer to the Chancellor, Mr. Sedding said that the only sense in which the tower could be retained was by incorporating as much of it as possible in the new tower.

This concluded the evidence, and the Chancellor asked if there was any possibility, in the event of the decision being unfavourable to the applicants, of a compromise being made; of the tower, in fact, being restored. Mr. Childs replied that they would not entertain the notion for a moment. Unless somebody outside the parish raised the money to cover the cost of restoration, he was afraid the tower would have to fall and then it would be seen upon whom the responsibility rested. The parishioners might be prepared to discuss a modification of the plans, but not of the general scheme. And it was only by rebuilding the tower that the Pedlar legacy could be obtained. The Chancellor said he would deliver a written judgment in due course.

Identic copies of the following protest were addressed (1) to the Chancellor of the Diocese of Truro, and (2) to the vicar and churchwardens of Liskeard parish church:—

"13th July, 1897.—Sir,—We are desired by the President and Council of the Royal Institute of British Architects to inform you that they, having had the proposed demolition of the tower of the parish church of Liskeard, in the county of Cornwall, brought to their notice recently, have given the matter their careful consideration. They have been supplied with much information and numerous photographs of the building by various gentlemen interested therein. The tower dates from about the end of the 12th century, and is the only remaining portion of the earlier church, which was pulled down to make way for the present church about the end of the 15th or beginning of the 16th century. In the opinion of the Council of the Royal Institute, it is badly in need of repair; but there would be no difficulty in making it perfectly sound. The expense would probably not exceed £700, and might be much less. The Council are, therefore, strongly of opinion that to pull down so ancient a building, and thereby destroy a valuable and interesting chapter of history, would be a deplorable mistake, and they protest against the threatened demolition in the most emphatic manner possible. It appears that a recently deceased lady has left in her will the sum of £1,000 for the purpose of building a new tower, and to this, as the Council understands, the further sum of £2,000 is proposed to be added by the parishioners. There can be little objection to the proposed new tower being erected in some other part of the churchyard; indeed, there is good evidence that up to the time of Henry VIII. the church had two towers. Examples of detached towers are fairly frequent, those at Chichester, Evesham, and West Walton being, perhaps, the best-known examples. The new tower might properly contain the peal of bells which, owing to the defective manner in which they are hung, have very probably helped to cause the cracks which appear in the old tower. We are desired, therefore, by the President and Council of the Royal Institute of British Architects, to say that, to pull the old tower down would be not only a great mistake, but an act of vandalism altogether without excu e.

"We have the honour to be, Sir, your most obedient servants, "Wm. Emerson, Hon. Secretary.
"W. J. Locke, Secretary."

SOME SPECIAL PAINTS.

FIREPROOF PAINTS.

THE vehicles employed as binding materials to the pigments in compounding ordinary paints are very inflammable and combustible, and impart this quality more or less to the paint compound. It is only when a coat of paint has become thoroughly hardened that it may be said to be non-combustible; even then, however, such paint is not proof against fire. The only media which resist the action of fire are solutions of glue and of soap. The latter material is out of the question as a vehicle for compounding paint, since it is one which is not waterproof. Glue, however, forms a layer of an incombustible nature, which will prevent the wood it covers being ignited at any ordinary heat if not a flame; but compounds of glue and other pigments can be used in only a few cases as paints. A compound of glue and lime, however, may be used as a fireproofing paint, and since the addition of lime to any paint renders the paint compound miscible in water, an aqueous solution of glue may be made to an oil-paint in which lime has been mixed. It would be ridiculous to assert that any paint would perfectly resist the long-continued action of a fire heat; but in the following compounds will be found suitable substances to meet all cases of fireproofing woodwork, scenery, and such constructions as builders are likely to be called on to prepare.

No. 1.—Ingredients: 2 parts of finely-powdered glass, 2 parts ditto porcelain, 1lb. of any sort of stone in powder, 1lb. of calcined lime, and 3lb. of silicate of soda (called water-glass) of commercial strength. The compound is prepared by mixing together the solid ingredients by sifting several times, then moistening the mixture with a little of the water-glass, and finally intimately mixing it with the remainder of the silicate, when the compound will become of a syrupy consistence, that may be used alone as it is, or with mineral colouring matter to form a coloured paint. The lime constituent imparts a certain amount of unctuosity to the mass, which allows it to be used as a washable distemper. The solid ingredients may be varied. Keep, however, the ultimate quantity of them the same, and the amount of water-glass must remain constantly the same to the above amount of solids; all parts by weight. Apply the mixture with a brush, like ordinary paint, and after the first coat has been laid on six hours give a second application. It is suitable for fancy woodwork, stone, metal, &c.

No. 2.—Ingredients: Equal parts of freshly-slaked lime, hydraulic lime, sand or slate pulverised (or any other silicious or argillaceous matter), mix altogether, and use as a vehicle sufficient cow's milk to give the whole when thoroughly mixed the proper consistency for laying and spreading with an ordinary paint brush. Glue solution, not too weak, may be added, as also any colouring pigment. The above proportions of each ingredient may be altered at will.

No. 3.—Ingredients: common rosin, turpentine, zinc oxide, zinc carbonate, and boiled oil. Preparation: Pound up the rosin, and dissolve it in sufficient turps to make a compound of the consistency of cream; mix 4 parts of zinc oxide with 1 of zinc carbonate, and stir the white mass into the rosin solution until a stiff paste is made, and, for use, thin the mass with boiled oil and turps to enable the compound to be of a working consistency. This may be coloured with stainers' colours.

No. 4. — Ingredients: Lime, glue, water, linseed-oil, colouring matter. Preparation: Put 1lb. of caustic lime into sufficient water to make a thick milk of lime, and boil this with 2oz. of glue that has been soaked (weighed dry) overnight in water, but not sufficiently soft to lose its form. When the glue has dissolved, add sufficient linseed-oil to make a soap with the lime, and to the compound thus prepared add whatever stainers' colour is desired. This paint will bear varnishing, or can be protected by rubbing with linseed-oil and turpentine.

No. 5.—3 parts finely-ground silica, 3 parts marble and sandstone (ground), 2 parts calcined white china clay, 2 parts slaked lime; mineral colouring matter as desired. Mix all the solids in dry powder, and when compounded with the slaked lime, add the colouring bodies. After several applications of this compound, the painted surface will become as hard as stone. This paint is both fire and waterproof.

SILICATE PAINTS.

Wood and plaster may be very conveniently painted with paints in which water-glass (silicate of potash or of soda) is the vehicle used to combine the pigments. It is only certain mineral colouring matters that can be used with water-glass, as certain pigments exert a chemical reaction on the silicate, and are decomposed or destroyed by the alkali in it. The following colours and pigments, however, are not altered by mixture with water-glass, and can, therefore, be used as paint therewith:—Chalk (lime carbonate), baryta white (i.e., native heavy spar or precipitated sulphate of barium), zinc white (oxide of zinc), cadmium yellow (sulphide of cadmium), Naples yellow, permanent lemon yellow (chromate of barium), chrome red, red ultramarine, blue ultramarine, cobalt blue, cobalt green, chrome green (of chromium), ivory black. Red and yellow ochres, Venetian red, smalts, umbers, and sienna earths may all be used. Dilute the silicate with water, and then mix in the colouring matter, and make up a suitable consistency to work well with the brush. If a silicate paint is to be applied to a wall, it should first be prepared with a mortar composed of pure fat lime and clean sharp sand, and the water used should be free from saline matter. When the surface of this plaster is dry, give repeated applications of a weak solution of water-glass before laying on the paint. Water-glass paint, on prolonged exposure to the air, gradually

decomposes, being washed away by the action of the mineral and carbonaceous matters carried down in the rain. Paints constituted with chloride of zinc as a vehicle are deadly poisonous should the material to which they are applied be subjected to heat, as the chloride will volatilise and the vapours give off poisonous fumes which are noxious to inhale.

WATERPROOF PAINT.

This at first sight may seem a misnomer, as it is generally considered that all oil paints are waterproof. Such, however, is not the case. Every painter knows that a coat of paint that is laid on in damp weather will take a very long time before it dries; this non-drying is caused by the moist air preventing sufficient dry oxygen reaching the oil to cause it to harden. Now, unless the exterior of the coat of paint dries rapidly after its application, the paint will never be perfectly waterproof, because it will be perforated with minute holes that allow moisture to penetrate through the coat of paint, and thereby cause a lot of trouble. The only paints that form a waterproof coating when laid on under general conditions are those compounds in which varnish is a vehicle. The following few compounds, however, are waterproof compounds—that is, will not be permeated by water even though the article painted with them be steeped in water.

No. 1.—Ingredients: 16 parts of a concentrated solution of potash; 8 parts of grape-sugar; 32 parts of solution of sulphate of copper; 6¼ parts of carbolic acid solution 75 per cent. strength; 8½ parts of raw linseed-oil. (All parts by weight.) Method of preparation: Mix the potash solution, grape-sugar, and copper sulphate solution, and heat the mixture; a precipitate of hydrated oxide of copper is formed. Filter the precipitate, carefully dry it, and then mix it with the carbolic acid, heat the mixture, and then add the oil. To reduce to a workable consistence, add linseed-oil. This paint is admirably adapted for use on all structures that are in contact with sea-water.

No. 2.—Ingredients: 9 parts of shellac, 4 parts of rosin, 3 parts of Burgundy pitch, 2 parts of galipot, 4 parts of arseniate of copper, 3 parts of arseniate of mercury, 9 parts of chromate of mercury, 6 parts of mineral colouring substances, 60 parts (by weight) of methylated spirits. Heat the compound until homogeneous.

No. 3.—Ingredients: 3 parts of Venice turpentine, 1 part of mastic resin, turpentine q.s., 96 parts of linseed-oil varnish, 20 parts of strongly burned clay, 80 parts of best Portland cement, 10 parts of zinc white, 5 parts of red lead, 25 parts of oil of turpentine. Method of preparation: Dissolve the Venice turpentine and mastic in sufficient turpentine to produce a fluid as thick as milk by gently heating the mixture, and to this solution mix in the linseed-oil varnish, and heat the whole over a sand or water bath, until the turpentine odour disappears, and with 115 parts of this compound mix all the other solid ingredients, and finally, thin the whole with the 25 parts of turpentine.

No. 3.—Ingredients: 2 parts of white lead ground in oil, 1 part of red lead (dry), 14 parts of raw linseed-oil, maganese linoleate q.s., yellow ochre, kaolin, &c. Preparation: Heat the lead pigments and oil together, and while hot stir in sufficient yellow ochre, china clay (kaolin), common clay, silica, barytes, gypsum, or any other inert solid body to form a stiff dough, and while this compound is still hot reduce it to the desired consistency by adding a sufficient quantity of linseed-oil varnish and manganese linoleate.

No. 4.—Ingredients: 1 part of dry white lead (lead carbonate only), 1 part of litharge, 14 parts of linseed-oil (fluid measure), 4 parts of clay that has been baked and powdered, 16 parts Portland cement, 1 part zinc white, 1 part red lead, turpentine q.s., mastic varnish q.s., mineral colouring matters q.s. Method of preparation; Mix the lead carbonate, litharge, and linseed-oil, and heat the mixture until of the consistency of thick glue, and for every 36 parts of the mixture add 3 parts (by weight) of turpentine and 1 part (by weight) of mastic resin (mastic resin dissolved in turpentine). Reheat the whole, and for every 32 parts (by weight) stir in and mix the clay, cement, zinc white, and red lead, and dilute with turpentine (not more than 25 per cent. of the whole) or linseed-oil varnish, and then add the colouring matters to form a suitable paint.

No. 5 (cheap compounds).—Ingredients: 12½ parts colophony (yellow rosin), 4 parts mineral green, 6½ parts oxide of zinc, 1 part (by weight) boiled oil, 5 parts (fluid measure) mineral naphtha, 7½ parts (fluid measure) petroleum spirit.

No. 6.—50 parts colophony, 30 parts light ochre, 10 parts zinc oxide, 1 part Turkey red paint, 3 parts petroleum spirit, 2 parts mineral naphtha. Preparation: Dissolve the colophony in the naphtha, and then mix in the other ingredients.

No. 7 (suited for marine structures).—(*a*) 60 parts methylated spirit, 21 parts shellac, 4 parts rosin varnish. (*b*) 7½ parts common rosin, 5 parts Burgundy pitch, 3 parts tallow. (*c*) 10 parts boiled linseed-oil, 3 parts tar spirit, 60 parts Turkey red, 10 parts arsenic, 1½ part zinc white, 1½ part red oxide of mercury. Method of preparation: Dissolve the shellac and rosin varnish in the methylated spirit (*a*), separately compound *b* by mixing all together by heating, also separately mix together the boiled linseed oil and tar spirit, and finally mix *a b* and *c* together, and then add the colouring bodies either separately or mixed together in the dry state by sifting; well pound up the mass.

No. 8.—Ingredients: 18 parts of amber resin powdered, 7 parts Venice turpentine, 3 parts colza (rape) oil, 8 parts mineral green, 13 parts zinc-white paint, 8 parts mineral naphtha. Preparation: Incorporate the first three ingredients by first melting the resin and then adding the Venice turpentine and oil to the heated resin. Separately mix the green and white paints with the mineral naphtha; separately dissolve the amber resin compound in half-gallon of turpentine, and dilute this mixture with one gallon of mineral naphtha, and then finally mix in the mineral-green compound, and well incorporate the whole. The quantities of fluids are reckoned in gallons, supposing the parts taken to be in pounds. The mineral-green should be first ground up with equal parts of refined oil, mineral turpentine, and turpentine varnish, and 8 parts of this compound taken to mix with the zinc-white paint.

PAINTS FOR MISCELLANEOUS PURPOSES FOR USE ON METALS.

To cause paint to adhere to metals, slightly acidulate their surface with a solution of sulphate of copper, to which a little nitric acid has been added. After an hour or so, wash the metallic surface with water, allow it to dry, and then proceed to lay on the paint.

No. 7. *Black.*—Ingredients: 16 parts of amber resin, 10 parts (fluid) boiled linseed-oil, 3 parts asphaltum, 3 parts rosin, 20 parts turpentine. Mix the first four ingredients by heating them together in a suitable vessel. Allow the compound to cool, and then mix with the turpentine.

BRONZE-COLOURED PAINT FOR IRON AND BRASS.

32 parts chrome green, 1 part ivory black, 1 part chrome yellow, 5 parts good japan, linseed-oil q.s. Grind all the ingredients but the last together, and then thin the compound with sufficient oil.

COPPER-COLOURED PAINT FOR METAL.

Dissolve sulphate of copper (bluestone or blue vitriol, as it is called by drysalters) in water, and then add some scrap iron to the solution. Collect the deposit of copper which collects on the iron, wash it in water, and then, after drying it, grind up in linseed-oil varnish or japan.

FLEXIBLE PAINT FOR IRON.

Dissolve indiarubber or guttapercha by heating in linseed-oil or turpentine until a pasty mass is obtained, and grind up this mass, with or without the addition of more linseed-oil, with graphite or plumbago. If bisulphide of carbon or any other volatile fluid be used as the solvent for the rubber, heat the pasty mass in linseed-oil until the oil is evaporated out of the mass before mixing in the graphite; the presence of the oil is necessary, because otherwise you would be simply mixing finely comminuted particles of rubber with the graphite, as carbon bisulphide has no binding qualities, but is entirely evaporated on exposure to the air.

PAINT FOR STEAMPIPES, METAL CHIMNEY STACKS, ETC.

Dissolve asphaltum in turpentine at a gentle heat, and allow the mixture to become cold before laying it on with a brush.

Linseed-oil paint, in which plumbago is ground up, also answers well for the same purpose.

WHITE PAINT FOR METALS.

Grind up zinc-white with waterglass of 40° to 50° Bé., to the consistency of ordinary paint.

Another white paint suitable for all purposes, to which whitewash can be applied is prepared thus: Mix zinc-white with ordinary milk of lime to the consistency of paint, and lay on a coat of this preparation; when dry, brush over with a solution of chloride of zinc, which will combine with the zinc oxide, and produce an enamel-like surface.

RED PAINT FOR METALLIC ROOFS.

Ingredients: 30 parts of linseed-oil, 10 parts of oil of turpentine, 14 parts of red oxide of iron (colcothar), 46 parts of red ochre or chalk. Mix the fluids separately, and also the red powders, and then pound up all together, and if too thick, reduce it with equal parts of oil of turpentine and linseed-oil. Give two coats, allowing one to dry before laying on the next. Remove all rust from the metal before painting it with the compound.

Another useful compound for painting metal is to grind up finely-pulverised rolling-mill and hammer scale with an oil varnish, and lay this on as a paint.

A HEAT- AND WATER-PROOF COATING FOR METAL ROOFS

is prepared as follows: Mix 35 parts of argillaceous schist, 30 parts of mica schist, 35 parts of rosin, coal tar q.s. Mix all the first three ingredients together in fine powder, and then mix the compound with half its volume of coal tar, and boil the whole to a fluid mass. The compound thus prepared is very pliable and durable.

PAINTS FOR WOOD AND STONE.

No. 1.—Waterproof: ¾lb. rosin, 6 gallons of fish-oil, 1lb. melted sulphur, ochre or other colouring matter q.s., rubbed up in linseed-oil. Dissolve the rosin in the oil and heat, then add the fluid sulphur to the hot oil, and finally stir in the colouring matter, and mix well; give several coats while hot.

No. 2.—80 parts of raw linseed-oil, 17 parts rosin, 12 parts litharge. Boil the whole until the rosin is deep brown, and lay several coats of this compound on a dry, hot day, choosing a day when the sun shines so as to insure that the wall is not damp.

No. 3.—Grind lampblack in linseed-oil which has been strongly heated with plenty of litharge.

No. 4.—To brighten up red tiles and bricks, soak 1lb. of glue for 12 hours, and then dissolve it in 1 gallon of water by boiling it, and, while boiling, stir in 2lb. of red ochre, and mix the whole. Lay one coat of this mixture on the tiles, and, when dry, give a second application. With the addition of drying linseed-oil, and, lastly, a third coating mixed up with size. Allow this to dry, and then rub it with wax.

No. 5.—Dissolve paraffin wax in heavy coal-tar oil, and lay this on the walls, choosing a warm, dry day. To dissolve the wax, use 1 pint to 3 of coal-tar oil, and dissolve by a moderate heat, being careful to choose sufficient oil to prevent the mixture congealing on cooling.

No. 6.—Rub up 2 parts of white lead and 1 part of verdigris in a mixture of linseed-oil varnish mixed with an equal quantity of turpentine, and dilute with ordinary drying oil.

No. 7.—Ingredients: Good glue, caustic lime, raw linseed-oil, colouring matter which is not affected by lime. Soak glue in water for 12 hours, and then dissolve it with constant stirring in a thick cream of milk of lime (made by slaking fresh caustic lime) by boiling the mixture, and to this compound apply linseed oil until it ceases to mix. If too much oil be used, add a little more milk of lime, then stir in the colouring. This compound may be mixed with oil or water, and for woodwork it should be mixed with one-fourth its volume of a solution of shellac, made by boiling 2 parts of shellac in water with 1 part of borax. This compound, when dry, will take a coat of varnish.

No. 8.—Slaked lime, bichromate of potash, sulphate of lead (or else sugar of lead or nitrate of of lead solution). Preparation: Slake freshly-burned lime to a powder by sprinkling water upon it, and passing the powder through a sieve, and to every 100 parts of the powder add sufficient water to form a thin milk of lime, and boil the whole in a copper vessel, and while boiling add 1 part of bichromate of potash; separately make a thin paste of sulphate of lead and water, and stir this in the boiling mixture; add cold water to the compound, and pass the whole through a fine wire sieve; drain it off through linen or cloth bags, and press the residue remain-

ing in the bags, and dry the solid residue in the air.

No. 9.—Ingredients: 3lb. burnt lime; 13lb. skimmed milk, 8½oz. white Burgundy pitch, 24oz. (by weight) linseed-oil, 13lb. Spanish white (i.e., chalk). Preparation: Slake the lime with the necessary quantity of water, and then add the milk separately; dissolve the pitch in the linseed-oil, and mix this with the lime compound, and well mix in the Spanish white.

No. 10.—4 parts of curdled milk, 12 parts of water, 1 part unslaked lime, 3 parts water, 4 to 5 parts of linseed-oil, colouring pigments q.s. Method of preparation: Boil the curdled milk in the water for a quarter of an hour, and strain the mass through a colander, washing it clean with cold water to free it from the sour whey, and press out the curd in a cloth; then, to every four parts of this curd add the unslaked lime to three parts of water, and rub up to a slimy mass. This compound is miscible in oil or in water to form an oil or a water-colour paint. The linseed oil is added to all compounds where it is to be used on wood. Yellow ochre, chrome yellow, Berlin blue, indigo, and lead and zinc colours are the best to use as colouring matters.

No. 11.—(For plastered surfaces). Ingredients: 3lb. pure raw linseed-oil; ¾lb. litharge finely powdered, hard curd soap q.s., sulphate of copper q.s., sulphate of iron q.s., white wax. Method of preparation. Boil the linseed oil and litharge together until a thick mass results; strain them through a coarse cloth, and allow it to stand until clear. Separately dissolve a hard soap made from soda (not from potash) in linseed-oil q.s., and to this oily solution of soap add 4 parts of a strong solution of sulphate of copper and 1 part of a strong solution of sulphate of iron. On the addition of these solutions to the soapy compound, a peculiar metallic precipitate results. Collect this precipitate, wash it in water, strain, and dry until of a powdery condition. Mix 12oz. of this powder with 5oz. of white wax by the aid of a sand or water bath, and then compound this metallic mixture with the thick linseed oil in the proportion of 5 parts of the oil to 4 parts of the metallic compound. Well evaporate the whole by heat, and then lay it on the plaster surface with a brush, having first heated the surface of the plaster to 200° Fahr. Lay the compound on as smoothly as possible, and at the end of a few days, when all smell of soap has disappeared, rub the surface over with a piece of linen to bring up a polish. Plaster so treated is waterproof, and may be painted on or varnished.

A COMPOUND FOR FILLING UP ROUGH WORK.

Grind together 4oz. barytes, 4oz. Paris white, 8oz. vegetable black, 80fl.oz. boiled oil, 80fl.oz. gold size.

BRUNSWICK BLACK.

7lb. of asphaltum or mineral pitch, 2lb. red lead, 3 pints of linseed-oil, 13 quarts of turpentine. Boil the red lead and oil together, melt the asphaltum, and then mix the two, and when cool enough, then work the turpentine.

PATENT KNOTTING.

12 parts (by weight) of shellac, 3 parts (by weight) of amber resin (powdered), 2 parts (fluid measure) methylated spirit. A cheaper compound is prepared by omitting the amber-dust.

FLEXIBLE PAINT FOR TEXTILES (CANVAS, ETC.)

Dissolve 1 part of yellow soap in 6 parts of boiling water, and mix this (grinding the solution while hot) with 14 parts of any good oil-paint.

A second flexible paint which is waterproof, and can be used mixed with water, oil, or varnish, is this:—Boil Brazil wood and linseed-meal in water until the colouring matter is extracted from the wood, and the fluid is of a thick consistency. Strain it, and then mix this solution with a solution of guttapercha which has been dissolved in hot linseed-oil, and mix this compound with suitable colouring matter.

PAINT FOR STIPPLING WINDOW-PANES.

Mix white-lead in boiled oil or varnish, and add a little driers. Paint this over the glass thinly, and stipple it by dabbing it all over with a pad of cotton-rag made into a ball.

CHEAP PAINT COMPOUND FOR OUTDOOR WOODWORK.

Ingredients: (*a*) 3 parts of rosin, 20 parts fish-oil. (*b*) 10 parts rye flour, 20 parts water. (*c*) 4 parts sulphate of zinc, 9 parts boiling water; colouring matter q.s. Preparation: Dissolve the rosin with the oil, make the flour into a paste with the 20 parts of water, and dissolve the zinc sulphate in the nine parts of boiling water, and then compound the three mixtures by stirring the flour paste into the solution of zinc, and the oil and rosin mixture into this compound. Finally work in the colouring matter.

TO COAT ZINC WITH PAINT.

Brush the zinc over with a solution made by dissolving 1 part of chloride of copper, 1 part nitrate of copper, 1 part salammoniac in 64 parts water, and adding 1 part commercial hydrochloric acid. This will leave a black surface on the zinc, which should not be disturbed for 24 hours, and then the oil paint should be laid on, when it will firmly adhere.

PAINT FOR METALS IN SEA-WATER.

Ingredients: 7 parts of red lead, 30 parts red oxide of mercury, 35 parts Venice turpentine, boiled oil q.s., red oxide of iron paint. Preparation: Rub up the mercuric oxide with the turpentine until well amalgamated, and then work the red lead by means of sufficient boiled oil to produce a compound of a workable consistence; the red oxide of iron paint is first applied to the iron, and then the above compound laid over it.

DRIERS FOR PAINT.

No. 1.—Two parts of white lead, 1 part sulphuric acid, 1 part sugar of lead, boiled linseed-oil q.s., all parts by weight. Mix all together and rub up to a paste with a sufficiency of oil. The compound may be used as a drier to any paint except white lead and delicate colours in which white lead is a component—white lead becomes buff or greyish in contact with this mixture.

No. 2.—(*a*) 15 parts of sulphate of zinc (coloured), 4 parts sugar of lead, 7 parts litharge and boiled oil. (*b*) 100 parts of Paris white (chalk or terra alba), 50 parts of white lead, and boiled oil). Preparation: Grind up all the components in (*a*) by passing it three or four times through a colour mill, and separately grind up the Paris white, white lead, and boil, and finally mix the two compounds, and pass them several times through the mill. Use an ounce or two per pound of paint.

No. 3 (for causing zinc white to dry).—6⅓ parts of anhydrous sulphate of manganese, 6½ parts of anhydrous acetate of protoxide of manganese, 6⅓ parts of anhydrous sulphate of zinc, 980 parts of zinc white. Mix all together, and use 2 to 3 per cent. with the zinc white paint.

DRYING OIL.

Boil together for a couple of hours at a moderate heat 1 part of litharge, 1 part of calcined ceruse, 1 part of umber, 1 part of talc, 120 parts (fluid measure) linseed-oil. Stir the mixture the whole time of boiling it, removing all scum as it rises, and then allow it to stand to clarify. 5oz. per pound of colour is sufficient to render it a quickly drying paint. H. C. S.

THE CHIPPENDALE PERIOD IN ENGLISH FURNITURE.*

THE author of this manual, published by Messrs. Debenham and Freebody, of Wigmore-street, has done a useful work in describing the characteristics of the Chippendale period of English furniture. A large number of persons, including those who deal in furniture, have but very slight acquaintance with the styles of furniture, and it is to this class of the public chiefly that the author's work will be found of value. Old furniture, like old pictures, suffer under the ban of imitation, and few people are quite sure when they purchase so-called "old" furniture that they have got a genuine work of the particular period. To such people an expert opinion is of much value. The author's Introduction contains a few useful considerations on the subject of originality. As we are told, "where admissible influence ends and copying begins is a difficult problem"; but one thing is certain, the point is a variable one. "One man may steal a horse out of a field, while another may not look over the hedge." Newness, in the hands of some men, we are truly told, is only eccentricity. Very seldom are eccentricity and originality combined. The materials employe in furniture are important factors in the earlier periods. Oak, for instance, suggested a massive treatment which we find in the 16th-century work; but in time the demand for greater refinement and lightness led to the use of mahogany, and the Chippendale period showed this refinement in the curves and delicate carving, which became more pronounced in the works of Hepplewhite and Sheraton. No doubt the revival of Classicism influenced furniture, and we have one or two illustrations of mantelpieces by James Gibbs (1728), and one at Wilton House by Inigo Jones and Kent (1744). Then followed the Adam Brothers, Chambers, and others, who made interior decoration their chief pursuit. The Gothic school of the Revival of the 18th century, fostered by Horace Walpole and Wyatt, was partially supplanted by the Greek, French, and other tastes. The following chapter of the book treats on Sir William Chambers's designs, which comprise illustrations of a Chinese room, a Chinese table, seat, Italian mantelpiece, chair, &c., and other vagaries, in which we discover the influence of his travels. Italian sculptors and decorators, like Cipriani, whom he brought over, were largely employed in England. "Thomas Chippendale" is the heading of the next chapter. Chippendale, no doubt, has been overrated; but with all his faults, he stands at the head of a period from the middle to the end of the 18th century. The examples given are not typical always, and the author's illustrations, taken from orignal books or from specimens which have been exhibited by Messrs. Debenham and Freebody, lack vigour in execution in some instances. We lately noticed a careful reproduction of Chippendale's great folio of copper-plate designs, published by Mr. Batsford. The author gives several typical examples of chairs, as in Figs. 16, 18, 19, a Gothic table and chair from Lacock Abbey, showing Chippendale's eclectic taste. Though feeble, these designs have a certain elegance about them which shows his taste and skill in adaptation. A Gothic hall-chair and designs for chairs in Chinese are interesting; the latter show the lattice-work backs and legs and pierced frets in the square legs. A very elegant French chair (Fig. 24) and a settee made for the Bury family with a succession of scroll or strap-work uprights, are worth notice; sofas, bedposts, screens, chimney-pieces, side-board, hanging china shelves, girandoles, pier-glass frames, a commode clothes-press, &c., are a few of the designs given. Some of these are rather florid and redundant with Louis Quinze devices, broken scrolls and shells, Chinese pagodas, figures, and birds, as in the pier-glass shown in Fig. 47, and in the Rococo ornament wardrobe, page 46. His Gothic bookcase, Fig. 36, is puerile. His designs often show a wildness and eccentricity in the ornament despite the elegance of the forms and contour. He knew where to put his ornament, and never lost sight of the proportion and outline. Chippendale's contemporaries, such as Manwaring, Ince, Mayhew, Copeland, Lock, are also described. The work of these men is often mistaken for that of Chippendale. Many of the designs given show how closely they followed the master, in elegance of outline, as in many of Lock's designs, chimneypieces, mirror-frames, which are exceedingly delicate. The Brothers Adam are well illustrated with some very beautiful and chaste designs. Hepplewhite and Shearer were fellow workers, and produced some excellent furniture; but Shearer was less educated, and his designs are rather heavy. Thomas Sheraton is better known; his designs show cleverness, sometimes to excess; but they are designed with a regard to utility. As a guide to assist in distinguishing the work of these leaders of the craft, the author's work will be found acceptable.

* The Chippendale Period in English Furniture. By K. Warren Clouston. With illustrations by the Author. London: Debenham and Freebody, and Edward Arnold, Strand.

THE ARCHITECTURAL ASSOCIATION.

THE Architectural Association will hold its annual general meeting on Friday, Oct. 8, at No. 9, Conduit-street, W., at 7.30 p.m., when Mr. Hampden W. Pratt, F.R.I B.A., will deliver his presidential address, and distribute the prizes, medals, and certificates. The drawings submitted in competition for the various prizes offered by the Association will be exhibited; also students' drawings executed in the Studio and School of Design during the past session. The classes which are held at 56, Great Marlborough-street, commence on October 11, and the Studio reopens on October 12 at 6.30 p.m.

ELECTRIC LIGHTING NOTES FOR ARCHITECTS.—IV.

By an Assoc. Inst. Elect. Engs.

ELECTRIC CIRCUITS.—We are now in a position to consider the various methods of arranging conductors in practice, and to show how to calculate the resistances of the various combinations of conductors and the distribution of currents and potentials in such combinations. These calculations are important, and may be looked upon as the fundamental methods to be applied when dealing with the more difficult problems of distribution. As is well known, the complete path traversed by a current of electricity is termed an electric *circuit*, and it is obvious that a circuit must at least be composed of two parts: (1) the source or generator of electricity, and (2) the line or conductor connecting the terminals of the source. The former is known as the *internal circuit*, and the latter as the *external circuit*. In the external circuit, we usually have some receiving mechanism, transforming device, measuring instruments, &c.; and the general methods of arranging the separate portions (or elements, as they may be termed) composing a circuit are (*a*) the *series* arrangement, (*b*) the *parallel* arrangement, and (3) various combinations of the series and parallel arrangements.

"In series" is defined as that arrangement in which the positive terminals of an element are connected to the negative of the next, and so on, so that the whole thus connected forms a series of parts, through which the same current passes in succession, as shown in Fig. 1*a*.

"In parallel" is defined as that arrangement in which all similar ends, terminals, or poles of the elements are connected to one conductor, and the other ends of the elements are connected to another conductor, so that the circuit is composed of several separate paths through which electricity may pass simultaneously, as shown in Fig. 1*b*.

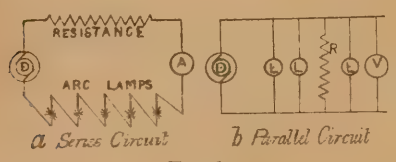

Fig. 1.

Fig. 1 illustrates these arrangements, and shows diagrammatically circuits containing a resistance, lamps, and a measuring instrument. When the arrangement does not permit of electricity passing—as when the circuit is broken, for instance—the elements are said to be on *open circuit*.

Series Circuits.—Let $r_1, r_2, r_3 \ldots r_n$ denote the several resistances of the individual portions or elements of a series circuit, and since the total resistances of such an arrangement must be the sum of the separate resistances—

$$R = r_1 + r_2 + r_3 + \ldots r_n$$

where R = total resistance. If there are n equal wires, or n parts having the same resistance connected in series, then $R = nr$. It is also obvious that the current will be the same at all points, and the arrangement forms a constant-current circuit. Now, by Ohm's law—

$$C = \frac{E}{R} = \frac{E}{r_1 + r_2 + r_3 + \ldots r_n}$$

$$\therefore E = C(r_1 + r_2 + r_3 + \ldots r_n)$$
$$= Cr_1 + Cr_2 + Cr_3 \ldots Cr_n \ldots\ldots\ldots (13)$$

and the total E.M.F. of the circuit is equal to the sum of the individual P.D.'s required by the separate portions, since the product of the current and a resistance gives the electrical pressure required to send the current through the resistance. If we, therefore, denote the P.D.'s required by the separate portions by—

$$e_1, e_2, e_3 \ldots e_n$$

Then— $Cr_1 = e_1$, $Cr_2 = e_2$, $Cr = e_3$,

and so on, and—

$$C = \frac{E}{R} = \frac{e_1}{r_1} = \frac{e_2}{r_2} = \frac{e_3}{r_3} = \frac{e_1 + e_2 + e_3}{r_1 + r_2 + r_3} \ldots\ldots\ldots (14)$$

This is an algebraic statement of the fact that the electro-motive force distributes itself throughout a simple circuit uniformly, whilst in a series circuit the electro-motive force distributes itself proportionately to the resistance. From the equation several useful relationships may readily be deduced. Thus, since—

$$\frac{E}{R} = \frac{e_1}{r_1} \quad \therefore \frac{e_1}{E} = \frac{r_1}{R} \ldots\ldots\ldots\ldots\ldots (15)$$

—that is, the P.D. between any two points in a circuit is the same proportion of the E.M.F. of the circuit as the resistance between the points is of the total resistance of the circuit. Again—

$$\frac{e_1}{r_1} = \frac{e_2}{r_2} \quad \therefore \frac{e_1}{e} = \frac{r_1}{r_2} \ldots\ldots\ldots\ldots\ldots (16)$$

These and several applications of these relationships will be referred to in the exercises given below, and in passing we may note that the general method of arranging arc lamps in practice is by the series method, as shown in Fig. 1*a*.

Parallel or Divided Circuits.—A more common method in connection with the use of incandescent lamps is to arrange two or more conductors so

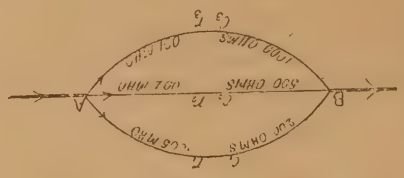

Fig. 2.

that their ends are connected immediately to the same two points, as at A and B in Fig. 2, in which three wires, having resistances of r_1, r_2, r_3 ohms respectively are connected to the two points A and B. In such cases it is evident that we have between the two points a *divided* circuit, and that the current will have the choice of three paths between the two points, with the result that the current will divide according to the power of the three branches to conduct electricity—*i.e.*, according to the conductances of the wires. This arrangement is the same as that shown in Fig. 1*b*, and is an example of a parallel circuit. Sometimes this arrangement is spoken as the *multiple-arc* arrangement.

With the addition of separate paths forming a parallel or divided circuit, it is obvious that an increased area of conducting material is offered to the current—that is, the conductance between A and B increases with the number of branches, and the joint resistance of the wires diminishes. If we denote the separate conductances by k_1, k_2, and k_3, and the total conductance by K, then $K = k_1 + k_2 + k_3$; but conductance is the reciprocal of resistance.

$$\therefore \frac{1}{R} = \frac{1}{r_1} + \frac{1}{r_2} + \frac{1}{r_3}$$

—where R is the equivalent combined or joint resistance of the wires between the points A and B.

$$\therefore R = \frac{1}{\frac{1}{r_1} + \frac{1}{r_2} + \frac{1}{r_3}} = \frac{r_1 r_2 r_3}{r_1 r_2 + r_1 r_3 + r_2 r_3} \ldots (17)$$

With only two branches, supposing the branch of resistance r_3 to be removed—

$$\frac{1}{R} = \frac{1}{r_1} + \frac{1}{r_2} \text{ and } R = \frac{1}{\frac{1}{r_1} + \frac{1}{r_2}} = \frac{r_1 r_2}{r_1 + r_2} \ldots (18)$$

If $r_1 = r_2 = r_3$, then $R = \frac{r}{3}$, and generally for parallel circuits $R = \frac{r}{n}$, if r is the resistance of each branch, and n is the number of branches. To take a numerical example, let us find the joint resistance of three wires of 200, 500, and 1,000 ohms resistance respectively, when connected in parallel (see Fig. 2). In this case—

$$k_1 = \frac{1}{200}, k_2 = \frac{1}{500}, \text{ and } k_3 = \frac{1}{1,000},$$

and— $$\frac{1}{R} = \frac{1}{200} + \frac{1}{500} + \frac{1}{1,000}$$
$$= 0{\cdot}005 + 0{\cdot}002 + 0{\cdot}001 = 0{\cdot}008 \text{ mho.}$$

$$\therefore R = \frac{1}{0{\cdot}008} = 125 \text{ ohms.}$$

In this example it is obviously an advantage to express the separate conductances as decimals; in other cases it may be more convenient to make use of the expressions given in equations 17 and 18. A moment's consideration will suffice to show that when the branches are of unequal resistances, as in the numerical example above, the current divides through the branches unequally, and we shall now explain the relationship between the currents in the branches.

Let e denote the difference of potential between the points A and B (Fig. 2); then, if c_1, c_2, and c_3 denote the individual currents, we have, by Ohm's law—

$$e = c_1 r_1 = c_2 r_2 = c_3 r_3 \ldots\ldots\ldots (19)$$

But this may be written—

$$e = \frac{c_1}{\frac{1}{r_1}} = \frac{c_2}{\frac{1}{r_2}} = \frac{c_3}{\frac{1}{r_3}} \text{ or } \frac{c_1}{k_1} = \frac{c_2}{k_2} = \frac{c_3}{k_3} \ldots\ldots\ldots (20)$$

and— $$c_1 : c_2 : c_3 :: k_1 : k_2 : k_3 \ldots\ldots\ldots (21)$$

Expressing this result in words, we may say that the current divides itself among the branches of a parallel circuit in the ratio of the conductances, or inversely as the resistances of the branches. If the resistances are equal, the current divides equally. And in passing we may note that the general method of connecting incandescent lamps in practice is to place them in parallel across the mains, as shown in Fig. 1*b*. If the lamps are the same candle-power and similar make, then—

$$R = \frac{r}{n} \text{ and } c_1 = c_2 = c_3 = \&c. = \frac{C}{n},$$

where n is the number of lamps, r the resistance of each, C the main current, and R the joint resistance of the lamps. Again, from (20)—

$$\frac{c_1}{c_2} = \frac{\frac{1}{r_1}}{\frac{1}{r_2}} = \frac{k_1}{k_2} \text{ and } \frac{c_1}{c_3} = \frac{\frac{1}{r_1}}{\frac{1}{r_3}} = \frac{k_1}{k_3},$$

and—

$$\frac{c_1}{c_1 + c_2 + c_3} = \frac{\frac{1}{r_1}}{\frac{1}{r_1} + \frac{1}{r_2} + \frac{1}{r_3}} = \frac{k_1}{k_1 + k_2 + k_3} = \frac{k_1}{K}$$

$$\therefore \frac{c_1}{C} = \frac{r_2 r_3}{r_1 r_2 + r_1 r_3 + r_2 r_3}$$

$$\text{or } c_1 = \frac{r_2 r_3}{r_1 r_2 + r_1 r_3 + r_2 r_3} C \ldots\ldots\ldots (22)$$

Similarly—

$$c_2 = \frac{r_1 r_3}{r_1 r_2 + r_1 r_3 + r_2 r_3} c \text{ and } c_3 \frac{r_1 r_2}{r_1 r_2 + r_1 r_3 + r_2 r_3} C$$

For a two-branched circuit, as when the branch of resistance r_3 is removed—

$$\frac{c_1}{\frac{1}{r_1}} = \frac{c_2}{\frac{1}{r_2}} \text{ and } \frac{c_1}{c_2} = \frac{\frac{1}{r_1}}{\frac{1}{r_2}} = \frac{r_2}{r_1} = \frac{k_1}{k_2} \ldots\ldots (20a)$$

Also— $$\frac{c_1}{c_1 + c_2} = \frac{\frac{1}{r_1}}{\frac{1}{r_1} + \frac{1}{r_2}} = \frac{r_2}{r_1 + r_2} = \frac{c_1}{C}$$

$$\therefore c_1 = \frac{r_2}{r_1 + r_2} C,$$

$$\text{and similarly } c_2 = \frac{r_1}{r_1 + r_2} C \ldots\ldots\ldots (23)$$

All the relationships given algebraically above are very important, and should be carefully studied in connection with the worked examples given below, which have been specially prepared to illustrate one or more principles.

Worked Examples.—Example 1.—If a current of 20 ampères is flowing in a wire of which the resistance is 3 ohms. per mile, state what will be the drop in volts for each 100 yards of this circuit? (City and Guilds Institute Examination.)

Since the resistance is 3 ohms per mile;
Since the resistance of 100 yards

$$= \frac{100}{1,760} \times 3 = \frac{30}{176} \text{ watts.}$$

And by Ohm's law drop in volts $= e = C \times r$;

$$\therefore \text{Drop in volts} = 20 \times \frac{30}{176} = 3\tfrac{2}{22} \text{ volts.}$$

Example 2.—A dynamo, giving a constant voltage of 110 volts at its terminals, sends a current of 40 ampères when a certain external resistance is in circuit, and 25 ampères when a lamp is placed in series with the external resistance. What is the resistance of this lamp, and what is the drop in volts between its terminals?

Let r = original resistance in the circuit when 40 ampères are passing, then—

$$110 \text{ volts} = 40 \text{ ampères} \times r \text{ ohms.}$$

$$\therefore r = \frac{110}{40} = \frac{11}{4} \text{ ohms.}$$

If r_1 = resistance of the lamp added, then—

$$110 \text{ volts} = 25 \text{ ampères} \times \left(\frac{11}{4} + r_1\right) \text{ ohms.}$$

and— $$\frac{11}{4} \times r_1 = \frac{110}{25} = 4{\cdot}4.$$

$$\therefore r_1 = 4{\cdot}4 - 2{\cdot}75 = 1{\cdot}65 \text{ ohms,}$$

and drop in volts—

$$= e = C \times r_1 = 25 \times 1{\cdot}65 = 41{\cdot}25 \text{ volts.}$$

Example 3.—It is required to place a 100-volt lamp 100ft. from the street-mains, the pressure of which is maintained at 110 volts. Determine the resistance of the connecting wire, given that the resistance of the lamp is 200 ohms?

Since the lamp requires 100 volts, the drop in volts for connecting wire—

$$= 110 - 100 = 10 \text{ volts;}$$

the drop in volts for connecting—

$$= e = C \times r;$$

but the current required for the lamp—

$$= \frac{100 \text{ volts}}{200 \text{ ohms}} = 0{\cdot}5 \text{amp.}$$

$$\therefore \quad 10 \text{ volts} = 0{\cdot}5 \text{ ampère} \times r \text{ ohms.}$$

$$\therefore \quad r = \frac{10}{{\cdot}5} = 20 \text{ ohms.}$$

It must be noted here that 200 ohms is the resistance of 200ft. of wire—*i.e.*, 100ft. for lead, and 100ft. for return.

Example 4.—What resistance must be added to a circuit to lower the P.D. between two points in the circuit from 100 volts to 95 volts, given that the total resistance of the circuit at first was 57w., and the total E.M.F. of the circuit 300 volts?

Let R = added resistance.
r = resistance between the two points.
C = current passing after the change.

then— $$\frac{100}{300} = \frac{r}{57} \text{ by equation (15)}$$

$$\therefore \quad r = \frac{57 \times 100}{300} = 19 \text{ ohms.}$$

Again—

$$300 \text{ volts} = C \text{ ampères} \times (57 + R) \text{ ohms.}$$

and— $$95 \text{ volts} = C \text{ ampères} \times 19 \text{ ohms.}$$

$$\therefore \quad \frac{300}{95} = \frac{57 + R}{19} = 3 + \frac{R}{19}$$

$$\therefore \quad \frac{R}{19} = \frac{300}{95} - 3 = \frac{15}{95}$$

and— $$R = \frac{15}{95} \times 19 = 3 \text{ ohms.}$$

It is obvious from this example that the P.D. between any two points in a circuit will be

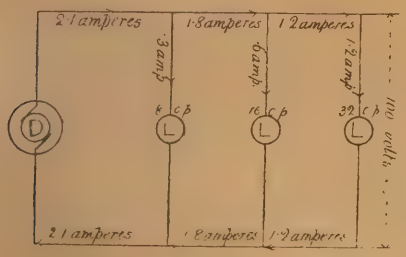

Fig. 3.

materially influenced by the addition or removal of resistances. We shall therefore give a general solution to this type of problem.

Let E = total E.M.F. of the circuit.
R = total resistance of the circuit.
e = original P.D. between any two points in the current of r ohms resistance.
e_1 = the P.D. between the same two points when a resistance of r_1 ohms is added or removed from the circuit.

Now from equation (15), when r_1 ohms is added—

$$\frac{e}{E} = \frac{r}{R} \ (\alpha) \text{ and } \frac{e_1}{E} = \frac{r}{R + r_1} \ (\beta)$$

and dividing α by β we get—

$$\frac{e}{e_1} = \frac{R + r_1}{R} = 1 + \frac{r_1}{R}$$

$$\therefore \frac{e}{e_1} - 1 = \frac{e - e_1}{e_1} = \frac{r_1}{R}$$

and— $$r_1 = \frac{e - e_1}{e_1} \times R$$

Note.—$e - e_1$ is the drop in volts between the two points.

Example 5.—Find the joint resistance of three 100-volt lamps giving respectively 8, 16, and 32c.p. when placed between 100-volt mains, each lamp taking 3·75 watts per candle.

The lamps take respectively 30, 60, and 120 watts, and since watts absorbed $= E\,C = \frac{E^2}{R}$

$$\therefore \frac{10{,}000}{r_1} = 30 \text{ and } r_1 = \frac{1{,}000}{3} \text{ ohms;}$$

similarly r_2 and r_3 for the 16 and 32c.p. lamps are—

$$r_2 = \frac{1{,}000}{6} \text{ and } r_3 = \frac{1{,}000}{12}$$

$$\therefore \text{ joint conductance } K = \frac{3}{1{,}000} + \frac{6}{1{,}000} + \frac{12}{1{,}000}$$

$$\text{and } \frac{1}{R} = {\cdot}021 \text{mho.}$$

$$\therefore R = \frac{1}{{\cdot}021} = 46{\cdot}7 \text{ ohms.}$$

The same result may be obtained by considering the current passing. Thus the lamps take respectively 0·3, 0·6, and 1·2 ampères; therefore, total current used = 2·1 ampères. This current is due to a common P.D. of 100 volts overcoming the joint resistance of the lamps in parallel.

$$\therefore R = \frac{e}{C} = \frac{100}{2{\cdot}1} = 46{\cdot}7 \text{ ohms.}$$

The distribution of current is shown in Fig. 3.

Example 6.—The joint resistance of two wires connected in parallel is $2\frac{2}{3}$ ohms. If the resistance of one of them is 8 ohms, determine that of the other.

By equation (18) $R = \frac{r_1 r_2}{r_1 + r_2}$

$$\therefore 2\tfrac{2}{3} = \frac{8 r_2}{8 + r_2} \text{ and } \frac{r_2}{8 + r_2} = \tfrac{1}{3}$$

when $r_1 = 8$ ohms.

$$\therefore r_2 = \tfrac{1}{3}(8 + r_2) \text{ and } r_2 = 4 \text{ ohms.}$$

Example 7.—A wire of 10 ohms resistance is connected between mains carrying 2·8 ampères. What resistance must a wire have so that when connected in parallel with the wire of 10 ohms, 2 ampères will pass through the wire of 10 ohms?

The current obviously divides into two parts, 2 and 0·8 ampères respectively, and—

$$\because \frac{c_1}{c_2} = \frac{r_2}{r_1} \text{ by equation } (20\,a)$$

$$\therefore \frac{2}{0{\cdot}8} = \frac{r_2}{10} \text{ and } r_2 = \frac{10 \times 2}{0{\cdot}8} = 25 \text{ ohms.}$$

Example 8.—A current of 1 ampère divides between three wires of 4, 8, and 10 ohms resistance respectively, connected in multiple arc. Determine the current in each branch.

The individual conductances are 0·25, 0·125, and 0·1 mho.

$\therefore$ total conductance $= 0{\cdot}25 + 0{\cdot}125 + 0{\cdot}1 = 0{\cdot}475$ mho.

$\therefore$ the currents in the separate branches are—

$$c_1 = \frac{{\cdot}25}{{\cdot}475} \text{ of 1 ampère} = \frac{10}{19} \text{ ampère}$$

$$c_2 = \frac{{\cdot}125}{{\cdot}475} \text{ of 1 ampère} = \frac{5}{19} \text{ ampère}$$

$$c_3 = \frac{{\cdot}1}{{\cdot}475} \text{ of 1 ampère} = \frac{4}{19} \text{ ampère.}$$

If the current in the main current was C ampères, then c_1, c_2, and c_3 would be respectively $\frac{10}{19}$ C, $\frac{5}{19}$ C, and $\frac{4}{19}$ C ampères.

(*To be continued.*)

ART AND ARCHITECTURE IN THE SERVICE OF THE CHURCH.

At the Church Congress now being held at Nottingham, a series of papers were read on Wednesday evening on "Church Art and Architecture." The meeting, which was held in the Victoria Hall, under the presidency of the Bishop of Southwell, was well attended.

The Rev. W. H. Draper, vicar of the Abbey Church, Shrewsbury, in the first paper read, remarked that, to any one who studied the history of architecture, nothing was more striking than the way in which, as a matter of fact, it had shared in the mighty influence of the Christian spirit, and received from it certain characteristics which, in their turn, became fresh witnesses and agents of that spirit's life. The Christian religion counted nothing human as alien from its influence, but had within itself a power of eliciting new beauty and higher service from all kinds of art natural to man. What were the points and principles to which attention needed most to be drawn? There was need of more personal intercourse and fellowship between the clergy and the artists. Another point that needed attention was the truth that all Church buildings belonged to a living Church, with its past, its present, and its future. They were not simply sacred relics—they were something more even than precious works of art; they were the living instruments of praise and salvation. There was also a need that the public mind of Churchmen should show more response to such new ideas and hopes as were stirring in the hearts of architects and artists of the present time. But the one supreme need of all was that of the spirit of enlightened sacrifice (the first of Mr. Ruskin's "Seven Lamps") in the Church at large, but especially among men of wealth. The heart could not but quicken at the thought of what might be done when some of our great centres of commerce awoke to their noble opportunities, when the vast wealth now waiting to be consecrated was seen, not as a means of power chiefly, but as a possible means of glorifying God and uplifting man.

Sir William B. Richmond, K.C.B., A.R.A., said that, leaving aside the Classical period, for 400 years and more, from the 11th almost to the 17th century, it seemed as though in Europe the production of an ugly thing was out of the question. In times of turmoil and bloodshed of the Middle Ages, and up to the culminating events of the Reformation—times of excess in vice, of excess in virtue—when there was little or no mediocrity to the front, art flourished. The standard of taste was very high, but at the same time eminently spontaneous and fluctuating. Notwithstanding eager struggles for power, political complications, internecine wars, there was all through the life of the Middle Ages and the Renaissance a keen zest for the arts of peace as well as of war. Cathedrals, monasteries, and palaces were built, upon whose adornments the keenest intellects and the most crafty artisans expended their creative powers and skill. But the modern spirit, full of commercialism, differed from the spirit of ancient times, so appreciative of beauty. Contentment with "the commonplace"—aye, preference for it—had permeated every class and industry more or less, and had crept into the Church, where one would have thought a spirit of "protection" would have been stronger than "free trade." There, as in our public buildings and in our houses, the tradesman was more evident than the artist; the commercial, rather than the creative, instinct. In England, soon after the Reformation, even as early as the reign of Charles I., her churches were destined to become little more than preaching houses, open on Sundays and holy days for the rhetorical display of big-wigged parsons. There was no more art for the churches. Art in a church was like a red rag to a bull. It was a dull period, artificial in the extreme, a period in which it was impossible that any form of imaginative or decorative art, especially of a religious character, should flourish. The father of modern romance, the real author of the Gothic revival, the most imaginative tender-hearted gentleman, Sir Walter Scott, by his poems first and then by his novels, created a new romance. To him they owed the revival, or rather the beginning, of interest in romance. It bore fruit in the noble literature of this century, in the revival of interest in Gothic architecture, and, directly and indirectly, Scott exercised influence upon the graphic arts. In painting, that most interesting revival, the pre-Raphaelite, was an offshoot of Scott's genius. How was it that the most renowned painters of our time had been so rarely employed in the service of the Church, while there had been so much opportunity presented in that direction? The Gothic revival naturally led architects towards antiquarian research. Hence there had arisen a clear definition of the styles of various epochs. To accommodate these it had been sought to permit no decoration in glass, sculpture, or wall-painting which did not belong to the style chosen—13th, 14th, 15th, or of whatever century, Gothic or Renaissance. Surely it was not "style," but "styles," that were wanted; the expression of something that an artist had to say after his own fancy in accordance with such traditions as he had accepted. They would never get art worthy of their religion until they cared for it and realised its

great importance. They would never get it if they treated it as furniture.

Dr. J. Charles Cox, F.S.A., said a double demand was made on architectural art in relation to the Church. At the present day their architects were called in to restore the old as well as to supply the new. With regard to the former, he held that irrevocable mischief had been accomplished in the past half-century, blotting out for ever, in cathedral and parochial churches, many of the most interesting pages in stone of our ecclesiastical history. Some of our cathedral churches had suffered, too, from the rage for immense organ effects. The average ancient parish church of England had, if possible, endured more wrongs and obliterations than even the cathedral churches. England shared with Russia, and with Russia only, the discredit and the misfortune of possessing no central power whatever to control the caprice or to instruct the possibly historical and artistic ignorance of dean and chapter or of the humbler rector.

The last paper on "The Clergy and Artists' Association" was by Mr. Reginald Hallward, who said that this association, which was opened by the then Bishop of Stepney in May of last year, sought to establish the means through which those desirous of information in regard to the best work which was being done by individual artists might be helped in various ways towards obtaining it. The aim was to bring the clergy into closer relationship with the artist, to draw the artist into closer relationship with the Church, and to strengthen and build up the service of art to religion by directing employment into the hands of the most gifted. He had long thought that an order or community of artists on a definitely religious basis, endowed with funds to send out young artists relieved from all direct money responsibility, supported by the community during the work out of its funds, and in return accepting the restraints which a definitely religious basis must impose on their life and conduct, would have enormous advantages. They said, "Go direct to the artist, and we will help you to this." Not half the artists that could do beautiful work in churches were employed in this direction; but then they did not advertise in the Church papers, and the public said, "We do not know where to go." This evil, at least, this association could help to overcome if the clergy and the public would help also.

NOTES FROM EDINBURGH.

BUSINESS in the building trades continues to be, as it has now been for long, at high-water mark. Masons in many instances command higher remuneration than the standard wage of 9½d. per hour, and others follow. In public works, as well as in private speculation, there has never been so much doing in the city at a time. The demand for middle-class houses is not ebbing, and large sections of new streets are conspicuous in the suburban districts, principally in the north, east, and west, where the lines of tramway run. Masons have taken advantage of the great demand for their services to ask for, and have succeeded in obtaining, what is known as the eight hours' day. Work was suspended for a short period only—long enough, however, to induce many to go elsewhere for work, though with a nine-hour day. Edinburgh alone is trying the experiment, which is to begin in April. There is still much difference of opinion, according to newspaper correspondents, as to the eight-hour day, which looks feasible enough where the work of masons and engineers is laborious; but the experience of some goes in favour of the nine hours, because there is less fatigue in the longer day, with two breaks for rest, than in the shorter, with only one. There is no general adoption of the Utopian idea of an eight-hour day for all branches of industry, and very probably, if any large section of operatives find the shorter day unsuited to their circumstances, it will very soon be set aside.

The present Lord Dean of Guild, Mr. Miller, has held the office by annual re-election for six or seven years, and given great satisfaction; but there have been rumours of an attempt being made for the election of another party when the new council is formed. It will be difficult to find another better qualified, in so many ways for the office than the present occupant, who has not only acquired a thorough knowledge of all the details of the business of the court, but takes an interest in it, unencumbered by the calls of any other office or professional engagements. The reconstruction of the council chambers has from the first engaged his attention, and his services in this respect alone have been freely given to the city, so that, in all likelihood, he will remain so long as he may desire to hold the office. It is difficult to see what possible advantage could accrue by putting even any other equally eligible man in the place.

The new North Bridge has been opened without the pomp and circumstance one might have thought worthy of such an important improvement. The contrast between this thoroughfare (for nearly two years greatly contracted for the works) is very striking. It is not a greater improvement than many which have been made, more or less gradually, in the last twenty years; but it is more sensibly apparent as a whole, and will be found to be of immense advantage to the greatly augmented traffic of the city. As a feature in the architecture, it is all that could be desired, with a good gradient, and graceful outlines in arch and parapet. Some parties have expressed an opinion that the stone piers would be improved by groups of statuary. The bridge is seen to most advantage from the east, but the arches cannot be altogether eclipsed by the railway sheds on the other side, although it is difficult to see how these can be constructed to be ornamental accessories. The underground buildings, forming the Railway Company's offices, are now commencing the last floor, which will bring them to the level of the bridge, and the ironwork of the sheds on the north side of the access is completed for the roofing, or nearly so. It is of the most ordinary construction, with deep lattice girders covering the transverse trusses.

Operations have been for some time in progress at the Castle, removing the old and rather unsightly buildings at the north end of the lofty barracks building. The new hospital, which will be erected in the Scotch Baronial style, will do much to make the ancient fortress picturesque, and as the barrack tenements have, at least, the advantage of altitude, some little details about the roof and walls could easily make it a better companion to the new addition.

Little has been done this summer in the way of improving the Old Town. In some parts now there is little remaining to be done. The north side of the Lawn Market has been thoroughly opened up. Houses forming a series of narrow closes have been removed, and anyone can enter from Bank-street and emerge into the head of Lawn Market. The old houses retain their dingy character—all repairs carefully restoring what can be retained—and the aspect of the newly-extended courts is very different from that presented by the University Hall Courts. With the exception of some old doorways and inscriptions, there is not much of architectural interest. The only building making a conspicuous exception is one which is being restored by its proprietor, Lord Rosebery. The mason and plaster work of this ancient edifice are nearly complete. The old doorway is in good preservation, with armorial bearings and legend, initials, and date 1622. It was the dwelling occupied by the Dowager Lady Stair (a Primrose), and the close giving access to it is known as Lady Stair's Close. The plan is what the site has made it, with a projection to the south and frontage to the north, where, however, it stands considerably back from the line of streets. This Lady Stair's Close formed the principal thoroughfare between the Lawn Market and the north side, until Bank-street was made, and this access still remains, passing the east side of Lady Stair's Mansion. The most curious and interesting feature of the house is the lofty hall, entering from the octagon staircase, and having the height of two stories. This has been very carefully restored. The south projection in the front has more of architectural detail than the rest. The turret staircase, &c., has a pretty Jacobean balcony, and access to the third floor on the work is provided for by a very elegant verandah passage in timber; and probably the mansion never looked so well at its best in the 17th century.

Notwithstanding the increasing demand for electric-light supply—so great as to make new plant requisite already—the demand for gas supply continues also to increase, and there is every probability of the present gasworks in New-street being taken elsewhere, the present site being far too limited. This will, it is to be hoped, dispose both of the old and new chimney stack. Nothing has been decided as yet as to the rebuilding of North Bridge-street; but the matter cannot be much longer delayed. The elevations have been arranged for, and the question now awaiting decision is whether the work of construction is to be done by the council or private enterprise.

There has lately been a recurrence of the periodic outcry as to the condition of the thoroughfares within the city. The granite setts appear to be laid in some fashion that makes them much noisier (it is said) than the same roads as laid in Glasgow. The street and roads committee are roughly handled for their lack of enterprise and general mismanagement. For about twenty years they seem to have thought of no other than the wood pavement. This gives all satisfaction in so far as noiselessness is concerned; but it is dirty in wet weather, and the most expensive, and soon requires repair. The latest experiment in this way has been made with hard Australian woods, in a section of South Bridge-street. The hardwood laid in Princes-street stands a little longer than the old redwood blocks, but has had to be repaired already. The durability of rock asphalte is unquestioned, and if it were so very dangerously slippery, it is not likely that the town of Leith would be repeating (as they have done) the experiments they made with it in the Kirkgate about thirty years ago. No experiment with this material has ever been made by the streets committee. The Glasgow authorities have tried successfully a concrete, called tar macadam, costing only 7s. 6d. per super. yard. They are also experimenting with an American patent, which is compounded of the rock asphalte and stone or gravel, with some fibrous material which, in minute subdivision, is said to cure the slipperiness of the asphalte.

The memorial which has been placed in St. Chad's Church, Lichfield, in memory of the forty years' pastorate of the late rector, the Rev. Prebendary Graham, was dedicated by the Bishop of the Diocese on Saturday afternoon. It consists of a carved oak reredos, the central panel containing a representation of Christ as the Good Shepherd. The space, too, within the Communion-rails has been laid out with black and white marble, and on the south wall, at the side, has been placed a brass tablet, bearing an inscription.

Thomas Paterson and George Kerr, labourers, died on Friday night in the Royal Infirmary, Glasgow, from injuries received earlier in the day by the collapse of scaffolding at Cambuslang Free Church. Four men were working on the scaffold, and all fell to the ground. Kerr, Paterson, and another man, named Watson, were conveyed to the Glasgow Infirmary, while the fourth, an apprentice, escaped with slight injuries.

On Saturday the members of the North-Western and Midland Sanitary Inspectors' Association held a meeting at Manchester. The chairman, Mr. Urquhart, of Crewe, in submitting the report of the delegates to the Leeds Congress of the Sanitary Institute, congratulated the association on the fact that Dr. Farquharson, M.P., had promised to assist the progress of the Local Authorities (Officers') Superannuation Bill in Parliament, that a sanitary inspector had for the first time been appointed president of the sanitary inspectors' section of the congress, and that sanitary inspectors were granted an opportunity of reading papers in other sections.

Frank Webster, architect, Bradford, was charged on remand at Keighley, on Friday, with travelling without a ticket on the Midland Railway, and with assaulting Sidney Hadley, station-master, Thwaites. Prisoner pleaded that he had been working late, and in consequence had fallen asleep, and been carried beyond the station at which he should have alighted. His pass he had left at a friend's house. He was fined 5s. and costs, and for the assault 10s. and costs.

Rapid progress is being made with the building of the new Era spinning mill at Rochdale, and the bricklayers have commenced work on the top story. It is expected that the roof will be on by the end of the year, and that some machinery will be got to work before March has expired. The building is 315ft. long, inside measurement, and 134ft. wide. The length of it on the canal side is 43 windows, and there are three stories, besides the basement. The first brick was laid in May last. The mill is made fireproof throughout on the brick-arch principle. In the basement are rooms for warehousing and waste, above are the card and blowing rooms (18ft. high); in the next story are the ring-spinning and mixing rooms (also 18ft. high), and in the top room (15ft. high), warping, reeling, &c., will be carried on. Cabins for the overlookers commanding views of their respective rooms, and hot-water kitchens for men and women are being provided.

BOOKS RECEIVED.

First Principles of Electricity and Magnetism, by C. H. W. Biggs, editor of *The Electrical Engineer*, illustrated. (London: Biggs and Co., Salisbury-court, Fleet-street.)—This octavo is a useful introduction to the science of magnetism for all beginners, and is an amplification of a series of articles which appeared in *The Electrical Engineer*, based upon the syllabus of the City and Guilds Institute. Mr. Biggs' book is well illustrated with diagrams and figures of apparatus, and cannot fail to be found of use to the student. Those who want a simply-treated introduction in which first principles are clearly dealt with, will find this book more useful than many treatises of a more pretentious character that have been published of late. The relations between heat and work, and the mathematical principles and definitions, are fully expounded. Thus the units, the "poundal," &c., are well explained by examples. The book is well printed, and is a useful addition to the Biggs and Co.'s Electrical Engineers Series. The price is 3s. 6d.

CHIPS.

The new electric tramways extension from Belfast to Fishponds was officially inspected on Monday, on behalf of the Board of Trade, by Sir Francis Marindin, R.E., and Major Carden, R.E.

Lord Harlech and Mr. Herbert Roberts, M.P., were present at the laying of a memorial-stone at the County School, Llangollen, last week. The school will cost £4,800.

The Hampstead Vestry agreed, on Monday night, to apply for a loan of £3,000 from the London County Council, to be applied towards the purchase of Fortune Green, West Hampstead, as an open space. The Green, which will be laid out and maintained by the vestry, has an area of nearly four acres, and will cost £8,000. Of this sum £3,000 will be contributed by the County Council, a similar amount by the vestry, and £2,000 has been raised by public subscriptions.

The Baptist Chapel at Laxfield, East Suffolk, was reopened last week after external renovation, including reseating with pitch-pine benches, and erection of new gallery and pulpit, at a cost of £500. The works were carried out by Mr. Butcher, of Stradbroke, and Mr. Revell, of Laxfield. A large commemoration-stone has been let into the front wall, bearing an inscription to John Moyes, the Laxfield martyr, who suffered at the stake not many years from the site of the chapel door.

A conversazione took place at the People's Palace, on Monday evening, to mark the opening of the winter session of that institution. About 4,000 students, past and present, were invited, and the whole building was thrown open for the use of themselves and friends. The day-school now comprises over 400 scholars, and the average attendance in the evenings is over 1,000 students. Those who attend the Bow and Bromley Institute were also invited to be present at the gathering.

The interior of the chancel of the parish church of Otterbourne, Hants, has just been decorated with figures in colour and gilding, under the personal supervision of Mr. W. J. Pearce, of Messrs. W. and J. Pearce, of Albert-square, Manchester.

The Light Railway Commissioners held a public inquiry in the County Buildings, Haddington, for the purpose of considering the application made to them by the Gifford and Garvald Railway Company for an order to authorise the above-mentioned light railway. The estimated cost of the line is £88,000.

The Aspley Heath Board Schools, Woburn Sands, Beds, are being warmed and ventilated by means of Shorland's patent Manchester grates, patent exhaust roof-ventilators, and special inlet tubes, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

A new organ built by Messrs. Conacher and Co. for the Congregational Church, Bala, was opened on Wednesday.

A little Roman Catholic church, in the Early English style, costing from £4,000 to £5,000, has been built at Mr. J. Hope's sole expense at Heron's Ghyll, Uckfield, from designs prepared by Mr. F. Walters, F.S.A., of Westminster. It was dedicated last week.

The Bishop of Worcester will unveil on Wednesday next, October 6, the new west window now being placed in St. Philip's Church, Birmingham, in memory of the late Bishop Bowlby. The window will form the complement of the series by Sir E. Burne-Jones which already beautify the church.

Lord Wolseley performed on Friday the ceremony of the opening of the new headquarters of the 1st Lanark Rifles in West Princes-street, Glasgow, which have been erected at a cost of £14,000.

Engineering Notes.

Bristol.—With the completion of the electric tramway to Staple Hill, which will be ready for opening throughout a fortnight hence, the Bristol Tramways Company will have spent nearly £200,000 on the introduction of electric traction, and they will have a spendidly-equipped power-station, 8¾ miles of line, and 27 motor-cars, in addition to other appliances, to show for their money. The electric extension from Eastville to Fishponds, which was opened on Tuesday, has been carried out under the superintendence of Mr. G. T. Edwards, the resident engineer. The posts are of a light character, and the use of span-wires in lieu of brackets reduces the interference with the roadway to a minimum. During the present year some important extensions and improvements have been carried out under Mr. W. Wood, superintending engineer, at the power station at St. George, from which the two sections now opened are worked. Formerly Willans' engines were used, driving with ropes on British Thomson-Houston generators. The station is now equipped with four direct-coupled units, with McIntosh and Seymour engines and British Thomson-Houston generators. Under their latest order the company have obtained powers to provide a new station at Eastville which will be sufficient for the whole of the city, and they are also about to erect a large depot at Staple Hill for the housing of the cars and repairing purposes, at a cost of between £5,000 and £6,000.

Devonport.—The Lords of the Admiralty made an official inspection of Devonport Dockyard last week. In the course of this tour their lordships visited No. 1 jetty, which is being extended at a cost of £32,000. The work includes the erection of a new sea-wall, a feature of the improvement being the provision of shear legs capable of lifting 100 tons. It is hoped to complete the work early next year. A visit was next paid to the drawing office, which it is proposed to enlarge, and to No. 2 dock, which is to be extended at a cost of £30,000. At the Keyham factory Mr. Goschen considered a proposal to increase the police quarters by building a new wing. They next proceeded to the Royal Naval Engineering College and went over the new wing, which was completed in time for it to be brought into use at the end of the midsummer term. The extension provides over 50 additional dormitories and several instruction and demonstration rooms to meet the growing demands upon this institution. The central dining-room in the old portion of the college is also being lengthened so as to seat 200 students. At the Keyham extension works the members of the Admiralty were met by the contractor, Sir John Jackson, and were conducted to the entrance to a shaft which they descended to a depth of over 80ft. This brought the visitors to the foundations of the wall of one of the four docks. From this point Mr. Goschen and Sir John Jackson led the way through a passage lighted with candles, which, when completed, will be used as a culvert for pumping the water out of the dock. Having regained the surface their lordships had pointed out to them the area of the closed basin, which in itself will occupy 35½ acres of the site.

The Institution of Civil Engineers.—The prize-list of this institution for session 1896-7, now made known, contains awards as follows:—The Howard Prize, of the value of 50 guineas, to Mr. Hilary Bauerman, in recognition of his work on the metallurgy of iron; for original papers presented to the Institution, Telford Medals with premiums of books or instruments to Messrs. H. A. Humphrey for "The Mond Gas-Producer Plant and Its Application"; to Colonel Pennycuick, C.S.I., R.E., for "The Diversion of the Periyar"; to Mr. E. C. Shankland for "Steel Skeleton Construction in Chicago"; to Mr. Dugald Drummond for "High Pressures in Locomotives"; and to Mr. Thomas Holgate for "The Enrichment of Coal-Gas." George Stephenson Medals and Telford Premiums to Mr. G. E. W. Cruttwell for "The Tower Bridge Superstructure," and to Professor Unwin for "A New Indentation Test for Determining the Hardness of Metals." Watt Medals and Telford Premiums to Messrs. Hay and Fitzmaurice for their joint paper on "The Blackwall Tunnel." The Telford Premium list contains the names of Messrs. Donaldson, Ripper, Ravenshaw, Worth, Santo Crimp, Homfray, Nichols, Ramsay, H. D. Smith, and Major Leach of the Corps of Engineers, U.S. Army. Awards to students attached to the Institution comprise:—The James Forrest Medal to Mr. A. H. Jameson, B.Sc., of Manchester; the Joule Medal to Mr. H. W. Barker; and Miller Prizes to Messrs. Beer, Brand, Berridge, and Kitchin for papers read in London, and to Messrs. Godfrey, Garvie, B.Sc. (Manchester), Carter (Newcastle), and Hurt (Leeds). This year marks the first award by the Institution of the medals named after James Prescott Joule, the discoverer of the Mechanical Equivalent of Heat; and James Forrest, whose long service as secretary and the care devoted by him to fostering the student class, has, on his retirement, been commemorated by the foundation of this medal. The presentation will be made at the opening meeting of the new session on Nov. 2.

Liverpool Overhead Railway and its Motive Power.—To meet the requirements of extended service on the Overhead Railway, it has been found necessary to greatly enlarge the generating station at the Bramley-Moore Dock. The work being now practically completed, invitations were sent to the members of the Liverpool Engineering Society to be present at the electrical headquarters of the railway on Saturday afternoon for the purpose of inspecting the new section of the works. Luncheon was provided at the Alexandra Hotel, the hosts being Messrs. Holme and King, contractors for the work. Colonel A. H. Holme presided, and there were also present Messrs. S. B. Cottrell (engineer and surveyor to the company, and president of the Liverpool Engineering Society), R. C. F. Annett (honorary secretary), and many members. The party afterwards proceeded to the central field of electric supply for the Overhead Railway at Bramley-Moore Dock. The addition to the generating station consists of two engines built by Messrs. Hick, Hargreaves, and Co., of Bolton, and two new dynamos and switchboard, built by Messrs. T. Parker, Limited, of Wolverhampton. The new engines, dynamos, and switchboards had to be put in position, connections changed over, and the main steam-pipes extended without interfering with the working of the generating station. The engineers for these works and the southern extension of the railway were Sir Douglas Fox, M.Inst.C.E., the late Mr. J. H. Greathead, M.Inst.C.E., and Mr. S. B. Cottrell, M.Inst.C.E., the latter acting as resident engineer, assisted by Mr. Charles Jones. The structural extension of the generating station, new foundations, and tunnel for cables were carried out by the railway contractors, Messrs. Holme and King, having the personal supervision of Col. A. H. Holme, J.P., assisted by Mr. Fred. Caulton. Messrs. Holme and King were also the contractors for the northern extension of the railway (opened in 1894) and other important works in connection with the railway to Seaforth. Adjoining the engine-room are stores, fitting-shop, and accumulator room.

The supply of properties at Tokenhouse-yard last week was limited, and the returns were consequently considerably below the average for the end of September. The aggregate realisation was £25,170, less than that recorded the previous week, and very far below the amount registered for the same week last year. The attendance, however, was good on each business day, and there were plenty of buyers for sound properties, for which good prices were readily obtained. In striking contrast to the dulness of the market in town, a remarkable activity has set in in the provinces. The market in the country has not presented so encouraging a feature for some years.

The Light Railway Commissioners held a sitting in Aberdeen on Monday to consider an application by the Great North of Scotland Railway Company for permission to construct the Echt (Extension) Light Railway from Kittybrewster to Oldmill, a distance of 3⅝ miles, entirely within the city of Aberdeen. Mr. P. M. Barnett, the company's engineer-in-chief, gave evidence, and stated that the cost of the extension would be fully £131,000. The cost of the work was largely augmented by heavy cuttings, bridges, and embankments, and the tunnel would entail an expenditure of £31,000. The average cost per mile of the whole railway to Echt would be about £12,000. The application was granted.

The new installation of electric light at Boston Dock was officially opened on Wednesday week by the mayoress. The dock and premises were illuminated by eight arc lamps and 150 incandescent lamps, superseding gas lamps. The work has been carried out by Messrs. Spaglionetti and Crookes, of London, at a cost of £1,682 13s. 11d.

Building Intelligence.

Bradford.—The Chancellor of the Diocese of Ripon held a court in Bradford on Friday to hear an application for a faculty authorising the removal of the north and south transepts, the removal of the remains interred in certain graves and vaults, and for other alterations in the city parish church. The works to be carried out now were, it was explained, the removal of the north and south galleries, and the building of a vestry on the north side, and other alterations. The architect is Mr. Healey, of Bradford. The estimated cost of the work to be carried out at once was £4,000, and of that sum £3,300 had been already promised. It would be necessary to take down a small portion of the north wall for the rebuilding of the transepts. The Chancellor, in closing the inquiry, said he believed that the alterations were desirable, and it was the duty of the court to grant the faculty.

Gloucester.—The ceremony of reopening the Lady Chapel at Gloucester Cathedral, after a disuse of more than thirty years, took place on Wednesday. This sanctuary, which was commenced in 1472 and completed in 1498, is one of the purest specimens of the Late Perpendicular style of architecture in England; but year after year it has been falling more and more into decay. The stonework was crumbling, and the roof was far from weather-proof. It is claimed by the restorers that in the work of reparation, not a fragment of the ancient stone has been sacrificed that could by any means have been made use of. Even the bits of stained glass that formed part of the window over the altar have been reset in the ancient tracery. Decayed mullions and transoms have been removed, the mouldings being reproduced. No alteration in the form of the chapel has been attempted; but the ingrained dust and whitewash four centuries old has been removed. The floor has been replaced, stone by stone, tile by tile, and Laud's altar rails have been preserved. The reredos at the east end, described by Sir Gilbert Scott as one of the finest examples of colour-work in existence, has not been touched: but is left in the sadly mutilated condition to which Cromwell's Ironsides reduced it.

Handsworth.—The new Technical School in Gold's Hill-road and Stafford-road, erected by the urban district council, was formally opened on Wednesday. The designs for the school, which has cost £10,500, have been prepared by Mr. William Henman, F.R.I.B.A., the style selected being an adaptation of Renaissance carried out in brick with stone facings. From the main entrance a porch leads to a vestibule with a spacious hall, from which a wide corridor branches east and west. Facing the entrance is a wide staircase flanked by marble and alabaster columns. On either side of the first flight of stairs is a large cloakroom, &c., and under the first half-landing there is a back entrance, as well as access to the caretaker's stairs leading up to his apartments on the second floor. On the east side of the entrance-hall the following accommodation is provided, viz.:—General office, library, and committee-room, two large classrooms, and the science principal's room. On the west side are two smaller classrooms for science teaching, the chemical laboratory, balance and preparation room, and a science lecture-room. Ascending the principal staircase, which above the half-landing is divided into two flights, the upper hall is gained, from which corridors run east and west. At the end of the east corridor is the art principal's room, and two other rooms for design and for life studies. Next to the life room are three rooms for antique and elementary drawing, which are practically one room divided by arches draped with curtains. At the end of west corridor are the modelling and casting-rooms and art lecture-room Right and left of the main staircase, doors lead out on to asphalted flat roofs, where out-door sketching may be practised. There is access to each floor from the caretaker's staircase, with a lift suited for taking large casts, and there are lavatories at each end of the corridor. Internally the rooms are plain in detail, with the walls tinted in neutral greens, the object being to provide a suitable background for drawings and casts. The rooms will be electrically lighted, the District Council having arranged for an installation which will supply both the school and their own offices adjoining. The contract for the buildings was, after tenders were obtained, placed in the hands of Messrs. Horton, of Brierley Hill.

Manchester.—A sitting of the Consistory Court was held on Friday in the Manchester Cathedral, Chancellor Vernon Smith presiding. Faculties were granted in respect of applications for the following purposes:—To reroof, reseat, and refloor the parish church of Admarsh-in-Bleasdale, extend the chancel, and remove the choir stalls; to remove certain seats in the nave and side-aisles of Holy Trinity Church, Preston, also one of the two pulpits, to form a quasi-chancel with choir seats, raised above the present level of the floor, to form the upper room in the tower into a choir vestry, and to form a small side chapel; to make considerable alterations in the interior and exterior of the Longridge parish church; to take out of St. Matthew's Church, Stretford, the present glass from the window at the east end of the church and replace it with stained glass; to replace in St. Matthew's Church, Ardwick, the present pulpit of stone and brick with one of stone and marble; to remove the old window over the baptistery in St. Peter's, Ashton-under-Lyne, and replace it with one of stained glass, and to replace old woodwork round the baptistery with a new oak screen; and to take the present glass from the window at the east end of St. James's Church, Daisy Hill, and replace it with a window of stained glass.

Middlesbrough.—The foundation-stone has been laid of a block of buildings which is being erected for the Middlesbrough Co-operative Society in Linthorpe-road. The plans of the buildings were prepared by Councillor W. G. Roberts, of Middlesbrough, and the new premises will have a frontage to Linthorpe-road of 87½ft., to Clifton-street of 110ft., and to Pelham-street of 70ft, the whole block occupying an area of 6,753sq.ft. There will be four shops—viz., grocery, drapery, boots and shoes, and butcher's, all being fronted with mahogany, and having recessed and tiled entrances. There will also be a boot-repairing shop in Pelham-street, and cellars, warehouses, and show-rooms, the latter being on the first floor, where also will be situate the directors' room; whilst the clerks' offices, &c., will be above the grocery warehouse. On the second floor there will be a public hall 67½ft. by 52ft., and two other large rooms 48ft. by 40ft. and 40ft. by 26ft. respectively. The three street elevations will be faced throughout with Accrington red-pressed bricks, with stone dressings, and there will be granite pilasters between the several shops. The work is being carried out by the following contractors:—Excavating, brickwork, masonry, &c., Messrs. W. and H. Pounder; plastering, &c., Mr. J. R. Smiles; carpentering and joiner work, Mr. W. Thompson; slating, Mr. J. Harrison; painting, Mr. J. H. Hill; plumbing, glazing, and gas-fitting, Messrs. Dunning and Walton. All the contractors belong to Middlesbrough. The total cost will amount to about £10,000.

St. David's Cathedral.—An interesting discovery has been made at this cathedral. In the middle of the east wall of the chapel, which was built by Bishop Vaughan, whose episcopate lasted from 1509 to 1526, between two niches, stood the principal altar, and right and left of it were originally two windows, looking into another chapel eastward. These windows seemed to have been blocked with solid masonry almost as soon as they were built. In Bishop Vaughan's chapel nothing was to be seen but smooth ashlar; but on the back of the wall the outline of a faint and four-centred arch could be traced. The cathedral has just been visited by Mr. John O. Scott, the cathedral architect, and under his direction the walling was removed to see if the blocked windows contained any remains of tracery. To the surprise of himself and others, they prove to have elaborate tracery, with several interesting peculiarities, and are richly moulded. They are windows of three lights, with stanchions and saddle bars, but were never glazed. In the spandrels are to be seen four shields, with coats of arms, one belonging to Bishop Vaughan, the builder of the windows, and the other the arms of the Cathedral Church of St. David's. The other two remain to be identified. When the windows were blocked, small squints, or "hagioscopes," were formed obliquely through the blocking walls, which looked on to the altar in King Edward the Confessor's Chapel on the one side, and the altar in St. Nicholas's Chapel on the other side.

Shrewsbury.—The ancient church of St. Alkmund was reopened on Friday after partial restoration. As soon as further funds are obtainable it is proposed to fill in the windows with stone tracery, and improve the flat plaster ceiling with wood principals and panelling, and to open out to view the ancient tower arch (now blocked up with a brick wall). The work just executed has been the removal of the west gallery (which was rotten and unsafe), the lowering and reconstruction of the seating, putting concrete and solid wood-block floors under same, in place of the old boarded floors, which were in a bad state of dry rot; the formation of a chancel by throwng out a projection into the nave, in which are placed oak stalls for the clergy and choir; and the erection of oak screens, for forming vestries and organ-chamber. The organ, which formerly stood in the west gallery, is now placed in the chancel. The new chancel floor is paved with blue stone in squares, the sacrarium with polished coloured marbles, and an oak-traceried pulpit is placed against the north screen. One of the nave windows has been filled in with stone tracery and cathedral glass, and it is proposed later to fill in the other windows in a similar manner, though with some variety in detail. A new porch has been erected on the south side of the church. The old porch at the east end of the church has been built in, and forms a choir vestry. The whole of the work has been executed by Mr. R. Price, builder, of Shrewsbury. The architect was Mr. A. E. Lloyd Oswell, of the same town.

CHIPS.

At Tockington, near Almondsbury, a new Methodist Free Church was opened last week. It is built of local stone, with Bath stone dressings, and is furnished in pitch pine. Mr. A. Dowling, of Bishopston, Bristol, was the builder.

The work of executing the statue of the Queen, which has been subscribed for by members of the Junior Constitutional Club in Piccadilly, in commemoration of the Diamond Jubilee, has been intrusted to Mr. Brock, R.A. The statue, which will represent her Majesty a little over life size, will be placed in the vestibule of the building.

Salem Chapel, York, was reopened last week after renovation. The improvements in the chapel have been carried out from a design and under the superintendence of Messrs. Penty and Penty, architects, Mr. T. Welburn having been the builder.

Owing to the increase in the numbers at Mill Hill school, it has been found necessary to provide further accommodation for the boys. The additional premises are in process of preparation, and will be available for use next term. The governors are also erecting a number of new studies for senior boys, and extensive chemical and physical laboratories, with a large lecture-room. A large school-room, to accommodate 250 boys, and the new chapel will be ready early next year.

In the newly-issued volume of "Army Regulations," alterations or additions have been made with regard to annual inspections by principal medical officers of the sanitary conditions and water supply in all camps, barracks, hospitals, or other War Department buildings within their districts; also of the cubic air space allowed for each bed in the wards of the various types of military hospitals at home stations.

By the will of Miss E. E. Gibson, who recently died in Durham, the National Portrait Gallery has obtained a fine example of Romney's art. This painter did not often introduce several figures into one picture, but in this there are four or five. Miss Gibson was the sister of Mr. William Sidney Gibson, whose "Tynemouth Priory" and other works are well known, and the picture contains portraits of their grandfather, Adam Walker (Philosopher Walker, author of "The Original"), and of his wife and baby and two grown-up sons. He is exhibiting an orrery to them by artificial light.

At Exmouth the foundation-stone was laid last week of a Jubilee Memorial clock tower, which is to be constructed facing the sea front, and adjoining the grounds of the Imperial Hotel. When completed the tower will stand 45ft. high, and will, in the main, be constructed of Bath stone. The dressings will be of limestone, and around the base will be an iron railing. The tablets bearing the inscriptions are to be of Aberdeen granite.

The dedicated stone of a new church at Bassett, South Hants, was laid on Wednesday. The site is on the Winchester-road, Bassett, and it will be a daughter church to the parish of North Stoneham. Mr. J. W. Fleming has given the site, and when completed the church will hold between 400 and 500 people. However, at present it is only proposed to complete a sufficient portion of the church to seat 200 people, at a cost of £2,400.

"PHOTO-TINT" by James Akerman, 6, Queen Square, London W.C.

NEW PREMISES, BRIDGE ST, CHESTER.

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Our Illustrations.

ALLOA NEW PUBLIC BATHS.

The new public baths in course of erection in Alloa, the gift of Mr. J. Thomson Paton to the burgh, are situated at the corner of Primrose-street and Primrose-place, the main entrance being from Primrose-street and close to the corner. The building contains a billiard and amusement room, with newsroom and anteroom; a swimming pond, with its accessories; a first and second-class plunge bath department; a Russian bath department; and a large gymnasium. These departments are so placed that, while each has an independent access, intercommunication is easy. On the ground-floor, immediately on either side of the main entrance, are the billiard and newsrooms, with their anteroom, and immediately beyond the entrances to those rooms, so that access may be free, is the booking and towel office. A wide corridor in front of this office gives immediate access to the other departments of the building. The swimming-pond hall, extending from this corridor through a spacious vestibule, is a large room, 98ft. by 50ft., having an open timber roof averaging 25ft. high from the floor. The pond is 75ft. by 33ft., and of varying depth, the shallow end being specially prepared for the use of children. On either side are dressing-boxes, 47 in all, and at the deep end a room for the use of the various swimming clubs that may be formed by frequenters of the baths. A large dressing-room and washing-room for school children are provided at the entrance end. A washing-room for adults, with the usual conveniences, is situated close to the clubroom. As it has been found that such ponds have been used for water carnivals and other entertainments, a gallery has been provided over the dressing-boxes and over the entrance vestibule for spectators, who have thus not only a full view of the pond, but look towards the clubroom, from which all such entertainments would be directed. Special access is provided to this gallery without bringing the public in contact with the bathers. The second-class plunge-baths, 10 in number, on a slightly lower level than the pond, are entered from the main corridor immediately behind the ticket-office. Each bath is placed in a room by itself, supplied with hot and cold water, and well lighted and aired. A special access is provided to the swimming pond. The first-class baths, on an *entresol* floor immediately over the booking-office, are reached from the same corridor by a stair rising from the side of the entrance to the second-class baths. They are the same as the second class baths, but these bathrooms are larger, and each is provided with a washhand basin. The Russian bath department, at the far end of the swimming-pond hall, is reached either from the gallery of the hall, through the second-class baths, or by an independent access from Primrose-place. It consists of a small vestibule with booking-office, cooling-room, 26ft. by 16ft., with separate couches for five persons; Russian bathroom, 16ft. 6in. by 9ft. 6in., and a washing-room. The gymnasium, 76ft. by 28ft., having an open-timber roof, average 22ft. high, occupies the whole of the first floor of the pond building over the billiard and newsroom, &c., the necessary dressing-rooms being provided over the first-class plunge baths fronting Primrose-place. A spectators' gallery is placed at the end. The heating and water supply arrangements have received special study, the boilers, &c., being placed at the far end of the building at Primrose-place beneath the Russian bath department, where light and air are ample, and a ready access can be obtained from Primrose-place for fuel. The washing-house and laundries are placed immediately behind the heating department, and the towel-drying room is specially ventilated to the main boiler-house chimney. Externally, the building is designed in a free treatment of French Renaissance. The cost of the baths will probably be about £20,000. The architect is Mr. John James Burnet, A.R.S.A., of Messrs. John Burnet and Son, 167, St. Vincent-street, Glasgow.

STONEHOUSE CHURCH, LANARKSHIRE.

The church, of which the exterior and interior views are shown, is in course of erection at Stonehouse, Lanarkshire, and will provide accommodation for 550 sittings. The materials for the outer walls are of a light grey stone from a local quarry, while the piers and arches of the interior are of red sandstone from Dumfries. The roof over nave is constructed of steel and encased with wood. The seating is to be of pitch-pine, slightly stained and varnished. The total cost is £4,000. The contractors are all local tradesmen. The architect is Mr. Alex. Cullen, of Hamilton and Motherwell, N.B.

DECORATION OF A DRAWING ROOM FIREPLACE.

The drawing from which this illustration is taken was hung on the walls of the architectural room at the Royal Academy this year. The author of the design is Mr. H. Dymoke-Wilkinson, architect, who writes:—"There is really but very little to be said in addition to the notes which appear upon the drawing with regard to this fireplace. It was designed to be erected in an old West End house, the large drawing-room of which is magnificently decorated in the style of the Second Georgian period, the ceiling being in the Italian style, richly moulded, and interspersed with leaves, fruit, &c., and having worked into it small medallions (paintings in oil colour) of Cupids and Amoretti. The walls are hung with very rich old yellow silk damask, into which are framed large dark portraits in gold frames. The floor is stained black and polished, with some rich Persian rugs laid about, whilst the woodwork is everywhere in cream and gold. The furniture of the room is gilded and upholstered in apple-green and strawberry-coloured damasks, so that in designing the fireplace it was necessary to so do primarily as a matter for elaborate colour decoration, &c."

NEW PREMISES, BRIDGE STREET, CHESTER.

This site was formerly occupied by dwelling-houses and shops, which have been pulled down to make way for the buildings now in course of erection for the Duke of Westminster. They consist of a shop on the street level, with warehouse premises above. The timber work is oak, and the roof will be covered with green slates. The contractors for the work are Messrs. Parker Bros., and the architects Messrs. Douglas and Fordham, of Chester.

NATIONAL PRIZE DESIGN FOR VIEW OF STAIRCASE.

This illustration which we give to-day was reproduced from the artistic and spirited drawing for which Mr. Edward M. Southgate gained a Book Prize in the National Competition. The staircase, though its exact date is uncertain, is situated on the west side of the Cloister Court of Queens' College, Cambridge, and was originally the entrance to the president's lodge. Queens' College is one of the most picturesque of all the colleges, and retains its old-world character more completely than any other. It is named after its foundress, Queen Margaret of Anjou. The famous Erasmus resided here, and his rooms are still pointed out, not far from this staircase, which leads out of the cloisters.

"TOTTERDOWN," WESTON-SUPER-MARE.

This house has undergone extensive alterations, costing upwards of £4,000, from the designs and under the supervision of Mr. S. J. Wilde, architect, of Weston-super-Mare, for Mr. E. M. Whitting. The contractors were Messrs. R. Wilkins and Sons, of Bristol. The new porch forms the principal entrance to the house, and the carving, which is executed in fine style, was done by Mr. Smith, also of Bristol. The stone is Corsham Down, leaded lights being used for the windows, and a red tiled roof.

CHIPS.

The measured drawings of the Gate House, Lostock Hall, illustrated by us on the 17th ult., were executed by, and should have been credited to, Mr. John Ormrod.

The parish church of Stanway, near Winchcombe, on the Gloucestershire estate of the Earl of Wemyss and March, was reopened on Saturday, after complete restoration, at a cost of about £2,000, which sum does not include that for fittings and furniture.

A window was unveiled on Saturday in the church of Theydon-Bois to the memory of the late Miss Frances Mary Buss, founder of the North London Collegiate School for Girls. It illustrates the words from "The Pilgrim's Progress":—"The Interpreter called a servant of his called Greatheart. 'Take these my daughters,' said he, 'and conduct them to the House called Beautiful.'" The window overlooks Miss Buss's grave in Theydon-Bois churchyard.

The foundation-stone of a new Wesleyan chapel was laid at Prudhoe-on-Tyne on Saturday. The building will be built of dressed stone, and the style will be Gothic. Seating accommodation will be provided for £400, and the cost is estimated at £2,000. The architect is Mr. John Mackay, Kingswood, Bristol, and the builder is Mr. Mauchlen, Newcastle. It is intended to use the old chapel for a Sunday-school.

The foundation-stone of additions which are to be made to the church of St. Andrew, Porthill, Wolstanton, was laid on Saturday afternoon. The extension will consist of a south aisle, transept, vestry, south entrance, and porch. The new work will be of stone, to correspond with the existing structure, and the contract, which is for £780, has been let to Messrs. Yorke and Goodwin, of Tunstall. Messrs. Wood and Hutchings, architects of the present church, have drawn the plans for the extensions.

The new organ at Bangor Cathedral was inaugurated on Tuesday by Sir Walter Parratt. The organ, a four-manual instrument, built by Messrs. Hill from a specification by Mr. T. Westlake Morgan, the organist of the cathedral, contains 87 registers, with 64 speaking stops, and 3,742 pipes. The console on which the performer plays is detached, and is placed in the north transept. A good many of the most valuable pipes in the old Bangor organ have been incorporated in the new.

The demolition of a section of the Hanover Buildings, Tooley-street, immediately facing the southern end of the Tower Bridge, is in progress, and is the first indication of the commencement of the new roadway which is to be made by the London County Council extending from the Tower Bridge to the Old Kent-road. The local authorities are being approached by the County Council with a view to obtaining their consent to the new thoroughfare being lit with the electric light, and to apportioning the charges to the several parishes.

The directors of the Aberdeen Town and County Property Company have accepted tenders for a new block of property to be erected at the corner of Rosemount Viaduct, Skene-terrace. The estimates amount in the aggregate to £15,000.

The Runcorn Free Library is about to be enlarged from plans prepared by Mr. J. Wilding, the surveyor to the urban district council. This plan proposes to add the present reading-room to the library, and to erect new reading-rooms facing Egerton-street. The estimated cost of the alteration is £600.

Sitting at Fraserburgh, on Friday, the Light Railway Commissioners, the Earl of Jersey presiding, Mr. Gerald Fitzgerald, barrister, and Colonel Boughey, R.E., recommended the construction of a light railway from Fraserburgh to four adjoining fishing villages. The cost of the proposed line would be £13,844, exclusive of land and cost of widening the existing Great North Railway.

At a meeting of the local Burns Memorial Society, held at Mauchline, N.B., on Saturday, Mr. William Fraser, of Glasgow, the architect, reported that the cottages were well forward, but that it would be some time before the tower was finished. The memorial fund now stands at £3,000. The tower and cottages were illustrated in the Building News for Jan. 22 last—p. 119 last vol.

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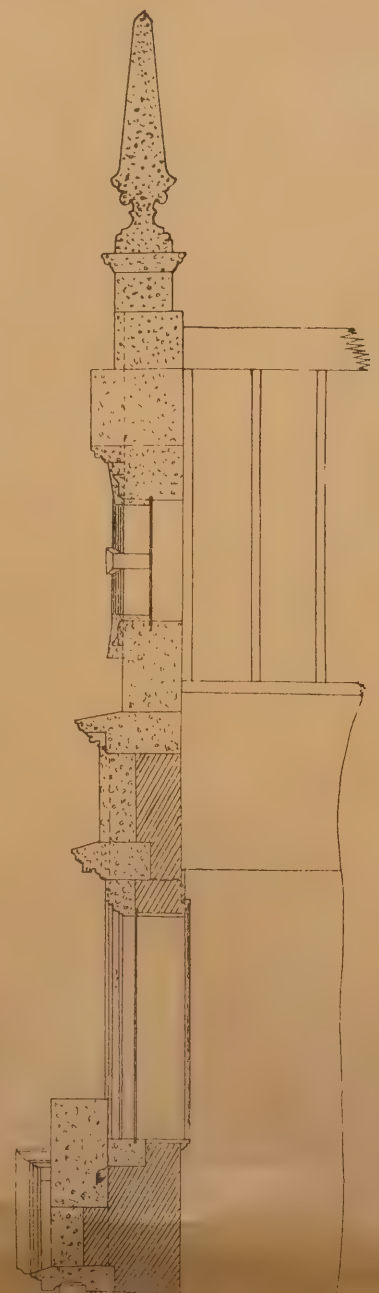

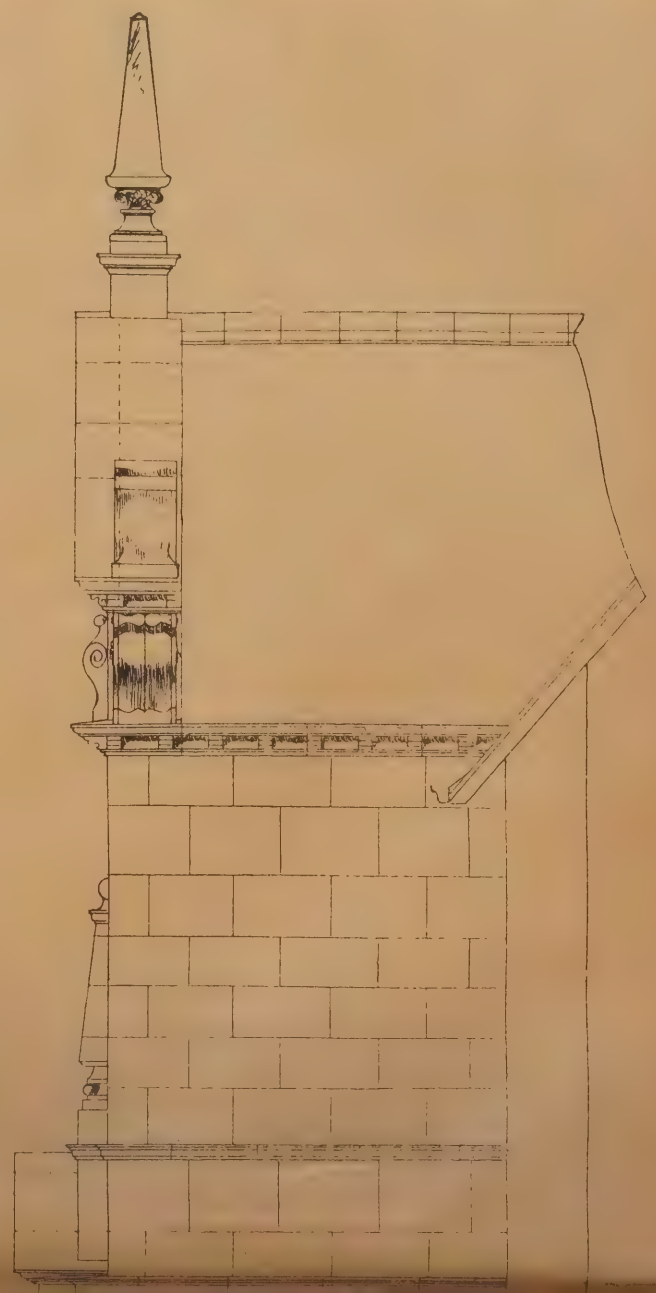

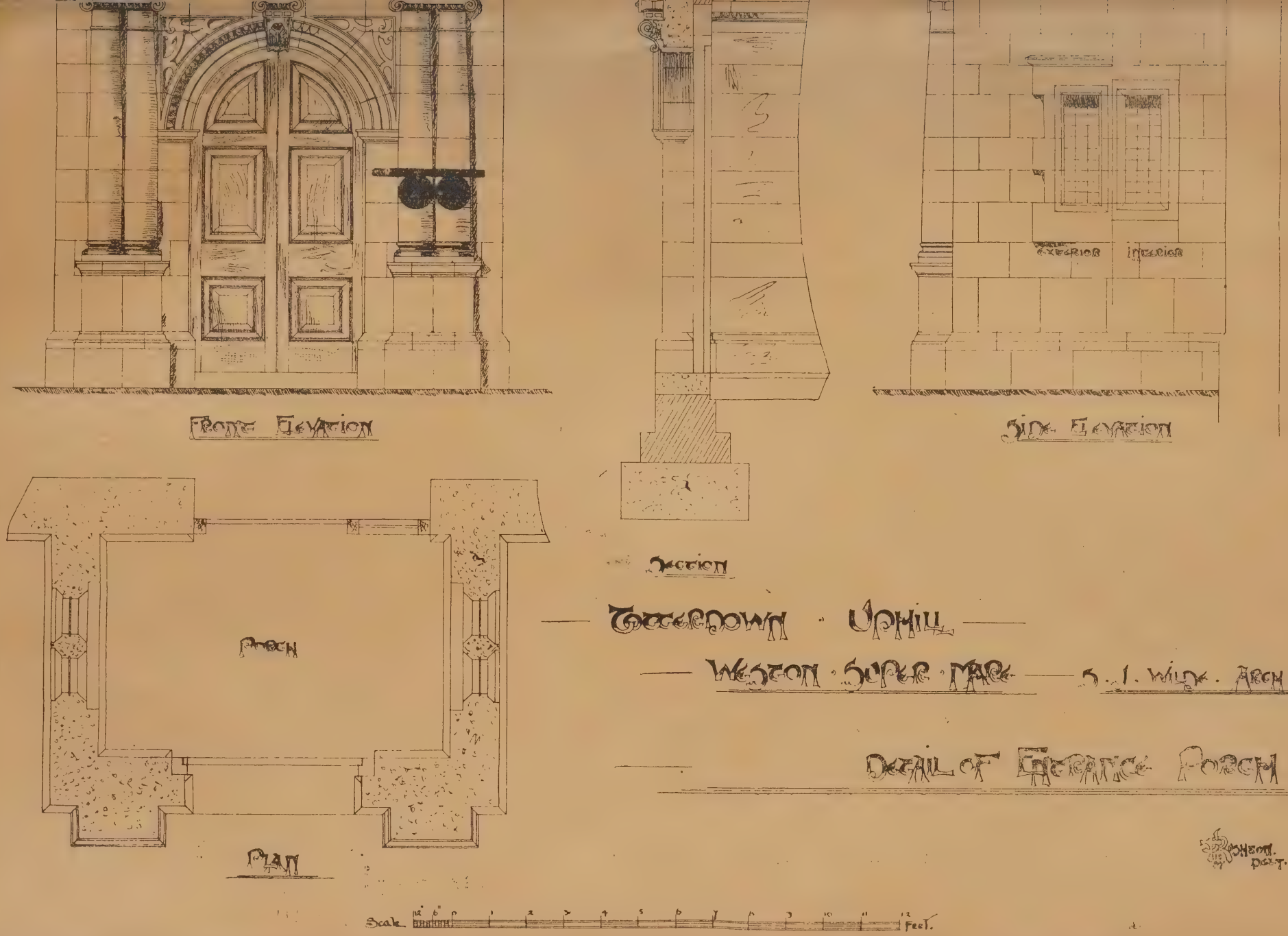
Front Elevation
Side Elevation
Exterior
Interior
Section
Porch
Plan
Totterdown · Uphill
Weston · Super · Mare
S. J. Wilde. Archt.
Detail of Entrance Porch
Scale
Feet.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

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The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and Sixpence for every eight words after. *All Situation Advertisements must be prepaid.*

NOTICE.

Bound copies of Vol. LXXII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

T. MORROW.—Better let the boy attend the classes at the People's Palace, or some other good school of science and art. Phrenology is not of much use, we fancy, as a guide to aptitude for building construction.

RECEIVED.—C. R. G.—T. K.—J. B. T.—S. A. S. P.—T. A. and Co.—M. L.

Correspondence.

POOR MORTAR.

To the Editor of the BUILDING NEWS.

SIR,—I can fully endorse the letter of Mr. H. C. Standage in your issue of the 17th inst. as to the evils of the bad mortar used by some speculating builders. At the same time, one also regrets, with "W. E. M.," that so many building men have but loose and hazy notions of the chemical phenomena connected with their business.

It is perfectly true that the chief chemical change which takes place in the setting of mortar is the absorption of carbon dioxide by the freshly-slaked lime from the atmosphere. It is also true that silicate of lime is formed by the action of calcic hydrate upon the silica of the sand contained in the mortar.

Your correspondents, however, seem to have overlooked the fact that the former reaction can, and does, only happen where the air has access to the mortar—*i.e.*, chiefly on the outer surface—and that, consequently, this cannot go on when mortar is immersed in water, or in any other position where the air cannot penetrate.

Also, respecting the latter reaction, it has been ascertained, by careful analysis of old mortar, that the silicate of lime formed by lime and sand alone is but a very small percentage of the whole bulk of mortar—in fact, so small, that its effect in hardening may be practically neglected.

The constituent which gives to our best limes their valuable qualities—viz., the clay, or hydrated silicate of alumina—seems to have been entirely lost sight of by your correspondents. All our best authorities seem to be agreed that the power which good stone limes and lias limes have of setting where the air cannot get to them is due almost entirely to the proportion of clay they contain, and that within certain well-defined limits the more clay a natural limestone contains, the more hydraulic will be the lime produced from it. When such limes are slaked after having been properly burnt, various hydrated silicates of limes begin to form, which will harden and crystallise even under water.

It appears that the hardening of the purer limes which have little or no clay in their composition is owing, to some extent, to the fact that the particles of slaked lime cling with greater tenacity to the grains of sand than to each other. A certain amount of crystallisation also takes place, which helps to harden the mass.

It need hardly be said, of course, that clay as a constituent of mortar is worse than useless, unless it has been previously mixed most intimately with the limestone, and calcined with it.

This explanation in no way affects the original question propounded by "A. H.," except that one is forced to the conclusion that the particular mortar used by those Romans, who kept it in pits for two years, could not have been made of good grey or stone lime, otherwise it must have become completely set long before the end of that period.

Being always ready to learn, I should be glad to hear a little more as to the precise nature and setting powers of the Roman mortar referred to.—I am, &c., H. BUSBRIDGE.

SIR,—The letter of "W. E. M.," in your issue for September 3, is a very pretty bit of self-advertisement of your correspondent's profound reading. When I penned the sentence, "Limestone, when burned, becomes oxide of lime (CaO), chemically called "calcic oxide," I purposely used the expression "oxide of lime" instead of "oxide of calcium," because many of my readers would not know that calcium is the metal of which lime is the oxide, and it is more casually referred to (of course, incorrectly), as "oxide of lime" by non-chemists. So that your readers should not suppose that I was writing on a subject of which I know nothing about, like so many fools who rush into print, I also gave the chemical name for the material—viz., "calcic oxide." The answer to the question at the end of your correspondent's second paragraph is that the CO_2 is imbibed by the lime, for the air, when freely exposed thereto is in a pulverulent state, and the object of putting in pits was to cause it to lose whatever amount of CO_2 it had imbibed while in transit from the quarries, and at the same time prevent any further imbibition of CO_2. Altogether, your correspondent is a trifle too hypercritical. The next time he writes I hope he will have something to say worth occupying your space with.—I am, &c.,

H. C. S.

ERRATUM.—Where "pots" appears, please read *pits* in my last letter.

SIR,—There is an error in my last letter—mine or printer's—13th line down, should read, "Will be dissolved gradually by the *water*, not "lime."—I am, &c., W. E. M.

The Baptist Chapel at Walton, near Felixstowe, which was built in 1812, had been practically unaltered until recently, when it was decided to remodel the edifice in harmony with modern requirements. A new porch and main entrance have been provided, the walls renewed, and the roof altered and slated. Internally the building has been reconstructed. The floor is new and so are the benches (replacing the ugly high pews), the pulpit, baptistry, galleries, and ceiling. Mr. Alfred Condor, F.R.I.B.A., Westminster, is the architect, under whom Mr. Robert Girling, Ipswich, has carried out the work. The reopening took place last week.

The new children's ward at the County Hospital, York, of which the Duke of Cambridge laid the foundation-stone on Thursday in last week, is to be built from plans prepared by Messrs. Demaine and Brierley, architects, of York. The buildings will be faced with red brick, with stone dressings, and will have teak floors and tiled walls, and will allow each patient 1,500 cubic feet of space. The contracts for building have been let at £3,600, as follows:—Brick and stone work, Mr. Geo. Walker, Stonegate; carpentering and joinering, Messrs. Hick and Hobson; plumbing, Mr. T. G. Hodgson; painting, Mr. John Thomas; slating, Mr. J. Hardgreaves; plastering, Messrs. Francis Hall and Son. All the tradesmen are citizens of York.

Intercommunication.

QUESTIONS.

[11794.]—**Parpoint Facing with Brick Lining.**—In the issue of this paper of August 28, of last year, page 292, in "Adaptable Specifications," I find Durford Bridge parpoint facing *with brick linings* mentioned. I would like to ask any reader if there is such a term applied to walling. I have always understood that parpoint work is composed of stones, finished and intended to be seen on both faces, and if so, why the brick lining? The courses, too, are mentioned not to be less than 3in. in height or more than 5in., so that the latter would not range with the brick courses, but make bad work. Perhaps this can be explained.—GALLATOWN.

[11795.]—**Water Supply.**—I wish to supply water to some houses from a well which is at a higher level than the houses. My idea is to siphon it out over the top of the well, which is about 20ft. deep. Will any competent correspondent kindly inform me of an easy way of charging the siphon, without the aid of a plumber, in the event of its ceasing to act? The houses are in an isolated district, and remote from plumbers or other skilled labour. Stopcocks or valves on the siphon might be used; but the one at the bottom of the well would be difficult to work, and I wish to avoid the expense of a pump to exhaust the siphon. N.B.—The well is about 100 yards from houses, and the bottom is 20ft. above the top floor.—SYPHON.

[11796.]—**Joists.**—If, instead of plastering to a concrete ceiling, wood ceiling joists are used, partly buried in the concrete, and then lathed and plastered, will the ceiling joists become rotten?—F. K.

[11797.]—**Contracts.**—I have a contract under notice, in which an error has been made in extending a provisional amount in a priced bill of quantities. The sum of 50s. (fifty shillings) was provided for unforeseen works, but the contractor extended it as £50 in the money column. Some amount of work for which the provision was inserted has been carried out, and the contractor has charged for this at contract rates, and allows only the £2 10s. provided as above. Can I claim the £50 on behalf of my client? A reply from any reader with reference to a case that has been decided on similar lines will be much esteemed.—SURVEYOR.

REPLIES.

[11790.]—**Fences.**—The ownership of a fence can generally be ascertained by the side the wooden posts are fixed, or the way the nails of the palings are driven. These are always towards the owner's side, the points of the nails being on the side of the owner. It is not so easy to determine the ownership of a brick wall, unless it is user.—G.

[11790.]—**Fences.**—In London and the South of England it is the custom to place the fence-posts upon the ground of the owner of the fence, the face of the palings being towards the adjoining owner. Consequently, the points of the nails should be towards the side of the owner of the garden.—H. BUSBRIDGE.

[11791.]—**Building By-Laws.**—The rights of building and adjoining owners are not defined in the local building by-laws, which is, perhaps, to be regretted. Party-wall is defined thus: (*a*) "A wall forming part of a building, and being used, or constructed to be used, in any part of the height or length of such wall, for separation of adjoining buildings belonging to different owners, or occupied or constructed, or adapted to be occupied, by different persons; or (*b*) a wall forming part of a building, and standing in any part of the length of such wall, to a greater extent than the projection of the footings on one side, on grounds of different owners."—ARCHITECT.

[11792.]—**Architectural Book.**—There are many books of the date mentioned treating on "elegant and useful designs." The book may be of value, if scarce. I do not know the author's position as an authority. The best plan will be for "Inigo" to take it to an old art bookseller.—A BIBLIOPHILE.

CHIPS.

The new Public Hall and Technical College at West Hartlepool were formally opened yesterday (Thursday) by Sir Philip Magnus.

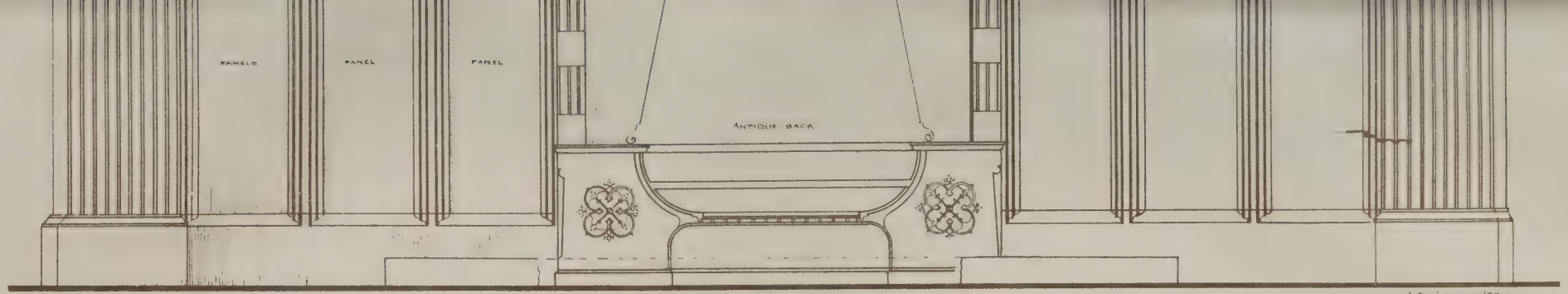
A reredos which has been erected in the St. Luke's Church, Cradley Heath, in commemoration of the Queen's Diamond Jubilee, was dedicated on Thursday in last week by the Very Rev. R. W. Forrest, Dean of Worcester. The work has been executed by Mr. H. O. Burgess, of Old Hill.

A new Calvinistic Methodist chapel is being erected at Edeyrn, South Carnarvonshire. The contractor for the chapel is Mr. G. Jones, of Morfa, and the architect Mr. R. Lloyd Jones, of Carnarvon.

At the last meeting of the Rochdale Board of Guardians a committee brought forward a proposal for the erection of cottage homes for children, and submitted plans prepared at their instructions by Messrs. Butterworth and Dunan, architects, of Rochdale, the total expense of the scheme being estimated at about £15,000. After a long discussion the scheme and report were rejected.

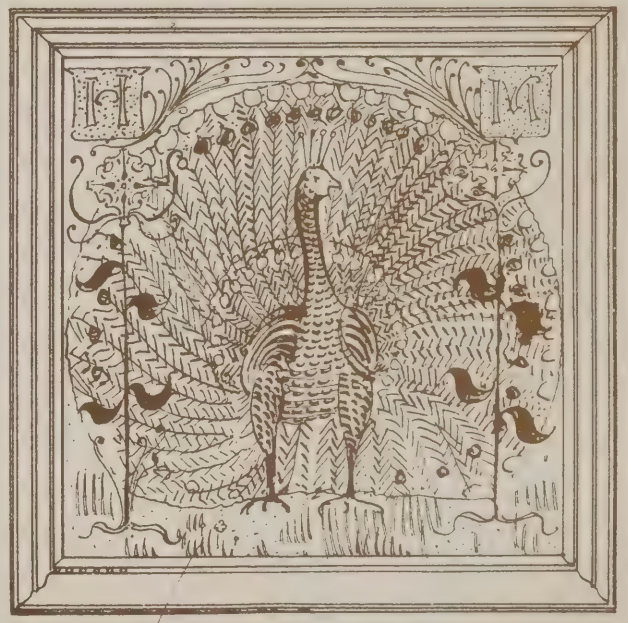
A crowded meeting of landlords and tenant-farmers of the county of Norfolk assembled in the Shire Hall, Norwich, on Saturday afternoon, for the purpose of presenting his portrait to Mr. Clare Sewell Read, who for many years in and out of Parliament has rendered valuable services to the cause of agriculture. The portrait is the work of Mr. Shannon, A.R.A., and will be permanently hung in the Castle Museum at Norwich.

THIS CORNICE IS IN WHITE ALABASTER, THE FRIEZE IS STAINED GREEN WITH WHITE PANELS, SPACES BETWEEN BRACKETS TO BE GILDED; WITH STRING ALSO
THE CENTRAL MEDALLION OF S. GEORGE IS PAINTED IN A SCHEME OF BLUE AND WHITE, MAUVE, VARIOUS GREENS, GREYS AND PURPLES
THE FRAME IS WHITE, WITH GOLD PATERAE. THE REST IS GREY VEINED ALABASTER WITH GOLD AND BLUE GESSO ORNAMENTATION
THE LARGE PANELS ARE IN DULL POLISHED ONYX, WITH WHITE FILLET, AND PALE GREEN FRAME
DULL POLISHED AND STAINED PALE RED
GESSO PANEL WITH COLOURED FIGURE ON GOLD GROUND
MANTEL SHELF
GILDED PATERAE
DULL INDIAN YELLOW
PALE RED
ARMS HERALDICALLY EMBLAZONED IN COLOURS SET IN MANTLING OF DEEP PURPLE, SEVERAL SHADES OF GREEN, CRIMSON FLOWERS AND BRILLIANT RED FRUIT
GILDED BRONZE CLOCK NOSE.
COMETHEN PUT THOU MUSIC AN D LAUGHTER
BEFORE THY FACE PUT AWAY FR OM THEE EVIL
CARES ALL, T HINK THOU ONL Y OF HAPPINESS
UNTIL THE DAY OF DEPARTURE WHEN
THOU DEPAR TEST FOR THE
LAND OF LOVING SILENCE
DEEP BLUE RIBBON WITH WHITE LETTERING
LINED WITH BLUE AND WHITE TILES
THE PANELS ARE FILLED



THE WHOLE OF THIS LOWERMOST STAGE, INCLUDING LOCK NICHE OVER, IS OF GILDED BRONZE.

THE LARGE FRIEZE IS DECORATED IN GESSO DURO COLOURED, UPON ALABASTER GROUND STAINED DULL INDIAN YELLOW



Brilliant Enamel on polished silver.

Photo Lithographed & Printed by James Akerman 6 Queen Square W

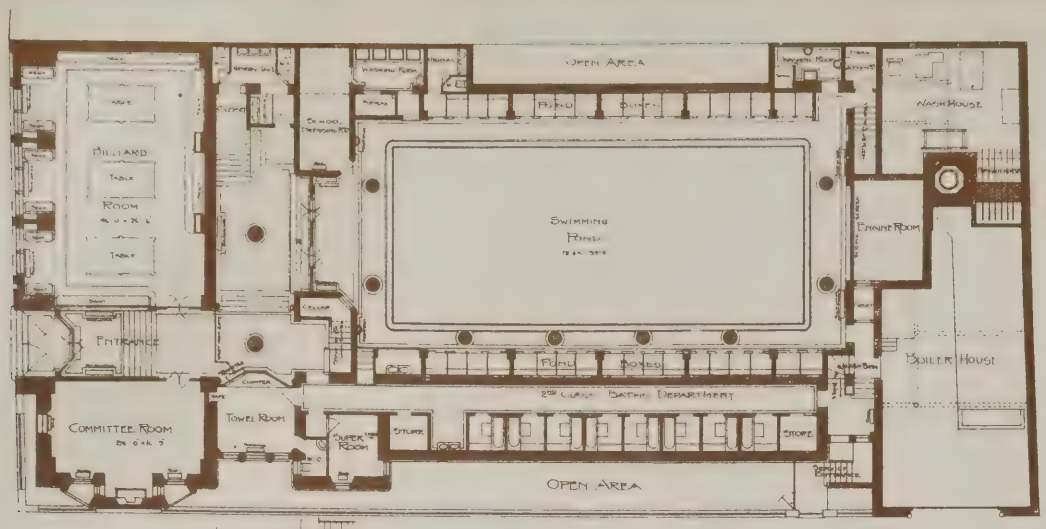
DECORATION OF A DRAWING ROOM FIREPLACE IN COLOURED GESSO DURO STAINED ALABASTER & GILDED BRONZE BY H DYMOKE WILKINSON ARCHITECT

VIEW OF THE INTERIOR.
STONEHOUSE PARISH CHURCH
LANARKSHIRE
ALEN: CULLEN ARCHT
HAMILTON & MOTHERWELL

View of the Exterior — Parish Church Stonehouse Lanarkshire — Alex Cullen & Arch.t Hamilton and Motherwell

"Photo-Tint" by James Akerman 6 Queen Square London W.C.

PUBLIC BATHS
THE GIFT OF THOMASON PASOND



· Plan of 1st Class Baths in Entresol ·

· Plan of Ground Floor ·

"Photo-Tint." by James Akerman 6 Queen Square London W.C.

"PHOTO-TINT" by James Akerman & Queen Square London W.C.

NATIONAL BOOK PRIZE · FOR VIEW · OF · A · STAIRCASE ·

BY EDWARD M. SOUTHGATE, CAMBRIDGE.

COMPETITIONS.

St. Helen's.—In a competition for new schools and mission church, to be built in connection with Eccleston Church, designs were submitted by a limited number of architects in the district, including Liverpool and Southport, and the plans of Mr. F. S. Biram have been selected. The building is to be used for day and Sunday-school purposes and as a mission church. Accommodation will be provided in the day schools for 250 children.

Stonehaven.—The designs submitted by Messrs. J. and J. A. Souttar, architects, 42, Union-street, Aberdeen, have been awarded the first place by the professional assessor in the competition for a Corporation lodging-house, and these architects have now been instructed by the commissioners to proceed with the preparation of the working plans, with a view to an early commencement of the building. The selected site is on the south side of Cowle-lane, to which the building will have a frontage of 52ft., extending 63ft. back. The front elevation shows a two-story building. The main entrance is in the centre, and leads to an entrance hall, from which, to the right, is the day-room, with scullery, superintendent's office, and shop; while to the left the superintendent's house, comprising kitchen, parlour, bedroom, and bath-room is placed. To the rear, in the main building, is a dormitory for twelve cubicles with bathroom and lavatory. The outbuildings consist of a washhouse for use of lodgers, store, coal cellars, and lavatory accommodation, with an airing yard. The staircase, which is situated in the centre of the building, commands all the dormitories. The upper floor consists of three dormitories, containing 28 cubicles, with ample lavatory accommodation, a sick-room being provided in addition. The cubicles or bed spaces are separated from each other by screen partitions, and each has a separate window.

CHIPS.

The Croydon Town Council have decided to spend £40,000 in kerbing, channelling, and paving works.

The plan of Messrs. Sharman and Archer and Brown and Fisher, of Wellingborough, joint architects for the new infirmary to be erected in that town, has been accepted. The estimate is £3,300.

The Old Mill, at the top of Shoot-up Hill, Edgware-road, Kilburn, is about to be replaced by a site of residential flats, with a return façade to Mapesbury-road. The new building, which will contain 16 self-contained suites of apartments, will be faced with red brick and stone. Messrs. F. Palgrave and Co., of Westminster, are the architects, and the outlay will be about £12,000.

The members of the Institute of Certified Carpenters recently visited St. Paul's to inspect its architect's famous dome and roof. Mr. T. M. G. Lloyd, hon. sec., conducted the visitors, explaining at certain stages the principles involved in the construction.

A new Wesleyan Methodist Chapel at Cheddar was opened on Tuesday. The chapel, which is a cruciform structure in the Early English style, is built of dressed Draycott stone, with freestone facings, and consists of a nave, north and south transepts, chancel, and gallery. The east end window is filled with stained glass (subject, "Sermon on the Mount"), while the remainder are filled with cathedral glass. The north transept is occupied by the organ and choir-stalls, while the chancel is furnished with a carved oak altar-table and chairs. The roof is an open one of pitch-pine and white woods, unvarnished. The building, which is lit throughout with the incandescent light, provides seating accommodation for 350. The pulpit is of carved pitch-pine.

Mr. Adler, architect, of London, has been engaged in making an examination of the tower of St. Mary's Church, Dover, previous to preparing plans for its restoration. The tower is in a dilapidated condition. Under the directions of the architect, Mr. W. T. Dowle, sen., builder, made an excavation some 10ft. deep, so that the foundations could be examined. These proved to be nodules of chalk. In the course of making the excavation, one of the Roman baths which were known to have existed on the spot was unearthed.

Mr. James Crocker, F.R.I.B.A., of Exeter, was on Wednesday week elected surveyor to the Exeter Benefit Building and Freehold Land Society, in succession to Mr. W. S. Croote, who has retired from practice through indifferent health. The board have passed a resolution of thanks to Mr. Croote for his past services and that of the firm for the past 30 years.

LEGAL INTELLIGENCE.

Side Steps to Communion Tables.—Lord Grimthorpe, as Chancellor of the Diocese of York, delivered judgment on Thursday in last week at the Consistory Court in that city in the case of the Rev. T. J. Miller, vicar of South Cave, who applied for a faculty to erect in that church a carved oak communion table and reredos. The application came before the Court some time ago, when the lay rector and patron of the living, Mrs. Barnard, of Cave Castle, opposed the same. The Rev. T. J. Miller was presented by Mrs. Barnard to the living in August, 1895, when, according to affidavits put in, the new vicar undertook not to adopt the eastward position nor yet to introduce a cross into the church. It was suggested that he had not kept his promise, and, with reference to the proposed faculty, Mrs. Barnard objected to the whole reredos, including a proposed cross, because it would, as alleged, partly obscure the east window, of fine old stained glass which was brought from Holland at considerable cost by one of her predecessors. The substitution of a new communion table was also objected to as unnecessary, the present table being perfectly sound and in good condition and put in by Mr. J. L. Pearson, R.A., as architect when the late lay rector restored the chancel. There was some contradiction as to the design of the proposed new communion table, and the Chancellor said the question was raised whether it was a *bonâ-fide* table at all. It was quite a mistake to imagine that the decisions against stone tables sanctioned a sham one made of wood. Mr. Prideaux, Q.C., in his "Churchwarden's Guide," doubted their legality. And the Court of Arches in "Bradford v. Fry," which had never been overruled, disallowed steps round the north and south side of a communion table, on the very ground that they made it look like an altar. He himself had always followed that judgment, and meant to do so until it was overruled, and not merely disregarded by some inferior Court, or by architects and clergymen unlawfully. The Chancellor severely commented on the conduct of the vicar. He refused the faculty, and condemned the promoter, Mr. Miller, in the costs.

What is a Building?—At the Ilfracombe Petty Sessions, on Friday, Albert Edward Copeland was summoned by the urban district council for having erected a building without depositing plans. Mr. Seldon, for the council, said Mr. Copeland had erected a building, known as the Harmonic Retreat, opposite the Victoria Pavilion, without sending in any notice or plans to the council. The building was of wood and canvas. There was a stage, upon which during the season performances had been given. By the sides of the stage were two boxes used as dressing-rooms. The council, in the interests of the ratepayers, asked for a penalty. Mr. Seldon quoted several cases bearing out his contention that the Harmonic Retreat was a building within the meaning of the Act. Mr. Brede (clerk to the council) and Mr. Prouse (surveyor) having given evidence, Mr. Ffinch asked the bench to inspect the place. He argued that it was not a building within the meaning of the Act, but simply a marquee, which could be removed in two hours. That at once showed its temporary character. The council only had power over permanent buildings, as to their stability, air space, prevention of fire, and those with roofs and chimneys, showing they were meant for occupation. There was none of that in connection with the Harmonic Retreat. The Bench, having viewed the spot, were of opinion by a majority that the Harmonic Retreat was not a building within the meaning of the Act, and therefore dismissed the summons.

Arbitration Award at Idle, Leeds.—Mr. John Hepper, of the firm of Messrs. Hepper and Sons, Leeds, auctioneers, has made his award as to the sum to be paid by the Idle Urban District Council to the Misses Crompton-Stansfield, of Esholt Hall, for the land adjoining the river Aire at Buck Mill, Thackley, which has been taken by the district council for the purpose of their sewage disposal works. The total area of the land to be acquired by the council is 14a. 24p.—12a. 2r. 16p. of land and 1a. 2r. 8p. of river-bed and goit. The amount claimed by the Misses Stansfield in their notice of claim was £4,000; but when before the arbitrators at Leeds, in July last, this claim was reduced by them to £3,542 10s., being £200 per acre for the land, and £100 per acre for half the river-bed and goit, plus 10 per cent. for compulsory purchase, and £600 for the consequential damages caused by the severance of this part of the estate from that adjoining. It was urged on behalf of the council at the arbitration that the price to be paid by them should not exceed £1,100. Mr. Hepper has awarded the Misses Stansfield £1,906, being £1,636 10s. less than the reduced sum claimed by them, and £806 more than the price contended for by the council.

In re C. W. King, of Newcastle-on-Tyne.—At the Newcastle Bankruptcy Court, last week, Chas. William King, contractor, came up for his first examination. Debtor's liabilities amounted to £3,403, and his assets were £5,042 8s. 8d. The debtor, a native of London, said he went to Darlington in 1872. Until 1879 he was inspector of various public works. In 1879 he started building on his own account. The whole period of his active building covered four years from 1879 to 1883. He built houses at Gateshead, the Vegetable Market in Newcastle, the Corporation stables, the Sanatorium on the Quay, and new streets. From the result of these works he put £12,000 by in cash and unencumbered property. In 1883 he realised his property, retired, and went to live at Cheltenham. He lived on the rents coming from his houses; his income was from £300 to £400 a year. In 1894 he returned to Newcastle, the reason being that his sons were growing up, and one wanted to enter into business at Newcastle. His capital during the time he had been away from Newcastle had diminished. Practically his first loss was due to his having made himself responsible for the carrying out of a contract entered into by his old manager. He lost money on the transaction, amounting to between £2,000 to £3,000. He estimated the gross value of the property he had mortgaged at £8,700. The last important contract he had was the building of a board school in Newcastle. Prior to that he had the Gallowgate Baths, over which he lost something like £3,000. That was due to delays and the bad weather. He thought the contract price was a reasonable one. The school board price was £12,400, and the contract that was afterwards accepted was £2,000 more; but there were two good men below debtor in price, although debtor's was accepted. The examination was adjourned for a week.

In re E. S. Gunn, Harwich.—At the Colchester Bankruptcy-court on Sept. 20th, Edwin Stephen Gunn, builder and contractor, residing and carrying on business at Fernlea-road, Harwich, came up for his public examination. The summary of the debtor's statement of affairs shows gross liabilities to the amount of £1,240 7s. 9d., of which £909 9s. 9d. is expected to rank as dividend, and there is a deficiency of £378 7s. 11d. The Official Receiver's observations are to the effect that debtor about 15 years ago executed a deed of assignment. The debtor asserted that he supposed he must have done work with inadequate profit, but he was not scholar enough to keep such books as were necessary to ascertain the profit and loss on various jobs. As far as the Official Receiver was able to judge, this appeared to be a case in which failure was due mainly to debtor's neglect to have his books posted up frequently. The Registrar declared the examination closed.

Hewing Stone in the Streets.—George Conabeer was summoned to the Guildhall police-court on Tuesday for hewing stone in Wood-street. The evidence of two constables showed that defendant chipped flag-stones on the pavement, and some chips, similar to those produced, flew about to the danger of the public, as defendant had not the screens up that his employers had provided him with. Mr. Vickery, solicitor, appeared for Messrs. Mowlem, the defendant's employers, and urged that, as contractors for the pavement repairs in the City, they were bound to do this work when notified of defects. All unnecessary chipping was avoided, and everything possible was done so as not to inconvenience the public. The City Police Act, under which defendant was summoned, did not say anything about screens. On this occasion screens had been provided, but had been taken down so that pedestrians could pass. Mr. Alderman Halse said Messrs. Mowlem did almost all they could to prevent accidents, but in this case their men had not kept the screens up they were provided with, and defendant would be fined 5s. and costs.

A technical school is about to be erected for the Llanberis School Board, from plans by Mr. R. G. Thomas, M.S.A., of Menai Bridge. The contractors are Messrs. E. Thorpe and Son, of Llandudno, whose tender, the lowest sent in, has been accepted at £2,617.

With regard to the proposed new lock below Putney, the combined committee representing the districts of Hammersmith, Fulham, Chiswick, Brentford, and Isleworth, on the Middlesex side of the river, and Putney, Barnes, and Mortlake on the Surrey side, are now considering a report which has been submitted to them by Mr. Pritchard, C.E., who says that the best position for the proposed sluices is a point by the river on the Middlesex shore from the Broomhouse, Dock-lane, to land directly opposite on the Wandsworth side, and about five miles below Putney Bridge. The cost of the works is approximately estimated at £250,000, and four years would be occupied in the construction. The combined committee have also received an independent report from Messrs. Stevenson and Burstal, engineers, Burstall, who recommend the erection of a lock and half-tide weir, either from Broomhouse Dock to the Osier Beds a little above the Wandle outlet, or, alternatively and preferably, just below the Wandle outlet. They add that, having consulted Messrs. Ransomes and Rapier, of Ipswich, who constructed the Richmond sluice, they estimate the cost at £180,000.

WATER SUPPLY AND SANITARY MATTERS.

Carlisle Water-Supply.—The present water-supply of Carlisle has, by a high authority, been practically condemned. At present the water is taken from the river Eden, near the town, and pumped into a reservoir at Harraby Hill, whence it gravitates to the houses. Three proposed schemes have been proposed by the Water Committee are three in number. One is a scheme to obtain a supply by gravitation from the river Gelt, about eleven miles from the city, which would yield 2½ million gallons daily, at a cost of £129,320. The second is a pumping scheme, by which the water would be pumped from the river Eden near Cotehouse Island, about ten miles above the present intake, at a cost of £90,599, if a daily supply of 2½ gallons were taken, or of £65,989 if a supply of one million 650,000 gallons a day were deemed sufficient. The third scheme contemplated the extension and improvement of the existing works to yield a daily supply of one million 650,000 gallons at a cost of £38,679. Mr. Eaton, C.E., Sheffield and Westminster, was called in to report, and he recommended the adoption of the scheme for the supply of water by gravitation from Geltsdale, which he estimated could be carried out for the sum of £120,000.

Clubbiedean Reservoir.—This reservoir of the Edinburgh and District Water Trust, in the Pentland Hills, is at present empty. It is in the hands of Messrs. Young, contractors, undergoing repairs. There has been a leak through the embankment for several years, and though not of an alarming nature, it was recently decided to find out the cause of it, and make the embankment watertight before the good weather ended. In digging down where the water appeared at the tail of the embankment, it was found that the ground was of a very loose, rocky nature, with numerous fissues in the rock, and it was through these cracks that the water was making its way below the puddle wall. What will now be done will be to cut deeper than the old foundation of the puddle trench, and fill up the fissures with concrete and clay—a good supply of the latter material being found near the reservoir.

Heath Town, Wolverhampton.—The formal opening of the new works in connection with Heath Town sewerage scheme took place on Saturday afternoon. The sewage is conveyed five miles from the district, and is there treated. The contract for the works is in the hands of Mr. H. Holloway, of Wolverhampton, whose tender amounted to between £11,000 and £12,000. Mr. R. E. W. Berrington, of Wolverhampton, is the engineer.

Maidstone.—The outbreak of typhoid fever at Maidstone has assumed alarming proportions, the total number of cases exceeding a thousand, and so far there have been over thirty deaths. Such a widespread onset of the disease could have only one origin—namely, polluted water—and the borough authorities have accordingly turned their attention to the water supply, which is furnished by a private company. They have found that one of the springs at Tutsham, near Farleigh, was surrounded by land which had been poisoned by refuse, and the supply from that source will forthwith be stopped. It is stated that the town council only has the water supply tested once a quarter, and that the Water Company themselves not only have no periodic analysis of their supply, but have actually discontinued the use of their filters at Farleigh as an unnecessary expense. An inquiry into the causes of the epidemic was commenced by Dr. Theodore Thomson, from the Medical Department of the Local Government Board, on Wednesday.

Manchester.—A meeting of owners and ratepayers of Manchester convened under the provisions of the Borough Funds Act was held on Friday evening in the Manchester Town Hall for the purpose of consenting or otherwise to the scheme of the Rivers Committee for dealing with the sewage effluent by conveying it, by means of a culvert, into the Mersey. The Lord Mayor presided, and submitted a formal resolution giving consent to the scheme, and authorising the corporation to take the steps necessary for carrying it into effect. Mr. Alderman Thompson, chairman of the Rivers Committee, seconded the motion, and explained the position of the committee in the matter. Dr. Pankhurst and other speakers opposed the motion on the ground that the present system of purifying the effluent had not had a fair trial, and on a vote being taken, the motion was defeated by a large majority. The Lord Mayor and other members of the city council demanded a poll, which, it is understood, will be taken as early as possible.

An interesting ceremony in connection with the ancient grammar school at Ludlow took place on Tuesday week, when the building was formally reopened after being renovated and enlarged at a cost of about £1,500. The work was carried out by Mr. J. Thompson, of Peterborough. The school now affords accommodation for a larger number of boys than hitherto.

Our Office Table.

Newcastle-on-Tyne is one of the few large cities which hitherto has possessed no art gallery, but a committee of the corporation have just unanimously adopted a report, which, if agreed to by the council, will remove that defect. The proposal, originated by Mr. Harkus, is to utilise as a gallery the upper floor of the building already in existence in Elswick Park, the lower portion of which contains the Lough collection of sculpture. The rooms are well lighted, and would provide a space of from 65ft. by 35ft. The only objection to the scheme is that the site is a considerable distance from the centre of the city. Already promises have been made by several well-known local gentlemen to present the committee with a number of valuable pictures for the benefit of the public, and no doubt a liberal response will be made by others to an appeal for further aid in this particular direction. A report will be presented to the city council at its next meeting to carry the proposal into effect.

The final meeting of the shareholders of the Tower Subway Company was held on Thursday in last week, at 21, Great George-street, Westminster. The company was formed in 1868, and, in addition to the ordinary capital of £12,000, the sum of £7,830 was raised by preference shares and £6,600 borrowed on mortgage debentures. The Tower Bridge having injuriously affected the tolls of the company, the Corporation was called upon to pay compensation. This was fixed by the arbitrator at £11,500. The mortgage debentures and other debts have now been paid, and the subway sold to the London Hydraulic Power Company for £3,000. The object of the meeting was to distribute the money in hand to the shareholders. The balance in hand was stated to be £5,927 0s. 6d., and the directors recommended the distribution of £5,250, being at the rate of 5s. 3d. in the pound. The directors were also rewarded £100 each for their trouble in fighting the case with the City and effecting the sale.

The annual statement of the Dean of Guild for Glasgow, which has just been published, shows that the past year has been one of great activity in the building trade in that city—the busiest, indeed, since 1875-76. In two-roomed houses particularly there has been an exceptional boom, over 2,750 tenements of these having been put up in twelve months. Probably the most impressive fact in Dean of Guild Graham's statement is that the value of the buildings authorised during the year was £1,851,005—an increase of no less than £560,000 over last year, and £830,000 more than the average of the last ten years. Glasgow seems, indeed, to be on the crest of a wave of building speculation somewhat similar to that of 1872-77, which was succeeded by a depression that found its lowest point in 1881.

In June last Sir Benjamin Stone, M.P., inaugurated a movement for the collection and preservation of photographic records of all objects and scenes of interest in the British Isles. The idea was to follow the example set by Birmingham, and to establish a National Photographic Record Association. A committee was appointed to prepare rules and by-laws, and generally to arrange the constitution of the association. A meeting of the executive was held on Wednesday afternoon in the rooms of the National Photographic Association, 12, Hanover-square, when Sir Benjamin Stone, M.P., who took the chair, explained the objects of the society. He said that their intention was to deposit the photographs, with explanatory notes, in the British Museum, where they would be accessible to the public under proper regulations. The society was practically launched. He moved a resolution to the effect that application be made through the proper channel for the permission of Her Majesty to allow her name to appear as the patron of the association. This was seconded by Sir E. Maunde Thompson and carried unanimously. The rules having been approved, on the proposition of Mr. Ralph Nevile, F.S.A., F.R.I.B.A., seconded by Mr. C. E. Fagan, Sir Benjamin Stone was elected first president of the society, and a council was appointed. The meeting expressed its desire to work in harmony with provincial societies, to whom they would be willing to loan selections of photographs. A series of 100 photographs taken by the president in the Houses of Parliament was accepted as a neucleus of a collection.

In connection with the Church Congress, now being held at Nottingham, the 19th annual Ecclesiastical and Educational Art Exhibition was opened on Monday night by the Mayor (Mr. Alderman Fraser). The exhibition is held in a wooden building, erected for the purpose on a plot of ground adjoining the Guildhall, and which had been placed at the disposal of the executive by the Corporation. As on previous occasions, the exhibition is divided into two sections—the trade or general division and the loan collection. In the trade division are examples of the manufactures of the leading ecclesiastical and educational firms from all parts of the country, and the loan collection includes more than 400 exhibits, including chalices, in which the exhibition is very rich, reliquaries, embroidery, patens, medals, seals, manuscripts, and early books and engravings. The Bishop of the Diocese leads with his pastoral staff and cope. The Southwell Cathedral plate is also on exhibition, and the Corporation of Nottingham have lent their regalia and plate.

Apropos of the discussion which has arisen in Dublin concerning the importation from England of a peal of bells for St. Patrick's Cathedral in that city, Mr. R. M. Butler, M.R.I.A., a Dublin architect, writes that the custom of calling in English architects to design buildings in Ireland, to the detriment of Irish practitioners, prevails to a surprising extent. At the present time, he points out, the following works are now in progress under English architects:—Messrs. Power and Son's distillery (Mr. W. D. Caröe, architect to the Ecclesiastical Commissioners, London); Mr. John Jameson—residence at Howth (Mr. Darbyshire, Manchester); Lord Carysfort—church at Arklow, cost over £25,000 (Sir A. W. Blomfield, London); Lord Iveagh—residence, Farmleigh, Castleknock, and St. Stephen's Green (Mr. Wm. Young, London); new hotel, Sackville-street (English architect); Kilkenny Cathedral (Sir A. W. Blomfield, London).

At the annual meeting of the Cumberland and Westmoreland Antiquarian and Archæological Society, held at Penrith on Friday, Chancellor Ferguson gave an account of the work done at Furness Abbey during September, under the superintendence of himself and Mr. W. H. St. John Hope. The foundations of the buildings round the cloister garth had been uncovered, and carefully planned and measured, and it became apparent that the refectory or frater had been pulled down, and two new ones erected side by side. This was done to evade the statute, which directed that Cistercians were not to eat meat in the frater. So they built two. In one, the "lean frater," they had no meat, but on three days in the week they dined on meat in the "fat frater." The kitchens and other domestic offices were also examined and measured. A discovery was made about the church—that the Cistercians rebuilt it at an early date, using the old ashlar work over again; hence stones with mason marks of the Norman time were found in Perpendicular work. This should, Mr. Ferguson thought, be a caution to archæologists not to be too confident in dating a building by the mason marks on it, nor in speculating about families of masons with hereditary mason marks. Some unknown rooms were discovered at the abbey, but more work has still to be done.

In our account of the Theatre-planning and Construction Section of the Victorian Era Exhibition, Earl's Court, last week, we referred to a model fire-resisting curtain, shown by the United Asbestos Company, Limited, as being Messrs. Clarke's patent, and constructed by Messrs. Clark, Bunnett, and Co. for the Lyric Theatre. This was rather a stupid mistake. The curtain was an invention of Mr. E. Bull, architect, of Manchester, and Mr. J. Alfred Fisher, the manager of the United Asbestos Company, Limited. The curtain stood a practical test of fire successfully in the Queen's Theatre, Manchester, on August 17, 1890, when, although the whole of the auditorium was destroyed, the stage and properties thereon were preserved intact.

Mr. A. M. Kinnison, assistant surveyor of main roads for the Leek District of the Staffs C.C., has been appointed surveyor to the Leek Rural District Council out of a large number of applicants.

At the last meeting of the Urban District Council of Rushden (Northants) Mr. W. B. Madin, C.E., who for the past eight years has held the office of assistant town surveyor and water engineer of Leek, was appointed surveyor out of a large number of applicants.

MEETINGS FOR THE ENSUING WEEK.

Monday.—Society of Engineers. "Filter Presses for Sewage and Sludge," by James Croll. Royal United Service Institution. 7.30p.m. Liverpool Architectural Society. Opening Address by the President, W. E. Willink, M.A., A.R.I.B.A. 6 p.m.

Wednesday.—Edinburgh Architectural Society. President's Address. Dowell's Rooms, George-street, Edinburgh. 8 p.m.

Friday.—The Architectural Association. Inaugural Address and Distribution of Prizes by Hampden W. Pratt, F.R.I.B.A., President. 7.30 p.m.

THE ARCHITECTURAL ASSOCIATION.
OCTOBER 8th, ANNUAL GENERAL MEETING, 9, Conduit-street, W., 7.30 p.m. Distribution of Prizes. Address by the President. Mr. HAMPDEN W. PRATT. Exhibition of Prize Drawings and Students' Work.

E. HOWLEY SIM, G. B. CARVILL, } Hon. Secs.

THE SURVEYORS' INSTITUTION
(Incorporated by Royal Charter).
Temporary Address—
SAVOY STREET, VICTORIA EMBANKMENT, W.C.

EXAMINATIONS, 1898.

PRELIMINARY EXAMINATION.
Notice is given that the Preliminary Examination for the admission of Students will be held on the 19th and 20th of JANUARY NEXT.
It is proposed to examine Candidates from the counties of Lancashire, Cheshire, Yorkshire, Durham, Cumberland, Westmoreland, and Northumberland, at Manchester. Candidates from other counties in England and Wales will be examined in London.
Irish Candidates will be examined in Dublin.

PROFESSIONAL EXAMINATIONS.
Notice is also given that the Annual Professional Examinations for Land Agents, Valuers, and Building Surveyors (held under the provisions of the Charter), qualifying for the Fellowship and Associateship of the Institution, will commence on the 21st of MARCH NEXT.
English Candidates for the Professional Examinations will be examined in London.
Irish Candidates will be examined in Dublin.
Particulars as to subjects, course of examination, prizes, scholarships can be obtained of the Secretary.
All applications for the Professional Examinations, Divs. II., III., IV., and V., must be sent in before the 31st of OCTOBER, and applications for the Students' Preliminary Examination before the 30th of NOVEMBER. The necessary Entry Forms for the various Examinations can be obtained of the Secretary.

Sir Philip Magnus will, on Monday evening next, distribute the prizes and certificates to the students of the plumbing trade classes at the Polytechnic, Regent-street.

The President of the Board of Trade, when laying the foundation-stone of the Passmore Edwards Public Library, St. George's in the East, on Wednesday, referred to the progress made in recent years in providing the East-end with institutions for the instruction and recreation of the people, and said that, out of the eighty parishes into which London is divided, from fifty to sixty had adopted the Public Libraries Act. The library, which has been built from designs by Mr. Maurice B. Adams, F.R.I.B.A., was illustrated in our last issue.

Colonel W. L. Coke, M.Inst.C.E., one of the Local Government Board Inspectors, held an inquiry at Leicester, on Tuesday, into an application of the town council to borrow £30,200 for a new public park, £33,719 for the extension of its electric lighting plant, and £1,200 for a branch free library.

The Dean and Chapter of St. Paul's Cathedral have selected a position in the central nave, near the north-west quarter-arch of the dome, which is now being prepared for the reception of the noble picture of "Time, Death, and Judgment," the generous gift of the artist, Mr. G. F. Watts, R.A.

The Leith Corporation on Tuesday elected Mr. W. A. Bryson, consulting engineer of Glasgow, as electrical engineer, at a salary of £300 a year. There were 22 candidates for the appointment.

At Wednesday's meeting of the Halifax Chamber of Commerce, the President announced that the Midland Railway Company would next Session proceed for a Bill to connect their line with Huddersfield and Halifax, but would not at present go further north.

The Canadian Government is inviting artists to send competitive models of a Jubilee statue of the Queen, to be erected on the Parliament terrace at Ottawa, and also of a statue of Alexander Mackenzie, the first Liberal Premier of the Dominion.

The Duke of Devonshire will lay the foundation-stone of the Jubilee Memorial Chapel, in connection with Giggleswick School, Yorkshire, on Thursday in next week.

At the quarterly meeting of the Court of the Worshipful Company of Plumbers, held at the Guildhall on Wednesday, Alderman Richard Hind was sworn into the office of Master, Mr. Frederick Machin to that of Warden, and Mr. Charles Hudson to that of Renter Warden for the ensuing year.

An agreement has been made between the Great Western Railway, the London County Council, and the Paddington Vestry as to the arrangements for reconstructing and widening, at a cost of £17,000, the railway bridge and the approaches at Westbourne Park. The thoroughfare is to be 50ft. wide between the pavements.

Trade News.

WAGES MOVEMENTS.

East Lancashire Masons' and Plasterers' Strike.—An important correspondence has been passing between the masters and workmen in order to bring about a settlement of this strike, which has been going on since May. An offer of arbitration on the part of the masters has been repudiated by the men, who demand an advance of from 8d. to 9d. per hour.

Leeds.—Three months ago the plasterers' labourers employed in Leeds gave notice of their intention to demand an advance of ½d. per hour on the present rate of wages, making it 7d. per hour. A deputation from the men had an interview last week with the masters, who offered ½d. advance. This the men declined. The masters have conceded 7d., and the advanced rate came into force on Saturday last. Considering the contracts in hand, some extending over more than two years, the masters urged the shortness of the notice; but, as stated, they had to yield.

Nelson, Lancs.—On Saturday all the operative plumbers in Nelson came out on strike, consequent upon the masters refusing to grant an advance of from 8d. to 9d. per hour, in pursuance of notice served six months ago, which terminated on Friday evening.

CHIPS.

In the York Consistory Court, held in the Minster on Thursday in last week, before the Rev. W. Haworth, acting as Surrogate, faculties were decreed to vicars and churchwardens as under:—Levisham, to extend the clergy and choir vestries, and to make other alterations; Swinton, to rebuild the church, which was destroyed by fire on the 24th of March, 1897; Sherburn-in-Elmet, to affix two additional bells in the tower; Carlton, to fix a clock over the porch; Bramham, to insert a stained-glass window in the church, in memory of the late Mr. George Lane Fox.

Henry Pumphrey, foreman at Whitley Brick-works, near Tynemouth, was cleaning some machinery on Thursday in last week when his neckerchief, which was tied in a slip knot, caught in the cog-wheels, and the noose was tightened so quickly that he was strangled before any assistance could be rendered.

The poll decided on by a majority of eight to six at the last meeting of the town council of Launceston on the question of the site for Mr. J. Passmore Edwards' generous gift took place on Wednesday at the Guildhall. At 8.30 the mayor declared the result of the poll to be as follows:—For Westgate, 111; for Northgate, 369—majority for Northgate site, 258.

The fire at Ravenstone, Bucks, although a bad one, was not so calamitous as was at first reported. It resulted in the destruction of seven cottages, one house slightly larger, and several farm buildings. The number of persons burnt out of their homes was only 26, and, as several houses in the village are unoccupied, there was little difficulty in finding accommodation for them all. The damage to houses, furniture, barns, and farm produce can scarcely be as much as £1,200, about half of which is covered by insurance.

A special meeting of the town council will be held on Tuesday next, to consider a report presented by the Docks Committee, embodying plans and estimates for the proposed new docks, and other works at Avonmouth. The estimated cost of the works proposed is about £1,550,000. It is proposed to construct a new dock of over forty acres in extent, giving upwards of 5,000ft. of quay space, with an exceptionally wide entrance lock. Then there is to be a large graving dock, granary and shedding will have to be erected, and the works will also include a landing stage, with railway connections with both docks.

In February, 1896, the Church of St. Paul, which Sir Charles Seeley has built for the new parish of Daybrook, was consecrated by the Bishop of Southwell. Since then, however, important additions have been made, notably a tower and spire, 150ft. in height, and an octave of bells. The temporary font and pulpit have also been replaced by others in harmony with the beauty of the church. On Saturday week the new font, pulpit, and bells were dedicated by the Bishop of Derby. The font is of white Mansfield stone with marble shafts. The basin, heptagonal in shape, is carved and traceried. At the angles are a series of canopied figures representing Truth, Faith, Hope, Charity, Courage, Industry, and Purity. Both in regard to the material used and the style of workmanship the pulpit corresponds with the font. The panels contain carved groups depicting the Saviour, St. Paul, and John the Baptist preaching. The canopied figures at the angles are St. James, St. John, St. Peter, and St. Paul.

A meeting was held on Friday of the sub-committee of the Lord Provost's Committee of the Edinburgh Town Council appointed "to consider and report as to the completion of the North Bridge-street improvement scheme, and whether the scheduled area should be exposed for sale in one lot, or in lots of convenient size, or if, under the circumstances, it is expedient for the corporation to undertake the rebuilding of that area in whole or part; also to report if any alterations are necessary on the plans approved by the magistrates and council." Opinion was sharply divided as between the council undertaking the rebuilding of the street—a course which was advocated by the treasurer—and the proposal to put the area up for sale in blocks, which was advocated by the Lord Provost. Nothing was decided, and the meeting was adjourned.

On Wednesday week the foundation-stones of new hand-made paper mills at Bersham, near Wrexham, were laid by Mrs. Kenyon. The mill is to cost about £4,000, exclusive of machinery.

At the board-room of the Foleshill Workhouse, on Friday, Dr. R. J. Reece, Local Government Board Inspector, held an inquiry into the proposal by the Foleshill Rural District Council to borrow £5,790 for the purchase of land and the erection of an infectious hospital for the Union. Mr. T. F. Tickner, architect, produced the plans of the proposed building, the site of which is in Church-lane, Little Heath, between the canal-bridge and the church. The hospital would be divided into an administration block, isolation block, ward block, and laundry block; and the building would be three stories high. There would be 18 beds, but accommodation could, on emergency, be provided for 20 or 24 cases at one time, and for three different kinds of diseases in patients of both sexes.

The announcements of dissolutions of partnerships in Friday's *Gazette* include L. Lewis and T. D. Williams, builders' merchants, Liverpool and Liscard, under the style of Lewis, Williams, and Co.; S. W. S. Saunders and C. D. Newton, road, sewer, and general contractors, Bournemouth and Southampton, under the style of W. H. Saunders and Co.; and E. J. Harland and J. D. W. Ashton, brick merchants, Bexley, under the style of Harland and Ashton.

After a general debate lasting three days, the Swiss National Council adopted on Friday by one hundred and twelve votes against twenty-one, the preamble of the Bill for the purchase of the railways by the State.

On Friday afternoon, while William Hillman, 20 years of age, a joiner, was fixing a bracket on the grand stand at New Brighton Tower Grounds, the scaffold upon which he was standing gave way, owing to the force of the wind, and he fell to the ground, a distance of 60ft. The unfortunate man was killed on the spot. This is the seventh death in connection with the works.

The life-size marble statue of the late Judge Thomas Hughes, which is to be erected at Rugby by old Rugbeians and others, has been intrusted for execution to Mr. T. Brock, R.A., who will carry out the work forthwith. Towards this object over £1,200 has been subscribed, and any further donations that may be received will be devoted to the Boys' Clubs which have been established both in London and Birmingham in connection with the Rugby School Mission.

A fire broke out early on Saturday morning in the saw mill of Messrs. Astell Brothers, who have an extensive wood-yard at a spot near where the Midland and London and North-Western lines cross at Bedford. The place was completely burned out, and several valuable machines were destroyed, while the engine was damaged and the large fly-wheel was cracked.

Mr. Herbert Ford, F.R.I.B.A., of 21, Aldermanbury, has taken into partnership Mr. H. L. Ford (his son) and Mr. W. J. Burrows (his chief assistant). The firm will trade as Ford, Son, and Burrows.

The Lachine rapids, near Montreal, have been successfully utilised for the production of electricity by a company of local capitalists. The formal opening of the new works took place on Saturday. From 20,000 to 25,000 horse-power is procured at a cost of nearly 2,000,000dols., and furnishes electricity for lighting and motive purposes to Montreal and the adjacent municipalities.

The foundation-stones of a new Wesleyan chapel and Sunday-school were laid at Castleton, Derbyshire, on Friday. The cost will be about £1,500.

Colonel A. G. Durnford, R.E., an Inspector of the Local Government Board, attended in the council chamber, Town Hall, Ipswich, on Thursday in last week, to hold an inquiry in reference to an application by the town council, as local sanitary authority, for permission to borrow £4,600 for completing the works of sewerage, in accordance with plans prepared by the borough surveyor (Mr. E. Buckham), who gave evidence as to the scheme.

LIST OF COMPETITIONS OPEN.

Leeds—Wholesale Dead Meat Market and Abattoir	£100 (merged), £50, £25	John Harrison, Town Clerk, Municipal Buildings, Leeds	Oct.	8
Dorking—Workhouse Infirmary (65 beds, £4,000 limit)	(No first) £15, £5	Geo. Scales, Clerk, High-street Dorking	,,	13
Pickering & Kirbymoorside—Gravitation Water-Supply Scheme	No Premium	Robert Kitching, Clerk to Pickering R.D.C., Pickering	,,	16
Colne—Technical School, Free Library, and Public Hall (£5,500 limit)	£50, £35	Alfred Varley, Town Clerk, Town Hall, Colne, Lancs	,,	20
Wolverhampton—Free Library (selected Architects)		The Town Clerk, Wolverhampton	,,	28
Eastcote and Northwood, near Ruislip—Sewerage Scheme	£10 for Combined Scheme, £15 for Eastcote, and £25 for Northwood.	C. Woodbridge, Clerk, R.D.C., 33, High-street, Uxbridge	,,	30
Southend—St. Alban's District Church	No premium offered; no Assessor named	Rev. E. C. Kimber, Avenue-terrace, Southend-on-Sea	Nov.	20
Mexico—Legislature Palace (1,500,000dol. limit)	15,000dol. Max.	Secretary Public Works, Mexico City	,,	30
Cardiff—Town Hall and Law Courts (A. Waterhouse, R.A., Assessor—£200,000 limit)	£500 (merged), £300, £200	J. L. Wheatley, Town Clerk, Town Hall, Cardiff	Dec.	4
Nottingham—Laying-out and Planting Basford New Cemetery	£100, £50	Samuel G. Johnson, Town Clerk, Nottingham	,,	15
Nottingham—Designs for Basford Cemetery Buildings: Chapels, Crematorium, Lodges, &c.	£100, £50	Samuel G. Johnson, Town Clerk, Nottingham	,,	15
Carlton, Victoria—Children's Hospital	£100, £50, £25	J. Nicholson, Hon. Sec., Pelham-street, Carlton, Australia	(1898) Jan.	30
New York—Sun Dial (Plaster Model)	500dol., 250dol.	Sec. National Sculpture Soc., 215, West 57th-street, New York	(1898) Feb.	28
Newcastle-on-Tyne—New Infirmary (local Architects)	(No first) £150, £100, £50	Secretary, Building Committee, Newcastle	(1898) Mar.	1
Brighton—Artisans' Dwellings (local Architects only)	£75, £25	F. J. Tillstone, Town Clerk, Brighton	—	
Lewisham—Free Library (£4,000 limit)	25gs.	Edward H. Oxenham, Clerk, Town Hall, Catford, S.E.	—	
Boscombe—Hospital Enlargement, Shelley-road		J. Pratt, Assistant Sec., 126, Christchurch-road, Boscombe	—	
Carlisle—Board School (530 places)	£20, £10	S. Cartmell, Clerk, 27, Lowther-street, Carlisle	—	
Tottenham—School Board Offices		J. F. Adams, Clerk, School Board Offices, Tottenham, N.	—	
Forest Hill—Free Library (£4,000 limit)	25gs.	Edward H. Oxenham, Clerk, Town Hall, Catford, S.E.	—	
Bexhill-on-Sea—Promenade Pier and Garden		Secretary, Pier Co., 7, Sackvill-road, Bexhill	—	
Blackburn—R.C. Infant School, Dean-street	(No first) £5	The Rector, 48, Islington, Blackburn	—	
Lichfield—Nursery Home and Invalids' Kitchen	£10, £5	R. R. Redmayne, Secretary, 22, Dam-street, Lichfield	—	

LIST OF TENDERS OPEN.

BUILDINGS.

Walton, Felixstowe—Shop and House, High-street	I. and E.S. Freehold Land Society	Secretary, Freehold Land Society, Princess-street, Ipswich	Oct.	2
Hawarden—County School		Grayson and Ould, Architects, 31, James-street, Liverpool	,,	2
Magheragall—Additions to Parish Church	Select Vestry	J. Blount, Architect, Waring-street, Belfast	,,	2
Warton—Five Houses		Robert Barrow, Shovel Inn, Warton, Carnforth	,,	2
Pytchley—Infants School	Trustees of Endowed School	J. H. Clarke, The Elms, Pytchley	,,	2
Port Talbot—Calv. Meth. Schoolroom, Grove-place		F. B. Smith, Architect, Port Talbot	,,	2
Aldershot—Dust Destructor and Chimney, Norris Bridge	War Department	Royal Engineer Office, North Aldershot	,,	2
Thornton—Villa, Storr Heights		J. H. Hey, Laurel Bank, Thornton	,,	2
Westhouses, Alfreton—Schools	Midland Railway Company	Secretary, Works Committee, Midland Railway, Derby	,,	2
Loscoe—Additions to Wesleyan Chapel		G. F. Pennington, M.S.A., Central Chambers, Carlton-st., Castleford	,,	
Knaresborough—Cottage, Park-row	James Hoy	J. G. Brown, Architect and Surveyor, Knaresborough	,,	2
Limavady—Residence and Offices, Main-street		W. and M. Given, Architects, Diamond, Coleraine	,,	2
Great Yarmouth—Additions to Distillery, Market-place	Charles Rackham	Chas. G. Baker, Architect, Town Hall Chambers, Great Yarmouth	,,	2
London—Stables, and fixing of Water-Softening Plant, Seven-Sisters-road, N.	Vestry of St. Mary's, Islington	J. Patten Barber, M.I.C.E., Vestry Hall, Upper-street, N.	,,	4
Brighton—Enlargement of Queen's Park School	Brighton and Preston School Board	John Carden, Clerk, 54, Old Steine, Brighton	,,	4
Banbridge—Stationmaster's Office at Station	Gt. Northern (Ireland) Railway Co.	T. Morrison, Secretary, Amiens-street Terminus, Dublin	,,	4
Rotherham—Swimming Bath	Corporation	H. H. Hickmott, Town Clerk, Rotherham	,,	4
Halifax—Drapery Warehouse, Rawson and Powell-streets		Jackson and Fox, Architects, 22, George-street, Halifax	,,	4
Rotherhithe—Chimney Shaft, 150ft. high, Bull Head Dock	Vestry	J. J. Stokes, Clerk, Town Hall, Lower-road, S.E.	,,	4
Preston—Alterations, Fulwood Workhouse	Board of Guardians	Jas. Clarke, Clerk, Union Offices, Preston	,,	4
Clones—Platform Roofs at Station	Gt. Northern (Ireland) Railway Co.	T. Morrison, Secretary, Amiens-street Terminus, Dublin	,,	4
Writtle—Classroom, Highwood School	School Board	A. P. Lindsell, Clerk, Writtle, Chelmsford	,,	4
New Tredegar—Six Houses, Tir Phil-road		W. Jenkins, Elliot Offices, New Tredegar	,,	4
Frongoch—Cottage	Bala and Festiniog Railway Co.	Geo. Boxall, Secretary, G.W.R. Offices, Paddington Station, W.	,,	4
Sheephouse Reservoir—Sandwashing Building	Bacup Corporation	Jas. Diggle, C.E., Heywood	,,	4
Grangetown, Middlesbrough—Baths	James Eadie	J. Mitchell Bottomley, Architect, 20, Albert-road, Middlesbrough	,,	4
Elgin—Duty-Free Warehouse, Longmorn Distillery		Charles C. Doig, Architect, Elgin	,,	4
Bridgwater—Works to Mariners' Chapel, St. John-street	Committee of Management	F. Davies, Clothier, Eastover	,,	5
Bethnal Green, E.—Band Stand, &c., Boundary-street	London County Council	C. J. Stewart, Clerk, Spring-gardens, W.	,,	5
Middlesbrough—Alterations, Cannon-street Police-Station	Corporation	F. Baker, Borough Engineer, Middlesbrough	,,	5
Petworth—Alterations to Workhouse	Board of Guardians	A. F. Mant, Clerk, Petworth	,,	5
Kingstown—Additions to the Town Hall	Commissioners	John Donnelly, Town Clerk, Town Hall, Kingstown	,,	5
Doncaster—Brewery, Cleve-street	Whitworth, Son, and Nephew	Athron and Beck, Architects, Dolphin Chambers, Doncaster	,,	5
Cowbridge—Additions to Maindy Board School		E. Jenkin Williams, M.S.A., 14, High-street, Cardiff	,,	6
Hatten, Cruden—House and Shop		Jenkins and Marr, Architects, 16, Bridge-street, Alloa	,,	6
New Wandsworth—Laundry to Workhouse Infirmary	Wandsworth & Clapham Guardians	A. N. Henderson, Clerk, St. John's Hill, New Wandsworth	,,	6
Dorchester—Four Terrace Houses in Alexandra-road		J. Feacey, Architect, Dorchester	,,	6
Halifax—Mixed School		W. Clement Williams, Architect, 29, Southgate, Halifax	,,	6
Weybridge—Stables, Elm Grove-road	Urban District Council	Geo. Wheeler, Clerk, Weybridge	,,	6
Rotherham—Assembly Hall at Sportsman Inn		J. Platts, Architect, Old Bank Buildings, Rotherham	,,	6
Huddersfield—House, William-street, Crosland Moor		J. Berry, Architect, 9, Queen-street, Huddersfield	,,	6
Lanchester—Laundry, Workhouse	Guardians of Lanchester Union	G. T. Wilson, Architect, 121, Durham-road, Black Hill	,,	6
Princetown—Farmhouse, Lafter Hole		R. C. Merson, Architect, Hollybank, Yelverton	,,	6
New Shildon—Alterations, Greyhound Inn	Massey's Burnley Brewery Co.	W. A. Mason, Architect, New Shildon	,,	6
Pentre—Rebuilding Houses, Llewellyn-street		E. Jones, Architect, Porth	,,	6
Sligo—New Flooring at County Infirmary	Governors	W. T. Vernon, Registrar, Sligo	,,	7
Belfast—Central Police-Station, Chichester-street	Police Committee	Sir Samuel Black, Town Clerk, Belfast	,,	7
Kanturk—Repairs to Labourers' Cottages	Guardians of Kanturk Union	T. Linehan, Clerk of Union, Kanturk	,,	7
Hull—Saw Mill, Hedon-road	Hollis Bros. and Co.	Botterill, Son, and Bilson, Architects, 23, Parliament-street, Hull	,,	7
Chatham—Two Shelters at the Victoria Gardens	Corporation	H. P. Mann, Town Clerk, Chatham	,,	7
Blaencaerau—Additions, Blaenllyfniltotel	Peter Thomas	Griffiths and Jones, M.M.S.A., Tonypandy	,,	7
Ton-yr-efail—Shop and House		J. J. Evans, Architects, Penarth	,,	7
Newbury—Additions, Atlas Brewery	South Berks Brewery Co.	Jas. H. Money, Architect, The Broadway, Newbury	,,	7
Radstock—Additions, Bell Hotel	Coombs and Co.	T. Martin, Surveyor, Radstock	,,	7
Belfast—Two Semi-Detached Villas, Whitehead	Thos. Bell	Young and Mackenzie, Architects, Donegall-square, Belfast	,,	7
Bridlington Quay—Two Pairs of Villas, Marshall-street	J. Woodmansey	J. Earnshaw, Architect, Wellington-road, Bridlington Quay	,,	7
Portland—Dwellings, St. Martin's Estate		Webster and Co., Architects, High-street, Dorchester	,,	8
Weston-super-Mare—Cottages, Uphill Drive-road	E. M. Whitting	S. J. Wilde, Architect, Weston-super-Mare	,,	8
Hull—Rebuilding Waterloo Mills, Cleveland-street		Wellsted and Easton, Architects, Prince's Dock Chambers, Hull	,,	8
Mullingar—Chronic Block & Farm Buildings, Lunatic Asylum	Board of Control	H. Williams, Secretary, Custom House, Dublin	,,	9
Cardiff—Timber for Showyard Buildings	Bath Agricultural Society	T. F. Plowman, 4, Terrace-walk, Bath	,,	9
Elgin—Three Blocks of Semi-Detached Cottages at Maisondieu	Elgin Building Company	G. Sutherland, A.R.I.B.A., 51, High-street, Elgin	,,	9
Sheffield—Stores, Abbeydale-road	Ecclesall Industrial Society	Secretary, 201, Napier-street, Sheffield	,,	9
Blaenavon—Classroom at Garn Schools	School Board	Lansdowne and Griggs, Architects, Newport, Mon.	,,	9
Glasgow—Two Ranges of Two-Story Good Sheds (1,476ft. and 1,444ft. long, by 75ft. wide) on South Pier, Prince's Dock	Trustees of the Clyde Navigation	James Deas, Engineer, 16, Robertson-street, Glasgow	,,	11
Porth—Alterations, Cymmer-road Schools	Ystradyfodwg School Board	W. G. Howell, Clerk, Pentre	,,	11
Halifax—Drapery Warehouse, Rawson-street		Jackson and Fox, Architects, 22, George-street, Halifax	,,	12
North Woolwich—Stores and Offices, near Beckton	London County Council	C. J. Stewart, Clerk, Spring-gardens, W.	,,	12
Aberlour—Fleming Cottage Hospital		Stewart and M'Isaac, Solicitors, Elgin	,,	12
Halifax—Goods Offices at North Bridge Station	Joint Railways Committee	A. Guille, Secretary, King's Cross Station, G.N.R., London	,,	12
Haverstock Hill—Gate Porter's Lodge, North-Western Hospital	Metropolitan Asylums Board	T. Duncombe Mann, Clerk, Norfolk-street, Strand, W.C.	,,	13
Winchmore Hill—Isolation Hospital at the Northern Hospital	Enfield Urban District Council	T. W. Scott, Clerk, Court House, Enfield	,,	13
Stockwell—South-Western Hospital, New Pavilion and Reconstruction of Drainage	Metropolitan Asylums Board	T. Duncombe Mann, Clerk, Norfolk-street, Strand, W.C.	,,	13
Wibsey—Store and Six Houses	Bradford Provident Industrial Socy.	Rycroft and Firth, Architects, Manchester-road, Bradford	,,	14
Bletchingley—Workhouse Alterations	Godstone Board of Guardians	E. A. Head, Clerk, Union Offices, East Grinstead	,,	15

BUILDINGS—*continued.*

Buckfastleigh—Additions to Farm Buildings at Torr Dean, and Additions to Stables at Bigadon House		J. Fleming, 9, Billiter-square, London, E.C.	Oct.	16
Belfast—City Hall	Corporation	Sir Samuel Black, Town Clerk, Belfast	,,	21
Winchfield—Cottage Home	Hartley Wintney Board of Guardians	F. S. Chandler, Clerk, Odiham, Hants	,,	22
Windsor—New Passenger Station	Great Western Railway Co.	G. K. Mills, Secretary, Paddington Station, W.	,,	26
Hampstead—Enlargement and Alterations, Fire Brigade Station	London County Council	C. J. Stewart, Clerk, Spring-gardens, S.W.	,,	26
Manorhamilton—Repairs to Courthouse		E. O'N. Clarke, County Surveyor, Carrick-on-Shannon	Nov.	1
Bromborough—Detached Villa		Bell, Williams, Son, & Co., Surveyors, 40, North John-st., Liverpool	—	
Kendal—Enamelling-House, Stramongate Bridge	Herbert Croft	John Stalker, M.S.A., Architect, 57, Highgate, Kendal	—	
Bromsgrove Lickey—Residence		F. J. Yates, Architect, 1, Newhall-street, Birmingham	—	
Carlisle—Warehouses, Scotch-street		T. Taylor Scott, F.R.I.B.A., Architect, Carlisle	—	
Portadown—Convent	Sisters of Sacred Heart	J. J. Macdonnell, Architect, 27, Chichester-street, Belfast	—	
Gwersyllt—Additions to National Schools		J. Plant, Wilderness Works, near Wrexham	—	
Pontypool—Two Houses, Wainfelin-road		C. Foxwell, 14, Wainfelin-road, Pontypool	—	
Bournemouth—Wesleyan Church and Schools, Westbourne		R. Curwen, Archt., Hamilton House, Bishopsgate-st. Without, E.C.	—	
Water Fulford—Farm Buildings	Captain Key	Digby Cayley, 7, Blake-street, York	—	
Enfield—Terraces of Cottages		Eugene Beaumont, Architect, 78, Fleet-street, E.C.	—	
Pensford—Schools	Stanton Drew School Board	J. Ace Beynon, M.S.A., Sunnyside, Coleford, near Bath	—	
Swanage—Burlington Hotel		Pearce and Offin, Dorsetshire Bank Chambers, Bournemouth	—	
New Ferry—Mortuary	Lower Bebington U.D.C.	Joseph Young, Surveyor, 78, Stanley-terrace, New Ferry	—	
Roths, N.B.—Town Hall		R. B. Pratt, Architect, County Bank House, Elgin	—	
Bletchingley—Workhouse Enlargement	Godstone Board of Guardians	E. A. Head, Clerk, East Grinstead	—	
Camberwell—Pair of Semi-detached Villas, Benhill-road		S. Evans, Architect, 36, Heron-road, Herne Hill, S.E.	—	
Long Eaton—Alteration of a Shop	Leeds and Leicester Boot Co.	Ernest R. Ridgway, M.S.A., Architect, Long Eaton	—	
Llanelly—Additions and Alterations to Brynawel New-road		W. Griffiths, Architect, Llanelly	—	
Stockton-on-Tees—Buildings and Chimney, Bridge-road	Imperial Tramways Co.	Clifton Robinson, C.E., Bridge-row, Stockton-on-Tees	—	
Revolving Observation Towers—Twelve		Secretary, Revolving Observation Tower Syndicate, Gt. Yarmouth	—	
Leeds—Extension of Mill Premises, East-street	Roberts, Mart, and Co., Limited	Ambler and Bowman, Architects, 9, Park-place, Leeds	—	
Hexham-on-Tyne—Square Chimney (75ft. high)		John Fenwick and Sons, Limited, Hexham-on-Tyne	—	
Holbeach—Public Hall	Holbeach Public Hall Company	Joseph Sawyer, F.R.I.B.A., 63, Chancery-lane, London, W.C.	—	
Stalybridge—Conservative Club, Mottram-road		Eaton, Sons, and Cantrell, Architects, Stamford-st., Ashton-u-Lyne	—	
Swansea—Additions, Waterloo Hotel, Oxford-street	F. Bradford	Margrave and Peacock, Architects, Metal Exchange, Swansea	—	
Hunslet—Extensions to Jericho-street Mission Chapel		J. M. Fawcett and Son, Architects, 26, Albion-street, Leeds	—	
Moreton—Footbridge	Wareham Rural District Council	W. W. Fookes, Surveyor, Wareham	—	
Halton—Four Houses, Graveleythorpe		C. W. Lambert, 39, Whingate, Armley	—	
Skegness—Pair of Villas, Algitha-road	J. Chapman	H. Harper, Architect, Market-place, Nottingham	—	
Kirkby Lonsdale—Alterations and Additions, Royal Hotel		John Kassell, Architect, Kirkby Lonsdale	—	
Roundhay—Pair Semi-Detached Houses, Lidgelt Park Estate	Kirby Banks	Ambler and Bowman, Architects, 9, Park-place, Leeds	—	
Hillsborough—Two Houses		T. Peckett, 19, Wood-road, Hillsborough	—	
Preston—Sixteen Houses	L. and N.W. Railway Company	G. F. Aveline, Estate Office, Central Station, Preston	—	
Rothes—Town Hall		R. B. Pratt, Architect, County Board House, Elgin	—	
Roundhay—Detached House	Miss Lilly	Ambler and Bowman, Architects, 9, Park-place, Leeds	—	
Braemar—Stables and Office Houses at Invercauld Arms Hotel		R. G. Foggo, Invercould Office, Braemar	—	
Leeds—Caretaker's House, Whingate-road School	Leeds School Board	W. Packer, Clerk, School Board Offices, Leeds	—	
Armley—Two Houses in Whingate		Ambler and Bowman, Architects, 9, Market-place, Leeds	—	
Whitehead, Belfast—Villa Residence	D. J. Lanigan	Thomas Pentland, Architect, 35, High-street, Belfast	—	
London—Additions to House at 5, Whitehall Gardens		R. Curwen, A.R.I.B.A., 149, Bishopsgate-street Without, E.C.	—	
Aylesbury—Three Shops and Houses, Cambridge-street	H. J. Goodey	W. F. Taylor, Architect, Aylesbury	—	
Ilkley—Pair of Semi-Detached Houses		Isitt, Adkin, and Hill, Architects, Prudential-buildings, Bradford	—	
London, E.C.—Three Blocks of Artisans' Dwellings in Moira-place and Plumbers'-place, City-road	Shoreditch Vestry	H. Mansfield Robinson, Clerk, Town Hall, Old-street, E.C.	—	
Ashton-under-Lyne—Cottages	A. B. Wilkinson	Eaton, Sons, and Cantrell, Architects, Stamford-st., Ashton-u-Lyne	—	
Haydon Bridge—Cottage Villas		George Tyzack, Tyne View, Haydon Bridge	—	
Hillsborough—Two Houses		T. Peckett, 19, Wood-road, Hillsborough, Sheffield	—	

ENGINEERING.

Morecambe—Sinking Well, Acre Moss Field	Urban District Council	Jno. Bond, Surveyor, Council Offices, Morecambe	Oct.	2
Plymouth—Electrical Plant for Tramways	Corporation	Jas. Paton, Borough Engineer, Plymouth	,,	2
Dartmouth—Flushing-Tank in Lower-street		T. O. Veale, Borough Surveyor, Dartmouth	,,	2
Limerick—Sinking and Erecting Pump, Singland	Guardians of Limerick Union	P. O'Malley, B.E., 10, Glentworth-street, Limerick	,,	2
Strathdon—Water Supply, Knocklea School		Rev. Watt, Strathdon, N.B.	,,	2
Lisburn—Steel Girder Bridge over Antrim-lane	Gt. Northern (Ireland) Railway Co.	T. Morrison, Secretary, Amiens-street Terminus, Dublin	,,	4
Hipperholme Mills—Water Tower, Tanks, &c.		Medley Hall, Architect, 29, Northgate, Halifax	,,	4
Clones—Steel Girder Bridge over Monaghan-road	Gt. Northern (Ireland) Railway Co.	T. Morrison, Secretary, Amiens-street Terminus, Dublin	,,	4
Swansea—Footbridge at the East Dock	Great Western Railway Company	G. K. Mills, Secretary, Paddington Station, W.	,,	5
Ripponden—Excavating Open Trench, Black House Farm	Soyland Urban District Council	L. H. Longbotham, Clerk, Carlton-street, Halifax	,,	5
Frome—Reconstruction of Bridges under Railway	Great Western Railway Company	G. K. Mills, Secretary, Paddington Station, W.	,,	5
Brentford—Well, Alterations to Engine-House and Engines, Pumping Station	Urban District Council	S. Woodbridge, Clerk, New Brentford	,,	5
Oxford—Reconstruction of Bridges under Railway	Great Western Railway Company	G. K. Mills, Secretary, Paddington Station, W.	,,	5
Ashton-under-Lyne—Hot-Water Heating Apparatus for Warming Hospital	Guardians	B. Seymour, Clerk, Union Offices, Ashton-under-Lyne	,,	6
Mitcham—Laundry Fittings	Guardians of Holborn Union	C. E. Vaughan, F.R.I.B.A., 25, Lowther Arcade, Strand, W.C.	,,	6
Loughlinstown—Boiler	Guardians of Rathdown Union	Joseph D. Cope, Clerk, Loughlinstown	,,	6
Kilkenny—Sinking Well, Castleinch Cross Roads	Guardians	Kieran Comerford, Clerk, Kilkenny	,,	7
Hull—Engines and Pumps		F. J. Bancroft, Waterworks Engineer, Town Hall, Hull	,,	7
Scredington—Scredington Waterworks	Sleaford Rural District Council	Jesse Clare, C.E., Surveyor, Sleaford	,,	8
Andover—Sinking Stormwater Well		Alfred Purkess, Borough Surveyor, Town Hall, Andover	,,	9
Sike, Thirsk—Rebuilding of Highway Bridge	North Riding County Council	Walker Stead, M.I.C.E., Northallerton	,,	9
Ramsgate—Three-Lift Gasholder	Gas and Water Committee	W. A. M'Intosh Valon, Engineer, Hardres-street, Ramsgate	,,	11
Nice—Steel Bridge over the Paillon	Official	Le Mairie, Nice	,,	18
Southend-on-Sea—Pumping Machinery	Corporation	William Gregson, Town Clerk, Alexandra-st., Southend-on-Sea	,,	18
Glasgow—Electrical Equipment, Springborn to Mitchell-street Tramways	Corporation	J. D. Marwick, Town Clerk, City Chambers, Glasgow	,,	20
Llyn Fawr—Reservoir, Llyn Fawr	Rhonda Urban District Council	Walter H. Morgan, Clerk, Treforest, Pontypridd, Glam.	,,	20
Renwick—Oblique Bridge Across the Raven, Sickergill	Penrith Rural District Council	C. N. Arnison, Clerk, Penrith	,,	23
Knighton, Radnor—Nine Miles of Aqueduct from Knighton to Downton (Two Lines of Cast-Iron Mains, 42in. Diameter)	Corporation of Birmingham	E. Orford Smith, Town Clerk, Council House, Birmingham	,,	27
Hull—Electrical Equipment of Tramways (9 miles Double Track)	Corporation	A. E. White, City Engineer, Town Hall, Hull	Nov.	5
Leeds—Sinking Well in York-street	Yorkshire Pure Ice Company	W. S. Braithwaite, Architect, 6, South Parade, Leeds	—	
Galway—Steel Joists, Iron Roof, and Balcony for Convent		James Costello, Sea-road, Galway	—	

FENCING AND WALLS.

Dewsbury—Boundary Wall, Boothroyd-lane	Corporation	G. Trevelyan Lee, Town Clerk, Dewsbury	Oct.	6
Hemsworth—Works of Wood Fencing	Rural Sanitary Authority	Joshua Scholefield, Clerk, Hemsworth	,,	12
Redruth—Fencing the Public Park		Horace W. Collins, Architect, Penryn-street, Redruth	,,	15
Nottingham—Walling-in Garden, Mansfield-road		W. H. Radford, Architect, Pelham Chambers, Nottingham	—	
Fairfield, North Derbyshire—Retaining Wall to Village Green	Urban District Council	Garlick and Flint, Architects, Buxton	—	
Fort William—Hill Fencing (1,000 yards)		N. B. Mackenzie, British Linen Bank, Fort William	—	
Ramsgate—Iron Fence (1,650ft. run)	Gas Committee	W. A. McIntosh Valon, Engineer, Ramsgate	—	

FURNITURE AND FITTINGS.

Limavady—Workhouse (Bedsteads, &c.)	Board of Guardians	W. Crawford, Clerk, Workhouse, Limavady	Oct.	4
Keighley—South Pavilion, Fever Hospital	Joint Hospital Board	George E. Spencer, Clerk, 40, North-street, Keighley	,,	5
Huddersfield—Free Library and Art Gallery	Corporation	W. Cooper, Architect, 4, Kirkgate Buildings, Huddersfield	,,	6
Guildford—Royal Surrey County Hospital		Assistant Secretary to Hospital, Guildford	,,	9
Crewe—Technical Institute	Town Council	J. A. Jenkins, Secretary, Municipal Offices, Crewe	—	

PAINTING.

Mansfield—Forest Hospital, Southwell-road	Town Council	R. Frank Vallance, Borough Surveyor, Mansfield	Oct.	2
Stamford—Depot	Urban Sanitary Authority	James Richardson, Borough Surveyor, Stamford	,,	2
Cambridge—Victoria Bridge	Cambridge and Chesterton U.D.C.'s	J. E. L. Whitehead, Town Clerk, Guildhall, Cambridge	,,	2
Derby—Recreation Grounds		H. F. Gadsby, Town Clerk, Town Hall, Derby	,,	4
Thornton Heath—Workhouse Infirmary	Croydon Board of Guardians	H. List, Clerk, Mayday-road, Thornton Heath	,,	4
Barrow-in-Furness—All Board Schools		W. Hutchinson, Clerk, Barrow	,,	4
Bridlington Quay—Britannia Hotel		Joseph Shepherdson, Architect, 22, Silver-street, Hull	,,	5
Cardiff—52, Charles-street	Guardians	Arthur J. Harris, Clerk, Queen's Chambers, Cardiff	,,	9
Selby—Thirty Houses (outside only)		T. C. Fawcett, Ousegate Maltkin, Selby	—	
Wrexham—Twelve Houses in Regent-street		J. Squire, 10, Temple-row, Wrexham	—	
Dewsbury—Twelve Houses in Reform-st., and Four at Fall-lane		J. C. Thornes, 1, Ashworth-terrace, Dewsbury	—	

PAINTING—*continued.*

Northallerton—Langton Grange Farmhouse and Buildings		W. R. West, Solicitor, Thirsk	—
Keighley—Eight Houses at Stoney Bank, Skipton-road		Robert Tomlinson, Builder, Keighley	—
Derby—24 Houses, Dashwood-street		101, Normanton-road, Derby	—

PLUMBING.

Ballinasloe—Plumbing Works at Asylum (One Year)	Governors of District Asylum	Jas. Young, Clerk, Ballinasloe	Oct. 11

ROADS AND STREETS.

Middlesbrough—Paving Streets	Streets Committee	F. Baker, C.E., Borough Engineer, Municipal Bldgs, Middlesbrough	Oct. 2
Ashton-under-Lyne—Sewering Smith-street and Gower-street		J. T. Earnshaw, Borough Surveyor, Town Hall, Ashton-u-Lyne	,, 2
Sevenoaks—Kerbing and Tar-paving Woodside-road	Urban District Council	Herbert J. Thompson, Clerk, U.C. Offices, Argyle-road, Sevenoaks	,, 2
Stalybridge—Flagging and Draining Hough Hill-road	Corporation	Borough Surveyor's Office, Town Hall, Stalybridge	,, 2
Romford—For Supplying and Laying about 1,950ft. lineal Norway Kerb at per foot, and Relaying about 3,639ft. lineal Kerb	Urban District Council	Geo. Bailey, Clerk, Romford	,, 4
Heckmondwike—Paving a Portion of Market-street	Urban District Council	James Saville, Surveyor, Heckmondwike	,, 4
Rochford—Kerbing and Tar-paving Footpaths in North-street	Rochford Rural District Council	Frederic Gregson, Clerk, Southend-on-Sea	,, 4
Wimbledon—Making-up Queen's-road, Florence-road, Trinity-road, and Effra-road	Urban District Council	The Surveyor's Office, The Broadway, Wimbledon	,, 4
Heckmondwike—Paving a Market-street with Granite	Urban District Council	James Saville, Surveyor, Heckmondwike	,, 4
Wakefield—Private Street Works in Westfield-grove		City Surveyor, Town Hall, Wakefield	,, 4
Leeds—Concreting and Paving in Kirkgate Market	Corporation	T. Hewson, City Engineer, Municipal Offices, Leeds	,, 4
Leyton—Constructing Pipe Sewers in Quartermile-road; also Forming Footpath in Lea Bridge-road	Urban District Council	William Dawson, M.I.C.E., Town Hall, Leyton	,, 5
Upper Norwood—Repair of Bedwardine-road	Croydon Town Council	E. Mawdsley, Town Clerk, Town Hall, Croydon	,, 5
Nuneaton—New Street	Urban District Council	J. S. Pickering, A.M.I.C.E., Surveyor, Council Offices, Nuneaton	,, 5
Southend—Making-up Heygate-avenue, Darnley-road, Hastings-road, Hillcrest-road, Cromer-road, Hartington-place, and Warrior-square	Corporation	William Gregson, Town Clerk, Southend-on-Sea	,, 6
Rochester—Making-up Pelican-yard, Strood	Corporation	Apsley Kennette, Town Clerk, Guildhall, Rochester	,, 6
Chiswick, W.—Making-up, &c., of Eastbury-grove, Dorchester-grove, Cornwall-grove, and Balfern-grove	Urban District Council	Arthur Ramsden, Surveyor, Vestry Hall, Chiswick	,, 6
Thatcham—Alteration of roads in Broad-street	Parish Council	Edward Mecey, Clerk, Thatcham	,, 6
Jarrow—Road Works in Back Hibernian-road, Blackett-street, and Nansen-street	Sanitary Authority	J. Petree, Borough Surveyor, Jarrow	,, 7
Great Yarmouth—Making-up Wolseley-road, Southtown	Urban Sanitary Authority	J. Wm. Cockrill, Borough Surveyor, Town Hall, Great Yarmouth	,, 8
Crewe—Sewering and Paving Main Streets	Town Council	Frederick Cooke, Town Clerk, Municipal Offices, Crewe	,, 11
Beckenham—Making-up Kent House-road	Urban District Council	F. Stevens, Clerk, Beckenham, S.E.	,, 11
Brownhills—Paving New Road, Shelfield	Urban District Council	T. Howard Stanley, Clerk, Council Offices, Brownhills	,, 12
Luton—Paving in Baker-street	Town Council	George Sell, Town Clerk, Town Hall, Luton	,, 12
London, N.—Hardwood Paving, High-street	South Hornsey U.D.C.	Edward B. Bennett, Clerk, Milton-road, near Newington Green	,, 13
Kingston-upon-Thames—Sewering and Paving Lincoln-road	Corporation	Harold A. Winser, Town Clerk, Clattern House, Kngstn-on-Thames	,, 13
Harrogate—New Road and Sewers	Stonefall Park Estate Company	Whitehead and Smetham, Architects, Albert Chambers, Harrogate	—
Enfield—Making Cahsfield-road, Enfield Lock		Crawter and Co., Cheshunt, Herts	—
Bradford—Construction of Two Streets, Bradford Moor		J. Hindle, 24, Bank-street, Bradford	—
Castle Donington—Seventy yards of New Road	New Industries Co.	H. German, Ashby-de-la-Zouch	—
St. George—Two New Streets at Pile Marsh		G. C. Ashmead and Sons, Small-street, Bristol	—
Phibsborough—New Road		Dunne and Co., Civil Engineers, 14, Great Denmark-street, Dublin	—
Halifax—Forming and Draining Two Short Streets		Jackson and Fox, Surveyors, 22, George-street, Halifax	—

SANITARY.

Dartmouth—Laying Sewers	Corporation	T. O. Veale, Borough Surveyor, Dartmouth	Oct. 2
Aldershot—Drainage, Marlborough Lines	War Department	Royal Engineer Office, North Aldershot	,, 2
Douglas, Isle of Man—Construction of Brick Sewers	Corporation	Thomas H. Nesbitt, Town Clerk, Town Hall, Douglas	,, 2
Clandeboye—Water Supply and Sewerage Works		T. S. Howe, Dufferin Estate Office, Hillsborough	,, 4
Southend—Stoneware Sewers (1,060 yards)	Corporation	W. Gregson, Town Clerk, Southend-on-Sea	,, 4
Cramlington—Sewerage Works	Urban District Council	William Hornsby, Clerk, Cramlington, Northumberland	,, 4
Cannington—12in Drain, Frog-street	Bridgwater R.D.C.	Paul O. H. Reed, Clerk, Bridgwater	,, 5
Newick—Sewerage Works	Chailey Rural District Council	J. Miles, Clerk, 173, High-street, Lewes	,, 5
Glasgow—Sewers in Old Shettlestone-road and Green-street	District Committee	William H. Hill, District Clerk, 194, Ingram-street, Glasgow	,, 5
Edinburgh—Construction of Sewers	Town Council	Burgh Engineer, 1, Parliament-square, Edinburgh	,, 6
London, E.—Reconstruction of Sewers in Branbridge-street	Vestry of Mile End Old Town	J. M. Knight, Surveyor, Vestry Hall	,, 6
Berwick-upon-Tweed—Sewerage Works	Sanitary Authority	Wm. Weatherhead, Clerk, 7, Quay Walls, Berwick-upon-Tweed	,, 9
Glossop—Construction of Main Concentrating Sewers	Corporation	C. Davis, Town Clerk, Market-street, Glossop	,, 11
Hemel Hempstead—Sewerage and Sewage Disposal Works	Rural District Council	Lovel Smeathman, Clerk, Hemel Hempstead	,, 11
Havercroft—Sewerage at Monckton Colliery Cottages	Hemsworth Rural San. Authority	Joshua Scholefield, Clerk, Hemsworth	,, 12
Brentwood—Stoneware and Iron Pipe Sewers		C. Edgar Lewis, Clerk, Brentwood, Essex	,, 13
South Moor, Co. Durham—Sewage Works	Owners of Townley Estate	T. C. Nicholson, F.R.I.B.A., Blaydon-on-Tyne	—
Cockermouth—Laying Sewerage Tiles		Harris and Sons, Derwent Mills, Cockermouth	—

STEEL AND IRON.

Liverpool—Pig Iron (300 tons)	Mersey Docks Board	M. K. Barton, Secretary, Dock Office, Liverpool	Oct. 2
Leeds—Steel Girders (150 tons)	Corporation	City Engineer, Municipal Buildings, Leeds	,, 4
Axbridge—C.I. Socket Pipes (800 tons)	Rural District Council	A. Powell, A.M.I.C.E., 3, Unity-street, Bristol	,, 4
Llandudno—C.I. Pipes (100 tons)	Urban District Council	A. Connolly, Clerk, Council Offices, Llandudno	,, 4
London—Steel Bridge Girders (200 tons)	Great Western Railway Co.	G. K. Mills, Secretary, Paddington Station, W.	,, 5
India—Ten Spans of 72ft. each	Government	Director General of Stores, India Office, S.W.	,, 5
Christiania—143,700 Fish-Plate Screens	Norwegian State Railways	Styrelsens Expedition Skontor, Statsbanerne, Christiania	,, 6
Christiania—340,500 Railway Plates, and 823,000 Dogs	Norwegian State Railways	Styrelsens Expedition Skontor, Statsbanerne, Christiania	,, 6
Hemel Hempstead—C.I. Pipes (4 miles, 21in. to 3in.)	Rural District Council	W. H. Radford, C.E., Angel-row, Nottingham	,, 11

STORES.

Manchester—Broken Stone (2,000 tons)	Highways Committee	Chief Highways Clerk, Town Hall, Manchester	,, 2
Wealdstone—Granite Macadam (150 tons), Gravel (275 tons)	Urban District Council	B. Wyand, Surveyor, Wealdstone	Oct. 4
Kingstown—Whitestone (1,250 tons), Limestone (800 tons), and Sand (300 tons)	Commissioners	J. Donnelly, Town Clerk, Kingstown	,, 4
London—W.I. Hurdles for Parks	London County Council	C. J. Stewart, Clerk, County Hall, Spring-gardens, S.W.	,, 5
Aldershot—Broken Granite (1,500 tons)	Urban District Council	W. E. Foster, Clerk, Aldershot	,, 5
Barking and Crossness Outfall Works—Commercial Green Vitriol (2,500 or 5,250 tons)	London County Council	C. J. Stewart, Clerk, Spring Gardens, S.W.	,, 5
Coventry—Road Materials (Six Months)	Corporation	J. E. Swindlehurst, City Engineer, Coventry	,, 5
Barking and Crossness Outfall Works—Lime (11,500 tons or 23,000 tons)	London County Council	C. J. Stewart, Clerk, Spring Gardens, S.W.	,, 5
Weybridge—Flints (1,000 tons)	Urban District Council	J. S. Crawshaw, Surveyor, Weybridge	,, 6
Gravesend—Broken Granite (420 tons)	Town Council	C. E. Hatten, Town Clerk, Gravesend	,, 6
Manchester—Cement, Iron Castings, Fence Rails, Timber, &c. (One Year)	Lancashire and Yorkshire Ry. Co.	C. W. Bayley, Secretary, Hunt's Bank, Manchester	,, 11
Bedlington—Whinstone (1,900 tons)	Urban District Council	C. D. Forster, Clerk, 24, Grainger-street West, Newcastle-on-Tyne	,, 13
Guildford—Broken Granite (600 tons)	Town Council	F. Smallpeice, Town Clerk, Guildford	,, 16

CHIPS.

The new reservoir just contructed for the Cardiff town council at Taff Vawr, was formally opened yesterday (Thursday) by the chairman of the waterworks committee.

The centenary of Donizetti, the composer, was celebrated at Bergamo, on Sunday, by the unveiling of the statue of the musician, carved by the Neapolitan sculptor, Signor Jerrace.

A convocation in connection with Durham University was held at the College of Science, Newcastle-on-Tyne, on Saturday, when the honorary degrees of Doctor of Literature was conferred on Miss Jane Ellen Harrison, the well-known student of classical archæology and interpreted Greek art. Miss Harrison, who has previously received the degree of LL.D. from Aberdeen, is the first lady recipient of an honour from Durham University.

The Poet Laureate has consented to open the new Science and Art School at Ashford, on Wednesday week, the 13th of October.

Mr. T. J. Rastrick, the oldest architect in Hamilton, Ont., died on Sept. 13. He was of English birth, and was educated as a civil engineer.

It was remitted to Mr. Morham, the Edinburgh City Superintendent, by the plans and works committee of the town council on Friday, to obtain estimates for the erection of the new baths at Glenogle-road, Edinburgh.

The Cumberland and Westmoreland Antiquarian and Archæological Society held their second meeting of the season on Friday and Saturday. They assembled at Penrith on Friday, and the programme included a visit to Edenhall, Langwathley, the Long Meg stone circle, and the Parks tumulus at Kirkoswald.

In the list of adjudications in bankruptcy in Tuesday's *London Gazette*, the name appears of John Ebenezer Lash, of Ruabon and Wrexham, architect and surveyor.

A new Presbyterian church in Gordon-road, South Byker, was opened on Sunday. It has been built from plans by Messrs. Badenoch and Bruce, of Newcastle-on-Tyne.

At the London Mansion House, on Friday, Walter Thomas Hooker, a builder, of Shirley, Southampton, was committed for trial upon a charge of libelling Sir Walter Prideaux, solicitor to the Goldsmiths' Company. Bail was refused.

The Sanderson memorial window which has been placed in the Trinity Presbyterian Church, Northumberland-road, Newcastle, was unveiled on Friday. The artists are Messrs. Atkinson Bros., of Newcastle-on-Tyne.

THE BUILDING NEWS
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FRIDAY, OCTOBER 8, 1897.

IMITATION AND IMITATORS.

It has been said that "Imitation is the sincerest form of flattery," and in this view and spirit we must regard a great many of the noble works which have been bequeathed to us, whether in architecture or painting. Have not the Romans left us examples of their admiration of Greek design in edifices which to this day are models of Classical taste? Are not the "Orders" themselves and their application to the more varied purposes of Roman civilisation proof of the admiration they held for Greek architecture? Was not the peristyle a Greek form which those daring adapters made their own? Though they borrowed also largely from the Etruscans, and combined the arch and vault with Greek forms, nevertheless no one can deny that they were, to as large an extent as their local circumstances permitted, imitators of the Greeks. Turning to Mediæval times, the builders of our cathedrals and churches closely followed their predecessors—not, indeed, slavishly, but with sufficient closeness not to be regarded as innovators. Contemporary works abound in which the same details and methods are used, even though the craftsmen were not the same. During the period of the Renaissance we find the most illustrious men copying what they conceived to be worthy of imitation. In all these instances a spirit of reverence for the past prompted the imitator; he knew very well if he set aside all that was good belonging to his predecessors, and relied solely on his own skill and ideas, he would be taunted as an eccentric or innovator, without being able to prove the superiority of his design; for, after all, there is a good deal of the egotist in the man who dares to place his own creation before the world, when there are better examples at hand. We are not contending for a slavish adherence to precedent when a departure is called for. For instance, an architect sees a façade he likes; but it would be bad imitation for him to appropriate it bodily or in part, windows and all. A technical school or new baths, for which no authority can be found, could hardly justify an architect in copying Mr. So-and-so's elevation of a building for another use. It would hardly be flattering to the original designer, who had thought he had produced something appropriate. Many bad imitations will occur to anyone who has observed contemporary works. They are always without a meaning, such as taking a feature and grafting it on a totally different building; for example, a church tower or cupola, or an entrance. Mr. Jerryman copies one of Norman Shaw's bay windows in his new villa, which may be in a very commonplace style, or a fireplace treatment suitable only for brick and stone in an ordinary dwelling. A good imitation reflects credit on both the original artist and adapter; but then it is not always the most literal. The good imitation discovers some adaptable feature and makes it its own; some motive that strikes the artist as being appropriate. If we apply this test to the general run of copies, we soon find out where they disappoint us. The feature is taken without the meaning; the style is imitated without any reference to the adaptability of the building; we even find the eccentricities and irregularities of the artist copied. The bad imitation thus discredits itself and its producer, and always tends to satirise the original by pointing rather to its defects and weaknesses.

In the good sense of the term all our best architecture may be included, even as we have said, those developments which we are accustomed to regard as original. Imitation in the right sense has always been going on; but since the 16th century the tendency has been more to copy buildings than to imitate the methods of their builders. We may see glaring cases of this during the Gothic and Classic revivals, when replicas of ancient buildings were produced; and this sort of reproduction has been going on to our own day, but with more knowledge. We know, for example, that the "Gothicist" of those pseudo days thought nothing of copying a pointed window, tracery and all, from Salisbury or Lincoln for his client's residence, without any idea of the different uses of the two buildings. A buttress was introduced where it was not wanted simply for ornament, and bosses, pinnacles, and gargoyles placed anywhere. Then we notice they were reproduced, not by the old, but by new, imperfect methods. They were often in brick, plastered over, and the bosses and carvings were cast in cement. Even a Gothic arch or a quoin or a pointed window was constructed in quite a modern fashion, with regular courses of uniform size; and it was not till the "sixties" that the modern architect and mason began to find out the Mediæval methods of construction.

In the best imitations it is difficult to discover where the influence of tradition ends and copying begins. Take any of our great buildings, St. Paul's Cathedral, the Houses of Parliament, or the Law Courts. Wren had the works of the great Cinque Centists before him, but no one can say that he copied any great building, except to take his inspiration from St. Peter's, at Rome. The two edifices are quite unlike. Externally the great work of Michael Angelo has only one order and an attic, that of St. Paul's two. If Wren had followed St. Peter's in this, he would have avoided his sham screen walls which inclose nothing over the real aisles; and if he had taken the great Roman example as a guide, he would have also avoided the other great sham of an outer timber and leaden dome, and the lantern would have been real, supported by the dome, and would have added to the interior effect instead of being merely an ornament. But we can admire the general proportions externally, while admitting the superiority of St. Peter's as a great construction. Nor will any one assert that the Houses of Parliament is a copy of any building. Though its exterior is covered with details and ornament derived from 15th and 16th century examples, the architect has shown boldness and adaptation. We have imitations of other building. In Pall Mall, clubhouses are to be seen which reproduce features from the Farnese Palace, and Library of St. Marks, at Venice, with more or less success. The Louvre and the Pantheon, at Paris, are inspired from Italian examples, and these have been reproduced in many modern buildings, though no one can say how much of either is a copy and how much original. Again the Renaissance of Italy, France, and Belgium have supplied models for most of our recent buildings. No one can deny to those countries an influence in the design of our best works. If we take leading Gothic buildings, we shall find the same principle at work. Many of the works of Scott are studious imitations of 13th-century buildings—if it had not been for his genius they would have been mere copies; but he made them his own. An old proverb says: "One man may steal a horse out of a field, but another may not look over the hedge," and this is very true about those who imitate. "Genius borrows nobly." The artist of genius can appropriate; but he who does so without that gift only merits the name of pirate. The lesson is worth remembering. And has not one of our best modern essayists said that "Next to the originator of a good sentence is the first quoter of it"? It has been said that Shakespeare was more original than the authors he quoted; and may we not say the same of every artist who has made his own the traditions of his craft? In the hands of a master the elements of any style are combined or modified in such a manner that a new result is attained. Have we not seen well-known Gothic precedents and details made to assume new form and life in the hands of a Pugin, a Sedding, a Pearson, or a Bentley? Few can trace back to their original sources the combinations and forms of beauty found in the works of these masters, whether it be only a piece of tower design, or the design of a font or a piece of furniture or ironwork; and yet the germs may all be found in a few old buildings or Mediæval examples.

Architects practise several sorts of imitation. Some take ancient models, others modern ones. There is always a fascination in taking old work; but the danger is that we imitate those portions which are the least adapted to our present wants. It may be an entrance of an old house, or a gable end of some baronial hall. We engraft it in a modern house built possibly of a different material; we lose all sense of proportion and harmony; the appropriations look out of place with the rest of the new work. Our designs are "shreds and patches." The gifted architect pursues another course. He takes an old manor or hall which he has studied carefully in plan and detail, and he designs his new work as far as possible on these old lines; but it is not a patchwork—he takes the motive of the original or some portion of it. He probably knows several old houses of the period, and he is able to adopt their spirit without closely copying any one feature. He knows how to generalise from the study of a particular period or style, and that is just what the mere cribber cannot do. Men who have made their mark in any particular field of design are generally zealous students of traditional treatment. They are the last to rely on unaided thought. On this ground the imitationist takes his stand: he knows he cannot go wrong if he understands the various ways the great men of previous ages have worked. Not that he follows any one, but it puts him in a position of forming an opinion. The designers of the best periods of our furniture, for example, were all men of this kind; they had learned the elements of their craft from a study of their predecessors' work. Thus, our Chippendales, Hepplewhites, Sheratons, and their contemporaries were men who had studied 16th and 17th century traditions, Flemish and French influences. These designers of furniture were greatly indebted to the decorative interior plaster-work of the Brothers Adam, of the woodwork of the Louis Quatorze period, and even of the carved stonework of the buildings. Such men as Vanbrugh, James Gibbs, and William Kent derived all their inspiration from the early revivalists of Classicism, Inigo Jones and Wren;—as they, in their turn, became the authorities on all matters of architecture and decoration in the last century. Yet we cannot say that Chippendale's designs or those of Sheraton's were mere tame reproductions. They infused their own taste into their work, and produced furniture at once graceful and refined. So, in the same sense, we can take any number of modern designers of ornament who have followed the traditions of Classic, Mediæval, Renaissance, Chinese, Persian, or Japanese ornament, who, by mastering the principles of one or other of these styles, have been able to give us designs for wall-papers, curtains, ceilings, and other fabrics worthy of the past. In

short, we have tried to indicate the work of one class of imitators—those who bring to their task judgment and a sound knowledge of traditional treatment; but imitators are made up of other kinds as well. We have those who design who have no knowledge of the traditions of their art, and who depend more or less on modern examples. They base their designs on works by architects more or less eminent in their profession, and are not over-desirous of going to the original. They are second-hand imitators; but perhaps they do better at this than venture on their own or any unbeaten paths. They find safety in following. But there is a third class of men who, while they would reject with indignation the term "imitator," have been unconsciously, it may be, imitating all their lives. Their lack of reverence for the past, their claim to be original, and their desire for independence of all tradition, have served to give their works in a few instances an interest; but despite all they say, their designs evince as close an observance of style and precedent as any of their compeers. Then we have the ignorant imitator—the man who has no judgment or discrimination; but of this class we need not speak. It is sufficient for our purpose to show that in the majority of instances of design and craftsmanship imitative processes are commonly found, and that in the best works the authors have followed a law of observing points of agreement and similitude in the works of others. Under the lowest conditions—"Inferior eyes that borrow their behaviour from the great"—imitation may be better than novelty.

PROFESSIONAL INSTRUCTION.

THE irreducible minimum of knowledge necessary for those who practise architecture has been rather obscured by the attempts to raise the qualifications of its members. Instead of teaching a few things well, authorities on professional education have been tempted to put before the student a large number of subjects more or less allied to the calling of architects, for which only a superficial knowledge can be expected. This attempt to raise the qualifications of the architect has rather defeated itself by keeping a large number of students back from an ordeal they are not willing to undergo. Imagine an architect's pupil attempting to become proficient in such varied and opposite sciences as chemistry, mathematics, physics, and geology by a course of lectures, to be followed by another course treating of building construction, and the various trades and arts of which it is composed. No doubt an intelligent youth will acquire a general smattering of these subjects, but of what practical use or application is a question of doubt. If they are gone through before he enters an architect's office, it is ten chances to one that he will quickly forget all he has learned by the time his term expires, and that during his pupilage he will relieve his mind of all his school training. Is it at all probable that a pupil will trouble his head about the mathematical principles involved in a piece of construction he may be engaged on, or that he will be able to apply his mechanical learning to the stresses of a roof or the equilibrium of an arch, &c. It is very doubtful whether he retains in his memory the rules he learned respecting the composition and resolution of forces, and the application of those principles to practical building. Does he remember the principle of "moments" sufficiently to be able to put them to any account? How far, too, does his knowledge of geology come to his aid when he is visiting any building?—or his chemistry smattering help him in his study of the solvent properties of acids on stone? It seems to us much of the practical value of this pre-pupilage training is almost lost, except, indeed, as a discipline, and all educational methods are valuable as disciplinary. In fact, school or college training can give all that is necessary in a general academical sense. Far better to postpone the professional course till the actual time of pupilage, and the second year of the term seems to be an appropriate time for the pupil to begin a course of instruction on these subjects, so that they may be carried on concurrently with his practical office work. If this could be managed agreeably to the master, and without overtaxing the pupil, what a gain it would be to the student, for the course of studies could be so arranged that it would help the student just when he is beginning to pick up his facts and experience. He wants to know, for instance, why walls of brick are made of certain thicknesses, generally by additions of half-a-brick; what bond is; why footings are formed as they are; how concrete and mortar are made. At that very time he would learn the *rationale* of the whole thing. Natural doubts as to the composition of brick, the varieties of stone, the qualities of timber, would speedily be set at rest by lectures on these subjects, which no master could afford to give himself. As he advances in his office experience, he wants to know why this and that is done? why roofs and partitions should be framed as they are? and a hundred other questions of a constructive kind will suggest themselves for solution. At this juncture the pupil will begin to feel a real interest in discovering the reasons why and wherefore. He will find his progress wonderfully assisted by the alternate aids of the drawing desk at office, and the classroom lecture or demonstration; by having to draw the construction to scale, and hearing the theory explained. Thus, theory and practice will go on hand in hand, and the mathematical demonstration will, having something practical associated, be more clearly understood and remembered than if given as a school subject months or years before the practical exemplification appears.

But it may be asked, what ought the minimum of attainments to be? We answer, just sufficient mathematics to enable the student to work out a formula, or to solve equations on structural questions; just enough mechanics to enable the student to determine the stresses of a structure of stone, timber, or iron. Sufficient geological knowledge may be given to enable the pupil who has any curiosity to find for himself to what particular stratum or formation a particular stone belongs, and from what bed it has been obtained, and to know the varieties and properties of the great limestones and sandstones of his country, at least. To expect a young man who has a dozen or more very important and practical subjects to take up and become familiar with in a short period, to know more, is to expect him to do an impossible thing. Of what immediate use, for instance, would it be to question him on the specific gravity and chemical constituents of any of the Plutonic rocks or greenstones, or in what strata the serpentine rocks of Canada are to be met with, in what series, or in what group. It will be enough if he knows sufficient mineralogy or chemistry to enable him to describe the mineral character, the specific gravity, the percentage of silica, lime, and other properties and durability of stones which are in use every day. In physics, ventilation, heating, and sanitary science he ought to know sufficient to enable him to understand all that is necessary to healthy habitation and construction; all beyond we should advise him to defer till after his term has expired, and he thinks of preparing for one of the professional examinations, when a more advanced and comprehensive course might be gone through at the option of the candidate. Till this period arrives, we think the pupil's attention and study should be limited to a few of the main scientific facts and principles of his art, and these should be learned thoroughly instead of being mixed up with a lot of irrelevant matter that may never be wanted, or, what is quite as stupid, their points of application to architecture and building obscured or lost sight of amid a vast number of distinctions and details. The courses of instruction given at King's College, University College, and at the technical schools and colleges in London afford the pupil facilities for carrying out the arrangement we suggest.

In this connection we may mention a Bill, the sections of which are before us, providing for the examination of architects and regulating the practice of the profession in the State of Illinois. The Ontario Association of Architects have already taken a similar course. The examination will have special reference to the construction of buildings, and will test the knowledge of the candidate in the strength of materials, and as to his ability to make practical application of such knowledge in the ordinary professional work of an architect, and in the duties of supervisor of mechanical work on buildings, especially in the laws of sanitation. The Bill has passed the Legislature, and is a proof that Trans-Atlantic architects are beginning to see the advantages of a certificate of competence.

ELECTRIC LIGHTING NOTES FOR ARCHITECTS.—V.

By an Assoc. Inst. Elect. Engs.

THE GENERATION OF ELECTRICITY.

MAGNETIC FIELDS.—Electricity may be produced in a variety of ways. For commercial purposes, such as electric lighting and the transmission of power, in which cases the quantity of electrical energy required is usually large, the only method at present of supplying the necessary quantity is by transforming mechanical energy into electrical energy by dynamo machinery. We shall therefore consider briefly the fundamental principles, and the different types of dynamos used for lighting purposes. As many are no doubt aware, the two essential parts of a dynamo are—(1) the pole-pieces or magnets, and (2) a rotating bundle of conductors forming the armature. To understand the function of the magnets, we must refer to some elementary

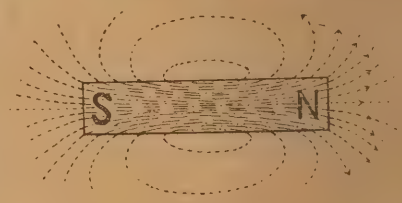


Fig. 3.

principles of magnetism. Everyone at some time or other has had some experience with bar or horseshoe magnets, and we shall assume that the effect which a magnet has on a compass needle, the tendency of a compass needle to set itself in a definite direction in space, as well as the powerful manner in which a magnet attracts pieces of iron and steel are well known. These properties, possessed by all magnets, imply the existence of force, and each impresses us with the fact that magnetic force can be transmitted across space, and that the surrounding medium is under a strain. Technically, any region or space within which magnetic force manifests itself is termed a magnetic field. All magnets and the earth have magnetic fields, and everywhere in such regions the magnetic force has a definite direction and magnitude. If iron filings be sprinkled upon a sheet of paper placed over a bar magnet, it will be found that the filings arrange themselves so as to form curious yet beautiful curves connecting the two ends of the magnet.

Such a picture is shown in Fig. 3, and as it graphically represents the directions in which the magnetic force acts, it is very useful as giving an insight into the nature of magnetic fields. It will be observed, for instance, that near to the ends of the magnet the filings are crowded more closely together, whilst at other parts of the

magnetic field the filings are less densely distributed. Faraday, who adopted this method of investigating magnetic phenomena, conceived the idea of denoting the strength of a magnetic field at any point by the closeness of the filings, and, as a result, introduced the "line of force" theory, a conception which has enabled physicists to grasp and explain many electrical and magnetic phenomena previously not understood. A line of magnetic force is an imaginary line in a magnetic field, which at every point is in the direction of the resultant magnetic force at that point. A field of unit strength is assumed to have one line per square centimètre, and the number of lines of force per square centimètre is a convenient method of representing the strength of a field. From the above figure giving the magnetic field of a bar magnet in one plane, it appears as if the magnetic force springs from two centres of force or points of maximum intensity, situated very nearly at the ends of the magnet. Such points are called the poles of the magnet, and the quantity of magnetism, acting as if concentrated at a pole, is termed the strength of the pole. Important as Faraday's conception of the line of force theory undoubtedly was, it was as nothing compared with his later discovery (in 1831) respecting the induction of currents. For a long time previous to 1831 it had been known that a very close connection existed between electricity and magnetism; but it was not until Oerstedt, of Copenhagen, in 1819, made the discovery that currents of electricity set up and maintain magnetic fields around the conductors through which they are passing, that the true connection between electricity and magnetism was understood. In fact, the conductor is equivalent

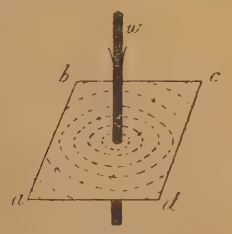


Fig. 4.

to a magnet so long as the current lasts, and the magnetic field set up is identical in its properties with the field due to a bar magnet. If a picture be obtained (by means of iron filings) of the field set up by a current, it will be found that the lines of force are circular (the filings being arranged in concentric circles about the wire as a centre), and that the magnetic influence extends some distance from the wire. The strength of the field at any point depends upon the strength of the current and the distance from the wire. Such a field is shown in Fig. 4, *a b c d* being a piece of cardboard in a horizontal plane, and *w* being the conductor threading the cardboard vertically. The direction of the current is denoted by the arrowhead.

When the wire is coiled, as in the upper part of Fig. 5, we have an electro-magnetic spiral, helix or solenoid, and upon investigating the magnetic field which is set up when a current circulates through the coils, we find that within the coil it is intense and uniform, and that its direction is parallel to the axis of the coil, except at the ends. The lines of force are denoted by the dotted lines in the figure. Externally the magnetic field exactly resembles that of an ordinary bar magnet, and, so far as its magnetic properties are concerned, the coil is an ironless magnet so long as the current lasts. It is important to notice that the magnetic field and its properties completely dissappear immediately the current ceases.

As is well known, unmagnetised iron and steel become magnetised when placed in a magnetic field, so that if a rod of iron or steel be placed within the coil, as in Fig. 5, B, the metal is strongly magnetised when the current passes. The hollow coil, Fig. 5, H, is simply a magnetising coil, the magnetic field of which is of definite intensity, being represented by H lines per square centimetre. With a soft iron core inside (Fig. 5, B) the intensity of the resulting field for the same current is represented by B lines of force, B being much greater than H, from which we see that the presence of the iron increases the intensity of the field by (B – H) lines per square centimètre. What actually takes place is that the H lines due to the current magnetise the iron by induction, and thus create (B – H) lines in the iron core. The result of placing iron in the coil is two-fold—(1) It concentrates the lines of force, iron being a good conductor of magnetic lines of force; and (2) it increases the number of lines by induction.

B is known as the magnetic induction. With the quality of iron used for dynamos, B is one

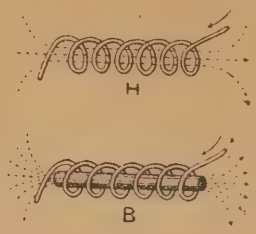


Fig. 5.

thousand or more times H. The arrangement represented by Fig. 5 B is termed an *electro-magnet*, and, as we shall presently see, it is essential to have very intense and uniform magnetic fields for the production of currents of electricity by mechanical means. In practice such fields are produced by arranging one or more pairs of electromagnets, as shown in Fig. 6, so that in the space S the field is very intense and uniform, as shown by the dotted lines. The parts P P, E M, and Y are the iron parts of the dynamo, E M being the cores of the electro-magnets (the coils of wire not being shown), Y is the yoke connecting the cores, and P P are the pole-pieces. The pole-pieces are arranged so as to concentrate the lines of force between the poles of the cores, and are also shaped so that the armature may rotate in the space where the field is intense.

Induction of Currents.—The phenomenon with which we are mostly concerned, however, is the generation of an electrical pressure by the rotation of the armature in a magnetic field, and, as we have already mentioned, it was in 1831 that Faraday discovered that a current is induced in an independent circuit placed near a magnet whenever the relative positions of the two change. This discovery was the most important and brilliant achievement of the many announced by Faraday, as it marks the beginning of a new era in the history of electricity and magnetism, and undoubtedly it is the foundation upon which the whole superstructure of electrical engineering has been built.

Faraday's discovery, it will be observed, was the converse of that of Oerstedt, and Faraday appears to have clearly foreseen that the setting up or changing the strength of a magnetic field of force around a conductor would generate a current in the conductor (if it formed a closed circuit) just as the starting of a current in a conductor sets up a magnetic field of force around it.

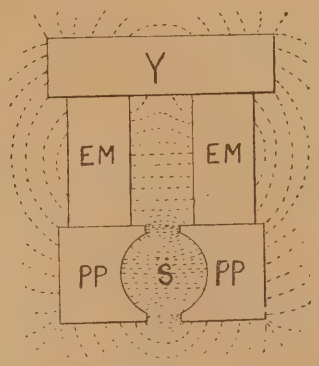


Fig. 6.

To get a clear insight into the cause of induced currents, let us consider what takes place when relative motion takes place between a magnet and a closed coil of insulated wire. As we have already explained, the medium surrounding a bar magnet is filled with lines of force which radiate from the N. pole on all sides, and it is obvious that when the coil is placed near the pole of a magnet, as at A, Fig. 7, more lines of force will pass through it than when it is farther away, as at B in the same figure. Consequently, when the coil is moved from A to B a change is produced in the number of lines of force passing through the coil, and when this takes place an induced current is set up in the coil, which, however, lasts but for a moment. If the coil be moved towards the magnet, the number of lines of force will be increased, and a momentary induced current will be set up in the opposite direction. But we know that if a current be produced there must also be an E.M.F. set up in the coil, and this is known as the E.M.F. of *induction*. This E.M.F. is set up (when the above changes take place) whether the circuit is closed or not, the E.M.F. of induction always being produced when the intensity of the magnetic field surrounding the conductor is changing, and the magnitude of the E.M.F. set up is a measure of the rate of change in the intensity of the magnetic field. The two extreme cases are, when the magnetic field is set up around the conductor and when it collapses, and it is immaterial whether the conductor is introduced into a magnetic field or is removed from it, or whether a magnet is brought near the conductor or is removed from it. The existence of the induced momentary currents may be shown experimentally by inserting a delicate galvanometer in the conducting circuit.

The Dynamo.—We thus see that the broad features underlying the production of induced E.M.F.'s is the interaction between a magnetic field and a conducting circuit, and we may mention here that it is to the credit of engineers that mechanical means were soon devised and efficient machines constructed, with the result that the momentary induced currents discovered by Faraday may be used on a commercial scale.

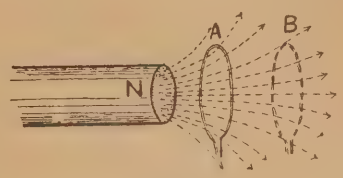


Fig. 7.

The dynamo, however, does more than interlink a conducting circuit with a magnetic field. It produces an intense magnetic field, and permits of the rotation of an armature in that field, so that the lines of force are cut at a rapid rate, and an electrical pressure set up in the rotating armature; in addition to this it also collects and delivers to an external circuit an unlimited quantity of electricity without interruption. We scarcely need point out that the mechanical energy expended in driving a dynamo is greater than the electrical energy produced; it is, however, difficult to understand how the mechanical energy is absorbed. We have seen that the magnetic field is under a strain, and it owes its properties to the medium being able to withstand the application of the stress, whilst in the conductor forming the armature the field breaks down in consequence of the energy being conducted away, so that the mechanical power has to be continually supplied to build up the field (in the conductor) as the conducter is being rotated. The energy conducted away may in its turn do useful work in the external circuit.

As we have indicated, the armature is usually the moving part, although in some machines we have the converse arrangement—*i.e.*, rotating field magnets and stationary armature. Generally generators are divided into two distinct types of machines—*i.e.* (1), the direct continuous-current dynamos, and (2) alternators. The latter class are typical of the machine so far explained, since we have not mentioned any arrangement for rectifying the alternating character of the current produced. A little reflection will show that a coil of wire rotated between the pole-pieces will be emptied and filled twice each revolution; consequently the direction of the current will be reversed twice each revolution, and, as the armature makes a large number of revolutions per second, the character of the current will be that of a wave rising and falling the same number of times per second—that is, we have an alternating current. Except in central stations for supplying large and extended areas, this type of generator is not in general use; consequently we shall deal specially with the direct continuous-current dynamo, and show how the alternating currents are changed into direct currents.

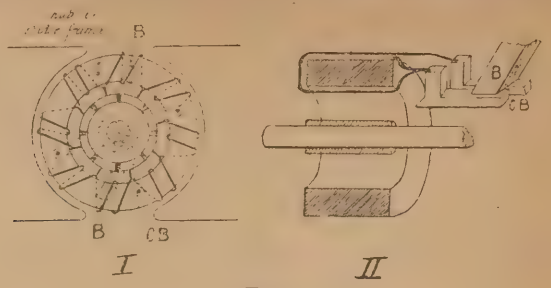


Fig. 8.

The Armature and Commutator.—The armature in many respects is the vital part of the generator. It consists of spirals of insulated wire wound on an iron core. When we remember that the function of soft iron placed in a magnetic field is one of concentration, it will be seen why iron cores are used. We have already mentioned that the magnitude of the electrical pressure set up in the rotating armature is proportional to the rate at which lines of force are looped with the conducting coil, and it is evident that this rate, and consequently the E.M.F. produced, will be increased by augmenting the number of lines of force passing through the coils and also by increasing the speed. These iron cores are of two kinds, giving rise to two fundamental types of armatures, known as the ring and drum armature respectively. With the ring armature, as the name implies, the core is of the nature of a ring, or, more correctly, a hollow cylinder built up of a large number of soft iron discs bolted together, and the wire is wound on as shown in Fig. 8 I.

Fig. 8 II. shows a section of the core with the method of connecting the wires to the commutator segments. The reason the core is built up of discs, and the plates electrically separated from each other by paper, as they always are, is to prevent the production of eddy currents in the core. These currents are always produced in large quantities when a solid mass of conducting material is alternately magnetised and demagnetised, and as they must of necessity spend themselves in the material, immense quantities of heat are produced, and this, of course, means so much waste. The core, built up as we have explained, is rigidly secured to the rotating shaft by means of a hub or spider-frame made of some non-magnetic material, as shown in Fig. 8 I. The conductor may be one continuous coil wound in section as shown, the ends of each section being metallically connected to

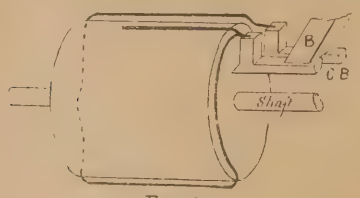


Fig. 9.

successive pairs of commutator bars, C B in the figure, on which the brushes (B) press. The function of the brushes, which usually consist of copper gauze pressed together, is to establish communication between the armature coils and the external circuit. They play no other part in the production of electricity.

The drum winding will be understood from Fig. 9, from which it will be observed that nearly all the wire forming the armature is actively engaged in cutting the lines of force, since they are all external wires; whilst with the ring winding less than half is used for that purpose, all the internal wires being unable to cut the lines of force. With both kinds of winding the wire is wound compactly, and since there is a powerful pull exerted on the wires which resist the motion of rotation when a current passes through the armature, the conductors are bound together by binding-wire, so as to prevent the armature conductors flying asunder.

The commutator is built up of wedge-shaped bars of hard copper, phosphor-bronze, or gun-metal, insulated from each other by thin strips of mica. The function of the commutator is to rectify the current, it being simply a device by means of which the alternating currents in the armature are made to flow in one direction only in the external circuit, to which the commutator is connected by means of the brushes. Commutators are not used in alternators, the undulating character of the current being given to the external circuit by means of positive and negative collecting rings.

(*To be continued.*)

NOTES ON SURVEYING AND LEVELLING.—I.*

By Walter Tester.

There are several textbooks which deal with the construction, adjustment, and reading of the theodolite and level, and it is not proposed in these articles to discuss that portion of the subject, but to consider some examples of surveying, setting-out, and levelling with these instruments which have actually occurred in practice. There will also be introduced incidentally many practical points which arise on any large architectural or engineering works, which are dealt with by the men on the ground, and which the men in the office never bother their heads about. Any average surveyor knows how to set and read the theodolite and level in the office; but let him be sent out on to the site and required to set out some work on the ground, and he will find himself confronted by a number of obstacles and difficulties never thought of in the office. The ground is perhaps exceedingly irregular and covered with trees and brushwood, or perhaps building materials and plant are in the way of his lines.

It is the object of these notes to try and give him an insight into the manner in which such difficulties are overcome, by examples based upon works actually carried out, and, in order to make everything as clear as possible, some of the drawings, dimensions, and data from which these works have been executed will be reproduced.

The examples are taken from works recently completed, or now in progress, at the New Brighton Tower grounds, under the management of, and from designs prepared by, Messrs. Maxwell and Tuke, the architects and engineers, and it is by their kind permission that many of the drawings accompanying these Notes are reproduced.

The intention in these articles is to make the surveying operations as carried out at the New Brighton Tower works a groundwork or basis for an instructive series of examples in the use of the theodolite and level, and in surveying generally. It must, therefore, be understood that these notes are not necessarily a description in detail of the methods there employed, but that the latter have been more or less modified to suit the requirements of these examples.

It will readily be understood how admirably suited for the purpose the New Brighton Tower works are from the following classification of the proposed articles:—

(1) Survey of site and preliminary levelling operations.

(2) Setting out tower buildings, octagonal in shape, with four wings off alternate sides of the octagon.

(3) Setting out the base of a steel tower, also octagonal on plan, with eight main pillars, one at each corner of the octagon.

(4) Setting-out the athletic grounds, consisting of central football-field, around which is a running-track, and outside the running-track, and separated from it by a grass verge, is a cement cycling track.

(5) Setting-out a circular building under the end of cycle track.

(6) Setting out approach roads to the buildings, also walks and drives in various portions of the grounds, lake, &c.

SURVEY OF SITE.

Let us imagine our surveyor sent over to New Brighton, with instructions to make an accurate survey of the site shown on the plan, Fig. 1, and to get a series of sections up the cliffs at the river front, and as many levels as he can in a limited time. He should previously have made sure that his instruments are in adjustment, and all his tackle in working order, and he should have provided himself with two chains in case of accident. His first care will be to have a good look round the site and to make up his mind the best way to get his lines through. He finds that there are many obstacles in his way—the ground being densely covered with trees and brushwood, and being exceedingly irregular in outline, consisting for the most part of blown-up sandhills. The site is an old family residence, and the family being still in possession, the surveyor is to do as little damage as possible, and is on no account to cut down any trees to clear his lines. The accompanying plan, Fig. 1, will give a correct idea of what the site is like, and we will suppose that the surveyor has provided himself with a copy of the Ordnance Survey to $\frac{1}{2500}$ scale, or 208·33ft. to the inch (the $\frac{1}{500}$ scale is not published), which will help him considerably to localise points on the ground. Having taken a thorough look round and familiarised himself with the position of the buildings and other features, he should by this time have made up his mind how to arrange his main lines. His first object is to get the boundary of the estate surveyed, and in this case it is well defined, a wall having been built all round the grounds.

The plan, Fig. 1, shows the lines selected, and it will be as well to give a few words of explanation why they are adopted. The line A B is first chosen practically parallel to the boundary-line at this side. It is kept as close up to the boundary as possible, so as to reduce the length of offsets, thereby diminishing the chance of meeting with obstacles on the offset lines, this part of the ground being covered with trees; it will also otherwise facilitate the work. The portion at the top of the cliff is first fixed so as to clear all trees, and it is then produced down on to the river front by means of the theodolite, the instrument being set at a point in the line near the top edge of the cliff, and the vertical hair being made to coincide with a pole placed at A; then, the instrument being clamped, the telescope is turned completely over, and the line produced in the opposite direction. This is on the assumption that the instrument in use is a transit theodolite; if it is not, the only way is to set round an angle of 180°, and it is advisable to do so even with the transit, as a check to see that the axis of the telescope is in adjustment. The line A B should be run well out on the river front, and two points M and B marked on it. These points should be retained by driving a long nail or an iron bar into the rock which we will suppose crops out here and there above the sand. The theodolite should next be placed over the point B, and a right angle set out off the line B A in each direction towards K and C. The reasons for having two lines at the river front are these:—(1) The point B being well out from the cliff, a good long sight can be obtained along the line B A, making the angles A B C, A B K, truly square off B A. (2) The line K C is too far away from the front boundary, so that L M has to be used for the offsets. (3) It is required to get a series of parallel sections up the cliff at the river front, and the two parallel lines are to be used for setting these out. This is also the object of making these lines square off B A, it being the intention to use that line for the first section. All that need be done to mark out the other sections is to measure out along each of the lines B K and M L a series of points, the distance apart of the sections, and taking the corresponding points in each line, they can be sighted up to the top of the cliff; M L and B K being kept well apart, and the ground at the river front being nearly level, the section lines can be accurately and quickly marked out. Of course the surveyor does not set these section lines out yet, but simply retains the requisite points.

The next line the surveyor settles is one along Egerton-street, marked C D, and this presents little difficulty, as the ground is clear; the only point to be noted is that he will have to fix the portion of the line near D first, and produce it towards the river with the theodolite, as described for A B, marking the point C. The portion D F

* The illustrations by kind permission of Messrs. Maxwell and Tuke, the architects and engineers.

NEW BRIGHTON TOWER

PLAN OF SITE

Fig. 1.

of this line is required for the boundary of the estate, which comes up to Egerton-street just here, and it is, in any case, desirable to put the full length of Egerton-street on the plan from the point F down to the river front. The line C D also serves to complete the closed figure A B C D E, of which more will be said presently. The line D E is for taking both sides of the short street shown on the plan, and it is not necessarily at right angles to C D; if it is not made so, the angle C D E will require to be measured. The surveyor finds he cannot conveniently produce the two lines B A and D E to meet, owing to the height of the boundary wall and the ground on the estate side being low-lying. He therefore closes up the figure with the line A E, the point A being on a rise of the ground he is able to see over the boundary wall to the point E.

The surveyor must measure accurately with his theodolite each of the angles A B C D E (it will not be necessary to take the angles B and D, as they are set out at right angles with the instrument), and the sum total of these angles, if accurately measured, will amount to 540°. And here the opportunity will be taken of pointing out a useful little rule for finding the sum of the angles of any closed rectilinear figure.

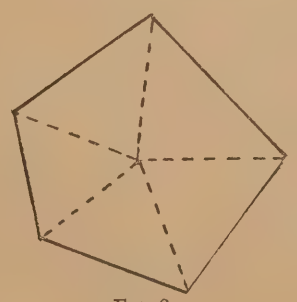


Fig. 2.

Take a figure of shape shown on the sketch (Fig. No. 2), having five sides. Select a point inside the figure, and join a line to this point from each of the angles.

The area of the figure is now split up into five triangles, and as the three angles of every triangle add up to 180°, the sum of the angles of the five triangles is 5 × 180 = 900°. There are obviously 360° in the five angles at the central point, and deducting 360 from 900 = 540° for the sum of the ten angles at the corners of the original figure. This method applies to any rectilinear figure, whatever the number of sides, the rule to find the sum of the angles being—multiply the number of the sides in figure by 180 and deduct 360. It also applies to a figure of the shape shown in the sketch (Fig. 3), containing an angle exceeding 180°, taking, of course, the angle as dotted. The surveyor should always, if possible, make a closed figure as here shown, as he can then check his angles in the way explained; and if they do not add up to the correct total, he will have to go over them again to find where the mistake lies.

We now come to the main figure C G H J K (Fig. No. 1) of which the lines K C and C G are already marked out. The surveyor walks over ground from F towards J, with a view to fixing a line adjacent to the boundary, and

he finds that this is the most irregular and difficult portion of the site to get his lines through. He decides that the easiest way to deal with this line is to let it cross to the outside of the estate near J, the ground thereabout having been levelled for a school playground. Standing on a ridge about midway between H and J, he can see towards F as far as point H, which is at the top of a sharp rise, the ground near F being a deep hollow; this ridge is the only spot from which he can see towards J. He sends a man with a pole to a point near H, which can be seen from the ridge, and he finds that the only point on the line D F from which this pole can be seen is at G by looking through the entrance gateway. It should be understood that there is a high wall along Egerton-street, from G to F, and that he cannot possibly see point H over this wall. He can now fix the points G and H, and setting his theodolite on the ridge between H and J, he can produce a line towards J by turning the telescope over, as already described if a transit, or by setting round an angle 180° if not. Point J can now be marked. In the same way this line can be produced towards F by setting the theodolite at H. There is no difficulty

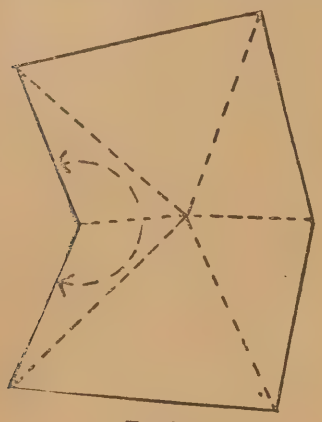


Fig. 3.

about the line J K, as it runs down a portion of ground belonging to the estate formerly used as an entrance road; the only point that needs mentioning is that it will have to be produced down on to the river front in the way described for lines A B and D C by turning the telescope of the theodolite over. Having completed the closed figure C G H J K, he should next take each of the angles, and these, when added up, should come to 540° as already explained. The point L should be marked on the line J K, making K L equal to B M (K L should be measured along a line square off K B, if the angle at K is not a right angle).

All the main lines being fixed, and the angles accurately taken, it only remains to measure the lines and take the offsets in the usual way. However, care must be taken in working up the cliff, to get the chain up level, and to see that where it is held up off the ground that it is plumb over the point. It is better, if the surveyor can spare the time, to measure all the main lines first before taking the offsets, working up the slopes with the tape, which can more easily be held up level, and carefully plumbing up where the tape is held off the ground with a plumb-bob. He will have to go over the lines again, and take the offsets, and this will be a check on his lengths. He will in this way satisfy himself that his main dimensions are correct, and, being sure on this point, should have no difficulty whatever in plotting the survey.

FILLING UP THE INTERNAL FEATURES.

The surveyor has not much choice in selecting the lines for putting on the drives, walks, &c., and he cannot do better than let the lines follow them in direction as shown on the plan (Fig. 1), taking as long lengths as the bends in the roads will permit, and joining the lines at the ends into the main ones of his survey. In this way he will make two closed figures, A N O P Q K B and Q R S T U B K, and each of the angles of these figures should be accurately measured (where not already taken) with the theodolite, and the sum of the angles of each closed figure checked by the method already given.

Advantage should be taken of any open spaces to obtain cross measurements to tie the lines together, and any further lines that are required, as for instance, N W or X V can easily be connected to those already fixed by angles and measurements; in fact, the surveyor can form a number of secondary closed figures. It will readily be understood that when the main lines are accurately fixed in position there will be little difficulty in tying on the buildings, and offsetting the drives and walks in the usual way. The surveyor can also take any measurements and notes for filling up on his plan the portions of the ground which are covered with trees, or for putting on any other features of the ground. His sections will also help him in this respect.

NOTES FROM PARIS.

THE ancient and fine Chateau d'Amboise, the birth and death-place of Charles VIII., and in 1850 the prison of Abd-el-Kadir, is at present undergoing a thorough restoration and transformation in view of making the building more suitable for the purpose of inhabitation. The chateau, situated amidst magnificent gardens on the hill-side overlooking the town of Amboise, was, on the death of the Comte de Paris, bought by the Duc d'Aumale with the intention of installing it as a retreat for the old servants of the family of Orleans. The work of restoration and reconstruction is proceeding fast, the fine Louis XIII. pavilion is nearly completed, and it is intended that the building shall be completely finished and installed for 1899.

The Ouest Railway Company have now submitted to the Minister of Public Works the plans and elevations of the new station which it is proposed to raise on the Esplanade des Invalides, and which will form the terminus station of the Moulineaux railway on the left bank of the Seine. It will be remembered the discussion and bitter feeling which the idea of building a railway station on the fine esp'anade caused some little time ago, and the protests made by the Amis des Monuments Parisiens against the spoiling of the esplanade and the view of the Hotel des Invalides, protests which, however, gave way before the promise that the station should be built entirely underground. This station will, however, be much more important than was supposed by the defenders of the esplanade, for it will receive the important lines of the Ouest railway from Brittany and Normandy viâ Versailles and Mantes, as well as several suburban lines; it is, therefore, found impossible to establish the whole building entirely underground as was promised; the façades will rise considerably above ground, and it is regarding the aspect of the elevations above ground that the Minister will have to decide. There will be two buildings, one on either side of the esplanade, and the station will be connected by a platform on both sides with the new bridge Alexandre III. The buildings are designed in the Louis XIV. style, which is that of the Hotel des Invalides; but, although the elevations are somewhat effective, it is doubtful if they will be at all in keeping with the palace built by Louis XIV. for the veterans of his armies.

The Union Centrale des Arts Decoratifs has decided to open a competition for the purpose of provoking the creation of original designs and objects of decorative work destined to figure at the Exposition Universelle of 1900. The programme states that the various compositions should present a certain harmony of purpose and unity of idea, such as designs for the fixed or movable decoration of the dwelling, furniture, utensils, &c., or, again, the ornamentation of the person, such as silks, cloths, jewels, &c. Each competition is fully open to artists and artisans, and the greatest liberty is given to the inventive genius of the competitors and the choice of the ideas they may present. The purpose of the Union Centrale des Arts Decoratifs is to give an incentive to the production of new ideas, which shall not only serve for the embellishment of the luxurious dwellings of the rich, but also be available and fit to enter into the existence and homes of the less wealthy; and, in view of this, the competitors are advised to search out and create objects of moderate price and general utility, and resist giving way to the usual temptation to produce only works of an exceptional richness and costly execution. Prizes to the value of £1,300 are offered, and it is expected that these various competitions will result in the production of artistic novelties suitable to the age, and logically adapted to the many new materials and means of execution which the end of this century places at the disposal of art-workers.

The work of constructing the new bridge Alexandre III., which will cross the Seine in the axis of the Invalides and join the Champs Elysées to the esplanade, is now rapidly advancing. One of the two immense caissons is completed, and is very nearly sunk to its proper depth, the other is nearing completion, as regards construction. The bridge will measure 358ft. in length between the abutments, and 132ft. in width. Its axis coincides with that of the Invalides, but the bridge will not quite form a right angle with the Seine quays. The bridge is being constructed of steel, and will have three articulations, one at each abutment and one at the centre, forming one low-centre arch. The dimensions of the caissons are 145ft. by 110ft. and 13ft high, and will contain 208,000c.ft. of masonry and concrete. The construction of these two enormous caissons is being undertaken by MM. Daydé and Pillé, two well-known and experienced constructional engineers.

The demolition of the Palais de l'Industrie is now completely terminated, and the architect of the new palais, M. Girault, will at once commence setting out the foundations of the new building.

The Office of Inspection of the Quarries of the Seine has just published an interesting album of plans, sections, and particulars of all the known ancient quarries and catacombs which undermine whole quarters of Paris. As all particulars are given of the exact positions, heights, and widths, and depths under the surface, this album will be highly useful to all intending purchasers of building land in Paris and to the contractors for the building work; it will also help to avoid the unpleasant discovery, now so often made after purchasing ground for building, of the deep quarries which may undermine the site, and which necessitate costly walls of masonry and deep foundations for the proposed building; it will also enable the contractors to estimate to a near degree the cost of the foundations, which, in many cases at Paris, forms one of the most important items in the cost of building. In two recent buildings which the writer has undertaken the quarries under the site necessitated foundation walls to a depth of over 40ft., and in the smaller building the nine masonry pillars destined to support a simple two-story house were carried down to this depth, costing a considerable sum, and affording an unpleasant surprise to the client, who had no idea of the nature of the subsoil when he purchased the ground. The superficies of the quarters of Paris which were employed for excavating gypsum and building-stone is estimated at 7,800 acres, and, of the twenty arrondissements of the city, seven only are free from any known excavations, all the other quarters being more or less undermined. The abundance of these two materials for building is probably one of the chief causes which tended to produce such a rapid development of the old City of Lutèce. The 14th arrondissement is simply honeycombed with underground quarries, which develop a length of nearly 800 miles, of which 280 have been consolidated at various times. The distance from the level of the streets to the roofs of these quarries varies from 23ft. to 100ft., and the average height of the galleries is 6ft. The catacombs or ancient ossuaries have a superficies of 500 acres only. A large proportion of these various galleries, some of which are superposed in three tiers, have been filled-in to a certain extent, or have, as was done with those under the Buttes Chaumont, been destroyed by blasting, and the fissures formed on the upper surface filled in. After the many serious accidents which took place in 1774 the Government began to look into the question of inspection and consolidation, but it was not until 1813 that any serious measures were taken. Since that time a great deal of work has been done in strengthening some of the galleries and filling-in others, and, owing to the constant danger of a subsiding in one or other of the streets, a continual and careful inspection is made; but it is thought probable that there still remain a large number of galleries which have not as yet been discovered.

One of the first of the more important competitions for the buildings of the Exposition of 1900 has lately been opened by the Ministre de la Guerre for plans and designs for the buildings to contain the exhibitions of war and marine, and the military exhibition, to be placed on the Seine quays, near the Champ de Mars. The buildings will be important and occupy a considerable space; that of war will cover 65 acres, and that of marine 32 acres, while the exhibitions of modern and ancient implements of war will occupy 25 and 37 acres respectively.

The well-known and respected Parisian archi-

tect, the late M. Henri Blondel, not long ago one of the richest of his contemporaries, has just died in absolute poverty. Born at Reims in 1822, he since rose from the state of a simple workman to that of an architect intrusted with the most important private work at Paris, from 1855 to his death, and during this time contributed greatly to the embellishment of Paris. His ability and knowledge of business enabled him to find work where others saw little to be done, and he created many vast works of enterprise and speculation. He constructed the buildings for the Caisse des Dépôts, on the Avenue de l'Opéra; the Passage de l'Industrie, on the Boulevard Sebastopol; the immense shops of the Belle Jardinière; the vast Hotel Continentale; the new Quartier Marbeuf, and the Bourse de Commerce on the Rue du Louvre. Two years ago, however, at the age of 72, through a stated error of judgment on his part, or, it may be by reason of a suite of unlucky circumstances, he was found debtor for the sum of 25,000,000f. and declared bankrupt, and other misfortunes followed in the wake of this; the once-rich architect, flattered by all, was abandoned even by those who had become rich through his enterprise, to struggle through the two years of life left him. He was awarded the Medal of Private Architecture by the Société Centrale des Architectes in 1878, after the inauguration of the Hotel Continentale, and shortly after was made Chevalier de la Legion d'Honneur.

A series of interesting experiments are now being made with various materials and substances capable of rendering light materials incombustible, in view of the buildings of the Exposition, and every really practical means of avoiding the danger from fire is being sought after by the Administration. The large wooden building in the Avenue Rapp, which will be used for the general offices of the Exposition, will be at once rendered fireproof by one of the substances proposed; but, as it is probable that incendiary experiments will not be tried on this building, an accident will be necessary in order to show the efficiency in a large building of the means of fireproofing employed.

It is possible that a very important and interesting competition will be opened at an early date for a palace destined to receive the various royal hosts who visit Paris from time to time. There is much complaint that Paris possesses no special building for this purpose: the royal visitors are housed, as best may be, in mansions hurriedly installed for each special reception; and as in 1900 it is hoped to receive more than one royal guest, it is proposed that a convenient and luxurious mansion be erected, and to be called the Palais des Souverains, one practical suggestion being that the ground now occupied by the picturesque, but inglorious, ruins of the Cour des Comptes, be utilised for this purpose.

The Ecole des Beaux Arts, which, for several years has been menaced with ruin, is being restored and repaired. This building is one of the oldest of Parisian monuments—it was in former times the celebrated Hotel de Chimay. The Ecole des Beaux Arts, which now occupies the ancient building, was instituted in 1648 by Louis XIV. after a report made to the king by the celebrated painter Le Brun, and was suppressed in 1793. In 1795, however, it was again installed and united to the Académie d'Architecture.

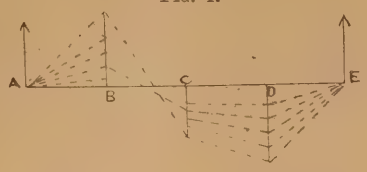
One of the most interesting buildings of the Exposition will be the Palais du Bâtiment, if carried out according to the proposed scheme. The idea is to construct a building which will form a practical application and example of all the newest materials for building work, and all the most improved systems of the art of construction, ventilation, heating, &c.; the most interesting specimens of decorative work for the interior of private buildings, and the latest and most improved applications of sanitary work, electricity, and all the new practical inventions of all kinds suitable to building which this age of research and invention can produce. The idea is certainly very interesting, and the conferences which it is proposed to hold in the building would not be less so; but it seems doubtful if the idea could be properly put to execution, for unanimous decisions on the perfection or superiority of such or such a system or method to be employed could hardly be arrived at.

The corporation of Edinburgh have under consideration a report by Mr. Herring, their engineer, recommending that the gasworks should be removed from the valley between the Old and New Town to some other site elsewhere.

CONSTRUCTION OF ARCHES IN CONCRETE.—XII.

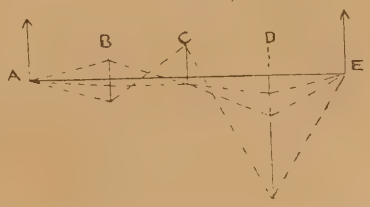
THE construction and testing of the third example of the large bridges of 76ft. span now claims our attention. But, previously to describing it in detail, it will be instructive to refer to Figs. 1 and 2, which record the results

Fig. 1.



of the trials, so far as they influenced the vertical deflections of the arches built of brick and stone respectively. In both figs. the span A E is divided into four equal parts, A B, B C, C D, D E, at each of which the observations were made and registered. To avoid confusion, some of the lines showing the intermediate deflections have been

FIG. 2.



omitted in the diagrams. The concrete arch was given a width of 16ft. and a uniform depth of 2ft. 9in. For some reason, which is not by any means clear, the concrete used was not of uniform consistency, but was mixed in three different

FIG. 3.

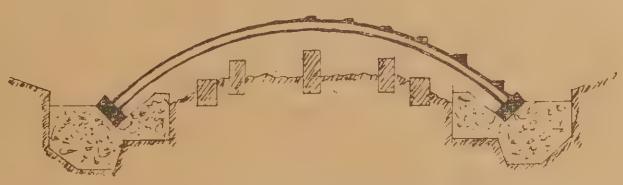
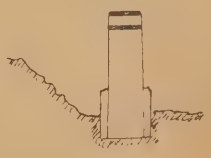


FIG. 4.



proportions, 2 to 1, 5 to 1, and 8 to 1. The first two of these were employed at the intradosal and extradosal points, where, by *à priori* calculation, stresses of a tensile character were anticipated, while the body of the arch was built with the third composition. They were all three thus prepared. Fairly hard sandstone was broken to a 1½in. gauge, the gravel and sand were procured from the bed of the river Danube, and the Portland cement was of an approved and tested quality. In all the three mixtures or classes of concrete the volume of the Portland cement was

FIG. 5.

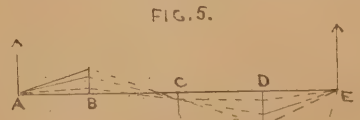
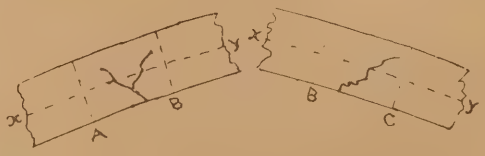


FIG. 6.



constant. Calling this volume unity, the proportions of the other ingredients were as follows: In the first mixture, gravel ½, broken stone ½, sand 1; in the second, gravel 1½, broken stone 1½, sand 2; and in the third, gravel 3, broken stone 2, and sand 3. Four mixers were at work, two gangs of punners and cement masons, and the laying and ramming of the material was carried on with the greatest regularity from each of the abutments to the crown of the arch.

An elevation of the concrete arch ready for trial is shown in Fig. 3, and a cross section through the crown of the arch in Fig. 4, in both of which the different descriptions of concrete used are represented by the two thick black lines and the space between them. It should be mentioned that a sample of every fifth or sixth mixings was taken of the concrete, for the purpose of testing its respective ultimate resistance. The total quantity of concrete composing the arch was equal to 1,400c.ft. After the arch was completed, it was allowed to rest for a couple of months before any attempt was made to strike or even ease the centring. Even when this operation had been satisfactorily effected, a further period of nearly another month was accorded before the actual experiment was commenced. During this long interval between completion and testing the arch was frequently and carefully watered, as it might be called, and was covered so as to be protected from the action of the sun. In all, there were no less than three sets of observations made, to determine and compare, with the greatest possible accuracy, the different displacements, both in a vertical and horizontal direction, to which the arch might be subjected at the various phases before it finally collapsed. The first set of observations was recorded before the striking of the centres took place, the second subsequently to that operation, and the third set registered the results of the application of the successive loads upon the half-arch. The corresponding deflections are shown in Fig. 5, which is drawn to the same scale as Figs. 1 and 2, so that a comparison can be readily instituted. Until the actual point of rupture was reached, the concrete arch did not manifest any serious tendency to deformation. If the half-arch be divided into thirteen parts, the first cracks made their appearance between A B and B C on each separate face, or between the seventh and eighth divisions, as shown in the diagram in Fig. 6. At this juncture the loading was at the rate of 1·71 tons per running foot, and when it was increased to 1·85 tons, some "threads," so slight as to be of no consequence, were observed to have occurred near the springing of the opposite and unloaded semi-arch. Upon the removal of the load, the arch returned to its normal position—righted itself, in fact—as its deflection amounted to only 0·12in. At the same time, the cracks practically closed up; but this recuperative action was only of a temporary character, for no sooner was the load again superimposed than they reopened. It was not, however, until a rate of loading equal to 2·06 tons per foot run was attained that the existing fissures evinced any signs of increased dimensions. With a total surcharge of 83·315 tons, equal to 2·2 tons per running foot, the arch gave way at three points, fairly approximating to the section where the first fissures appeared. The maximum deformation or vertical displacement on the unloaded half-arch did not exceed 0·36in., and the corresponding horizontal deviation was limited to 0·26in.

While the task of breaking up and removing the *membra disjecta* of the fallen structure was in

course of accomplishment, some very valuable and interesting information was obtained bearing upon the general construction of arches of concrete, built on the simple system. In the first place, the evil effect of employing different mixtures of concrete was abundantly in evidence. It was found that in every part of the structure where the concrete was not of uniform composition it separated into regularly distinct layers. For example, the 2 to 1 and the 5 to 1 mixtures, represented by the thick black lines in Figs. 3 and 4, parted completely from that of 8 to 1, forming the body of the arch between them. This circumstance, which is certainly somewhat peculiar, is the more to be wondered at because the three different descriptions of concrete were laid on so quickly that there was every facility for their becoming thoroughly amalgamated and incorporated. It was no question of permitting a layer or layers of one kind to partially set—even to a trivial extent—before the other was laid on it. There was no original straight joint, either vertically or horizontally, in the whole mass. It might be said, in attempting to explain this curious phenomenon, that the concrete might not have been sufficiently well rammed in some parts of the work, and hence there would have been a decided and readily comprehensible tendency for the successive layers to detach themselves the one from the other. This theory, however, will scarcely bear serious and close investigation. To begin with, the greatest care was taken that the ramming of the concrete should be done in the most workmanlike and efficient manner possible, and there is not the slightest doubt but that it was so done. Furthermore, the severance between the different mixtures was universal throughout the whole structure, and not observable only at certain places, as it would have been, had it been due to insufficient ramming. It may, therefore, be safely accepted, judging from the practical and unimpeachable evidence before us, that although there is no theoretical argument against the employment of various descriptions of concrete in one and the same structure, yet the exigencies of practice clearly indicate that but one uniformly-constituted mixture is the best to adopt. A further examination of the *débris* revealed the fact that parts of the concrete were considerably harder than others, and the cause of this difference was distinctly traced to the employment of the three kinds of material. The effect of protecting the concrete in the loaded half arch from the action of the sun, does not appear to have been attended by the beneficial results expected, as there was a considerable amount of humidity discovered in the body of the work. In the other unloaded half, which had not received the same amount of attention as its fellow, there was no evidence of any undue dampness. It should be remarked that the thrusts on the points of support, were efficiently provided for, since the plates of asphalte introduced at each springing performed their duty without flinching—that is, without undergoing any perceptible deformation. Although plates or layers of asphalte or asphalted felt inserted at the springings serve to possibly distribute the load more uniformly over the bearings, it is very doubtful whether they are of much use, so far as allowing any small angular movement to take place. They cannot be said, on the one hand, to have all the advantages of a complete *encastrement*, nor, on the other, do they impart to the arch the benefits of the pin, hinge, pivot, or other form of thorough articulation. They probably occupy an intermediate position, and fulfil a half-and-half kind of duty.

It ought to be stated that the authorities conducting on a scale of magnitude quite unparalleled in the annals of construction the tests and experiments under notice, strongly opposed the use of different mixtures of concrete, and the result amply confirmed their just condemnation of all such heterogeneous compounds. It has been suggested that if a different form of arch had been adopted, which would have restricted to very narrow limits the tensile stresses, the separation would not have taken place. There is one point deserving of attention in comparing the arch of concrete with the similar examples built of brick and stone. It is that the depth of the first, as shown in Fig. 3, is uniform, whereas in the other two it increases from the crown to the springings. In the brick arch the increase is effected by successive radial offsets, and in that of stone it is gradual and regular. There is no question that the depth of the concrete arch should have been increased in the same direction, if not in the same proportion, as in the other two structures. Independently of all practical considerations, the theory of the arch clearly indicates the necessity of this mode of construction, as we shall point out. Let W equal the total load in tons, dead and moving or live load, uniformly distributed over the arch; put R equal to the ratio of the span to the rise, and S and S_1 for the stresses at the crown and at the springings, then we have for the former—

$$S = \frac{W \times R}{8}$$

and for the latter—

$$S_1 = S \sqrt{1 + \frac{16}{R^2}}$$

It is true that these values have to be slightly varied according to the particular manner in which the arch is attached to its supports; but this does not affect the principle we are contending for. Or it may be thus stated, taking θ to represent the angle between the direction of the compressive stress $= S_2$ at any point of the arch, and the remainder of the notation as before. Then—

$$S_2 = S \times \sec. \theta;$$

but as the value of S is a constant quantity, that of S_2 will vary with sec. θ, or as it may be expressed—

$$S_2 \propto \sec. \theta;$$

and since the secant of any angle varies as the value of the angle itself, we have at the crown—

$$\sec. \theta = 1 \text{ and } S_2 = S_1.$$

At the springings θ is a maximum and $S_2 = S_1$.

It has been already mentioned that specimens of the mortar, whether lime or Portland cement mortar, and of the concrete were taken at random during the construction of the arches, and subjected to breaking tests. These varied, for cement mortar, as might be expected, with the different proportions in which the ingredients were mixed, from a minimum of 440lb. to 500lb., and as a maximum to 570lb. per same unit. It must be admitted that these discrepancies, although they are not of a magnitude or importance sufficient to invalidate the results arrived at, yet they do certainly, to some extent, detract from their value. Unless, in making experiments for the purpose of comparing the relative powers of resistance, either of different simple materials, or of structures built of different materials, the conditions are as nearly identical as human skill and forethought can make them, they do not give the thorough satisfaction they would otherwise do. There is an element of doubt, a factor of uncertainty introduced into the results, which cannot be altogether eliminated, and which it is exceedingly difficult to adequately or inadequately, as the case may be, allow for.

CHIPS.

New board schools are in course of erection on St. John's-green, Colchester. Messrs. Grimwood and Son, of Ipswich, are the contractors.

The Trinity Brethren have decided to erect a lighthouse at Pendeen, North St. Just. The point selected is close to the coastguard buildings. It has a full sweep of dangerous coast. Gurnard's Head lies three or four miles N.N.E.

The new chancel of St. Andrew's Episcopal Church, Wishaw, was dedicated on Saturday afternoon by the Bishop of Glasgow and Galloway.

An inquiry has been held in Sheffield with regard to the scheme of the London and North-Western Railway Company for the provision of workmen's dwellings in place of those to be demolished on the erection of the new goods station at the rear of Wharf-street.

Grove Academy, Broughty Ferry, the first portion of which was erected seven years ago, has within the past few months been completed according to the original design, and it was formally opened on Monday by Sir Henry Craik, secretary of the Scottish Education Department.

A difficulty has arisen in connection with the Wentwood scheme of water supply, now in course of construction for the corporation of Newport, Mon., a trench 90ft. deep having been filled with concrete, which has been pronounced defective. Mr. Baldwin Latham, who was consulted, recommended that the concrete should be taken out to the width of one yard, and to the depth of the bottom of the trench. The work is estimated to involve an outlay of £20,000. The undertaking of the Newport Water Works Company was taken over in June, 1888, by the Newport Town Council.

OBITUARY.

A prolific creator of graceful and vigorous Shakespearian and historical characters and a munificent donor to the art collections in the principal English cities has passed away in the death of Sir John Gilbert, R.A., the octogenarian President of the Royal Society of Water Colours, which occurred at his residence at Vanbrugh Park, Blackheath, on Tuesday last, after long suffering from paralysis. Born in 1817, in the village where he died and where he had lived all his life, John Gilbert early manifested his genius, and at the age of nineteen had his first pictures exhibited simultaneously at the Royal Academy at Somerset House, and at the Suffolk-street gallery of the Royal Society of Water Colours, the latter being entitled "The Arrest of Lord Hastings by the Protector, Richard Duke of Gloucester." In 1839 he exhibited at the British Institution, and for half a century his work, both as historical painter and leading artist in black and white, has been constantly before the public. Much of his best work was expended in drawing on wood for reproduction in the pictorial periodicals. It will be recollected that for years he drew all the illustrations for the novels and novelettes which appeared in the *London Journal*, and although much of his work necessarily now appears old-fashioned, the quality was always good and he never repeated himself. His illustrations to Shakespeare, Cervantes, and Longfellow were alike sympathetic, graceful, and firmly drawn, with brilliant effects of light and shade, while the way in which he instantly responded to the unanticipated demands made on his pencil proved his versatility, individuality, and originality. He will be long remembered by his book illustrations not less than by his historical and imaginative paintings, which he produced with equal facility in oil or water media; but it must be admitted that he ever displayed a greater mastery over line than colour. Elected an Associate of the Society of Water Colours in 1852, and a Member the following year, he became President in 1871, a position he has since held, save for resignation, followed by re-election in 1888. He was knighted in 1872, was elected an Associate of the Royal Academy in the same year, and in 1876 became a full Academician. In 1893 he made known his purpose, which he had cherished for many years, of presenting his own collection of works to the nation. His first idea was to build a gallery for their reception and present both building and fixtures to the nation; but he abandoned this scheme in favour of presenting them, suitably framed, to the Guildhall City Art Gallery and the permanent Art Galleries of Manchester, Birmingham, Liverpool, and Blackburn. Sir John Gilbert was never married, a fact to which the nation owes the generous distribution of his best productions. The funeral will take place to-morrow (Saturday) at 2.30 p.m. at Lewisham Cemetery.

A new theatre is about to be built in Stamford and George streets, Altrincham, from plans by Mr. Beasley, at a cost of from £5,000 to £7,000.

In view of the approaching completion of the People's Palace, erected on Glasgow Green by the Corporation, a proposal is under consideration of the council to hold an arts and crafts exhibition in the buildings to be opened about Christmas. The intention is to make the exhibition one of first-rate character, and not to confine it to local contributors only, but to have the collection as widely extensive and representative as possible.

The old post office premises in Queen-street, Wolverhampton, which are not now required by the post office authorities, as the business has been transferred to the new building in Lichfield-street, were offered for sale by auction on Friday. The structure, which is three stories high, with large basement rooms, was erected by the then architect to her Majesty's Office of Works, at a cost of over £10,000. The biddings were started at £2,000, and went up to £2,900, when the lot was withdrawn.

The improvement trustees of Glasgow Corporation have decided to erect three four-story tenements of shops and single and two-room dwelling-houses in Stobcross-street, at an estimated cost of £5,310. The gross annual rental is expected to be £437 15s., of which, after allowing 25 per cent. for upkeep and management, and interest at the rate of 3½ per cent. on the cost of building, £142 8s. 4d. will remain as net rental, being equivalent to £3 8s. 10d. per square yard for the 827 square yards occupied. It is proposed that the 570 square yards adjoining the property should be leased to the Police Department for the erection of a public washhouse.

Building Intelligence.

Bassett, Hants.—A new church is in course of erection on the east side of London-road, Bassett, situated between Red Lodge and the turning to North Stoneham Park. Over 30 years ago between £3,000 and £4,000 were promised towards the erection of such a church, but the scheme fell through. The subject was again brought forward early this year. Mr. E. P. Warren, Westminster, was selected as the architect, and prepared plans for a church, which will seat from 400 to 500 persons when completed. The committee only propose to complete a sufficient portion of the church to seat 200 persons, at an estimated cost of about £2,400. The building is in course of construction by Messrs. Holloway Bros., contractors, of Battersea, and the dedication-stone was laid on Wednesday week. The church is dedicated to St. Michael and All Angels. It is to be roofed with a groined vault, and the deep buttresses built to resist the thrust of this vault are placed internally, and pierced with arches to form continuous narrow passage-aisles, the outer walls of which are mere curtain walls connecting the buttresses, and roofed over with a low-pitched roof immediately below the tall nave windows. The nave is thus divided into a succession of deep arched bays. The chancel, which is a direct continuation of the nave, is formed by omitting the passage-aisles, and making the side walls almost flush with the inner faces of the buttresses; at the same time raising the floor, and providing steps for approach. The nature of the structure has been ruled by the strictest considerations of economy, and there has been no desire or attempt to follow an historic style. The materials are local bricks, red for external facing, and Monk's Park stone for all dressed work of doorways, windows, &c. The roof will be covered externally with green slates. For the present the south transept and the two westernmost bays of the nave will be omitted. The church, when completed, will be 99ft. long, and the nave will be 25ft. wide, and, with the aisles added, the total dimensions across will be 37ft. There is to be no tower; but it is finally intended to have a stone bell-cote on the west gable.

Birmingham.—The date of the formal opening of the new corporation meat market and slaughter-houses in Bradford-street has now been definitely fixed for Wednesday, the 27th inst. The ceremony will be performed by the Lord Mayor. The members of the Birmingham Clerk of Works and Builders' Foremen's Association visited the new meat market on Saturday afternoon, and were conducted through the building by the clerk of works and the foreman (Mr. Todd). The members were pleased with the interior of the market, and especially with the novel and ingenious arrangements for the slaughtering of the cattle. At the conclusion of the visit a vote of thanks was accorded to the architects (Messrs. Essex, Nicol, and Goodman) and the builder (Mr. John Bowen) for their permission to visit the market, and to the clerks of works and foreman for their explanations of the various parts of the building.

Middlesex Hospital.—It has been decided to considerably enlarge and partly reconstruct the existing buildings of the medical school amalgamated with this hospital. The plans for the new school have been prepared by Mr. Keith D. Young, F.R.I.B.A., and will necessitate the pulling down of part of the buildings on the west face of the hospital garden. The museum will be untouched, as will be the large lecture theatre. The new block will contain two wings set at right angles and facing respectively the hospital garden and Union-street. The latter site, with a frontage of some 80ft., has been acquired for the purpose of the extension. The new garden block will contain on the ground floor a complete chemical department, consisting of lecture theatre, chemical laboratory and lecturer's room, and private laboratory. On the upper floor will be housed the Pathological department, consisting of a large laboratory, which can be used for lecture purposes, and of a bacteriological laboratory and lecturer's room. This department will be in direct communication with the post-mortem department. The basement and ground floor of the new Union-street block will be occupied by the physical laboratory and by the physiological department, whilst the whole of the upper floor, some 120ft. long, will be occupied by the dissecting-room and anatomical classroom. The work is already commenced, and the new school buildings are to be ready for use next year.

Porthill, Wolstanton.—About twelve years ago a new church, dedicated to St. Andrew, was erected at Porthill, near Wolstanton, Staffs, to provide accommodation for the population residing in that part of the township, and in view of the rapidly-increasing population consequent upon the opening out of the Watlands estate for building purposes. The new church gave accommodation for 400 people, and cost nearly £4,000. The addition of a southern aisle with transept, south entrance, and porch was left for future effort when the necessity for increasing the accommodation arose. This work has now been taken in hand. When the extension is completed, additional seating room will be provided for 106 persons, besides giving 50 more seats in the west end in the space hitherto used as a vestry. The extension will correspond in style with that of the original church, having Hollington stone dressings and Macclesfield parpoint facings. The floor will be of wood blocks laid on concrete, and the passages will be paved with encaustic tiles. There still remains to be added to the church the upper part of the tower and a side chapel or vestry at the east end, when the church, which is on the main road between Newcastle and Tunstall, will be a complete example of the Early English style. The architects are Messrs. Wood and Hutchings, of Tunstall and Burslem (Mr. Wood being the architect of the original structure), and the contract, which amounts to £780, has been let to Messrs. Yorke and Goodwin, of Tunstall. The foundation-stone of the extension was laid on Saturday.

Stechford.—The foundation-stone of the new church of All Saints, Stechford, near Yardley, was laid on Monday by the Viscountess Newport. The church will consist of a nave, north and south aisles, baptistery, chancel, chancel aisle, and vestry. The nave, including the baptistery, will be 87ft. long and 20ft. 2in. wide, the aisles 10ft. wide, and the chancel 30ft. by 19ft. The total length of the church will be 117ft. 3in., and the width across the body of the church 44ft. 8in. The church when completed will accommodate 504 adults. The eastern portion of the church and three bays of the nave are to be erected first. The west end, with tower and spire, will be erected as soon as funds will permit. The exterior will be of brick with terracotta dressings, the interior of brick with Bath stone dressings, the style being Gothic of the Decorated period. Messrs. Collins and Godfrey, of Tewkesbury, are the contractors, and Mr. J. A. Chatwin, of Birmingham, is the architect.

CHIPS.

The Local Government Board have sanctioned a loan of £4,200 to the local district council of Erpingham, East Norfolk, for the Mundesley waterworks.

Mr. Henry Ross, architect, Accrington, has been commissioned to prepare plans for the part first to be erected of the new technical school for Padiham, Lancs, the cost not to exceed £4,500.

The town council of Ipswich have consented to the proposal of the Great Eastern Company to greatly extend the system of their tramways.

Messrs. Beesley and Son have forwarded their estimate to the Epsom Rural District Council for the drainage of Cobham. The amount works out at £15,540. The matter has been deferred for a fortnight.

At the last meeting of the Glasgow Corporation, a recommendation to have the portion of Castle-street alongside the Royal Infirmary laid with Altracaz paving was adopted. The price to be paid the Alcatraz Company is 8s. per square yard—5s. when the work is done and 3s. at the end of four years, during which period the portion laid will be maintained by the company.

After some years' discussion, the Wimbledon District Council have finally decided upon an electric-lighting scheme for the whole of the parish. About 900 public arc-lamps will be provided, and 5,000 incandescent globes for private consumers, at an estimated total cost of £32,000. Application for a loan to cover the amount will be made to the Local Government Board. Mr. Arthur Preece has been appointed engineer.

A large villa three stories in height is about to be erected in Drummond - terrace, Crieff, for Mrs. Murray. The following are the contractors: Mason, Mr. A. Crerar; joiners, Messrs. James Stothard and Sons; and slaters, Messrs. S. Drysdale and Son. The architect is Mr. R. Ewan, Glasgow.

Mr. Charles N. J. Oliver has been appointed Chief Commissioner of Railways for New South Wales in place of the late Mr. E. M. G. Eddy.

A Local Government Board inquiry was held at Broadstairs by Mr. Walter A. Ducat last week into an application by the Broadstairs and St. Peter's Urban District Council for power to borrow sums of £17,800 for a new drainage outfall and works, and £1,060 for the erection of public lavatories.

Several ornaments have been given to the Collegiate Church of Southwark, including a metal choir screen, a pair of silver altar vases, and a silver altar cross.

The Secretary of State for India has accorded sanction to the construction of a bridge of 56 spans of 150ft. over the Godavari River at Rajahmundry at an estimated cost of 5,969,718 rupees.

Satisfactory progress continues to be made with the new post office in Meadowside, Dundee. The roofing of the main buildings is now practically completed, and the builders are engaged in carrying up the north wall of the sorting office. The foundations of the sorting office are completed. The joiners are now at work in the interior of the building.

Mr. Walter A. Ducat, Local Government Board inspector, held a public inquiry at Ramsgate last week relative to the application of the town council for sanction to borrow the sum of £20,500 for gas-works purposes; and also £12,875 for the purchase of land adjoining Princes-road, the construction of a refuse-destructor and depot, making of new streets, &c.

Brussels is to have a permanent memorial of the Diamond Jubilee in the addition of a chancel to the edifice of Christ Church, of which the first stone was laid by her Majesty's representative, Sir Savile Lumley, afterwards Lord Savile.

An interesting gathering took place on Monday in the Council Chamber, York, for the purpose of doing honour to Ald. Sir Joseph Terry, the "father" of the York Council, by presenting him with a life-sized portrait in oils. The portrait represents Sir Joseph in his robes as Lord Mayor, an office which he held on four occasions. The picture is the work of Mr. George Fall, of York, and is to be permanently hung in the council chamber.

At a meeting of a sub-commitee of Edinburgh Town Council on Monday, it was resolved to recommend that designs should be asked for the erection of a memorial of Wallace and Bruce, the cost to be defrayed from the Hugh Reid bequest, which has now at its credit a sum of about £3,000. It is suggested that the statues of the heroes should be placed on two of the pedestals of the North Bridge, and that on the other two pedestals there should be erected the statue of John Knox at present in the quadrangle of the New College, and one of Burns, to be provided at the expense of the corporation. The Lord Provost's committee of the town council has adopted the former proposal, but have postponed decision as to the Knox and Burns statues.

At the half-yearly meeting of the Court of Governors of Owens College, held at Manchester on Tuesday, it was announced that Mr. R. C. Christie had offered £50,000 for the erection of a College Hall. The chairman also announced that two anonymous friends of the College had offered a sum of £10,000 for the erection of suitable buildings for the physical laboratory of the College, and a further sum of £5,000 towards its maintenance. A third gift was announced, Mr. Edward Holt, a member of the Manchester City Council, having given £1,500 towards the cost of the newly-erected gymnasium. The Governors passed resolutions accepting the gifts and thanking the donors.

In the theatre of University College, Gower-street, on Tuesday, a numerous company assembled to witness the presentation of awards obtained by the students during the past year, at the examinations in connection with the Faculties of Arts and Laws and Science Classes. Mr. J. F. Rotton, the treasurer, presided and distributed the prizes. The Dean's Report stated that the past year had been a notable one, and that the Government had increased the annual grant to the college from £1,700 to £3,000. The college had benefited during the past session by the trust funds in connection with the Pender Memorial to the extent of £5,000, and the Chadwick Trust, the trustees of which decided to found a chair of municipal engineering.

A large block of buildings being erected in Virginia-street, Liverpool, for the Shore Porters is making good progress. The building, which will be six stories high, has a frontage to Virginia-street of 92ft. and 85ft. to Shore-lane. This corner block is intended to be used for bonded stores and warehouse purposes. From the base to the first floor the front is of rustic ashlar, and above that hammer-blocked, and on the west wing there will be a turret rising from the third story. Mr. Alexander Cheyne, Ashley-road, Liverpool, has the contract for the mason work.

Engineering Notes.

The Incorporated Association of Municipal and County Engineers.—The 24th voluntary pass examination of candidates for the offices of municipal engineers and surveyors to district councils, carried out by this association, was held at Birmingham on Friday and Saturday. Twenty-one candidates presented themselves for examination, the written portion of which was taken on the first day. The greater portion of Saturday was occupied with the *vivâ voce* section of the examination. The examiners were: (1) For engineering as applied to municipal work, Edward Pritchard, Birmingham (past president); (2) building construction, A. M. Fowler, C.E., Manchester (past president); (3) sanitary science, J. Lemon, M.Inst., Southampton (past president); (4) municipal and local government law, J. T. Eayrs, Birmingham (past president). Mr. Pritchard acted as superintending examiner.

Proposed West Riding Extension of the Midland Railway. — The Midland Railway Company's engineers and solicitors visited Halifax on Tuesday to confer with the Corporation and Chamber of Commerce in regard to the proposed extension of the Midland line in that district. The company propose to branch off from their main line at Royston, between Normanton and Sheffield, and to make then for Thornhill. Here there would be a fork, one line running through the Spen Valley to connect with the Midland again at Bradford, while the other line would pass round by way of Huddersfield and Elland to Halifax. The station at Halifax would be for a time the terminus of this extension. But it is understood that a further extension might eventually be added north from Halifax, thus obtaining a still more direct course north and south than the Spen Valley route would give. The Midland Railway Company will seek power in the ensuing session of Parliament to proceed with these extensions.

CHIPS.

A new town hall is in course of erection at Conway. Mr. T. B. Farrington, borough surveyor, is the architect, and Messrs. Thorp and Son, of Llandudno, are the contractors.

The sanitary committee of the Middlesbrough Corporation have decided to construct an 8ft. sewer at a cost of £10,000, with the object of more efficiently draining the marsh district.

The three great asylums belonging to the county of Lancaster are so overcrowded that it has been decided to build a fourth, almost equal in size to those already existing. This new institution will be situated at Winwick, near Warrington. The contract for the building has just been given to Mr. Robert Neill, of Manchester, for £253,000. The electric lighting will cost a further sum of £14,000.

For building the new church of St. Matthew at Chapel Allerton, near Leeds, the tender of Messrs. Stephen, Bastow, and Co., of Bristol, has been accepted at £13,276. Mr. G. F. Bodley, A.R.A., of Grey's Inn-square, W.C., is the architect.

At a meeting of the City Commissioners of Sewers on Tuesday, a large deputation of owners of property, inhabitants, and others interested in the trades carried on in Thames-street and adjacent thereto, waited upon them to urge the importance of at once widening Lower Thames-street between Fish-street Hill and Botolph-lane. The roadway between Fish-street Hill and Botolph-lane is only 16ft. wide, and the traffic has been recently augmented by the widening of other parts of Thames-street, the opening of the Tower Bridge, the increase in the supply of foreign fruit, and the large numbers of holiday folks going to the various steamers and pleasure-boats. The traffic might be doubled by the removal of 15 old houses. The improvement might be effected at once. The memorial was referred to the Finance and Improvement Committee for consideration.

The parish church of Newburn is being restored from plans by Messrs. Hicks and Charlewood, of Newcastle-on-Tyne. A new porch, with massive walls of undressed stone, is being erected at the south entrance, a vestry has also been added. Internally, a new reredos of oak panels with Caen stone columns has been introduced, and the church has been paved with marble. The carved woodwork in the interior has been executed by Mr. Ralph Hedley, Newcastle, the marble by Messrs. Beall, of the same city, and the carved stone figures by Messrs. Milburn, of York, the marble floors by Messrs. Emley, Newcastle, and the paintings by Messrs. Bacon Bros., of London.

On Tuesday Sir Redvers Buller, as lord of the manor, will lay the foundation-stone of the new church of Emmanuel, which is to be erected in Okehampton-road, Exeter.

The Chiswick Urban District Council received on Wednesday from Mr. A. Sanderson, of Chiswick, a letter intimating his intention of making to the district a free gift of No. 1, Duke's-avenue, for the purposes of a free public library. The property consists of a large modern-built mansion, containing a number of lofty and commodious apartments. The council accepted the gift with thanks.

St. Peter's Church, Sumner-street, Southwark, was reopened on Sunday week, after being closed for seven Sundays for painting and decoration. The work has been carried out by Messrs. Heaton, Butler, and Bayne. A screen has also been erected, designed by Sir Arthur W. Blomfield, A.R.A.

The dedication of a new stained-glass window in the west end of St. Alphege, Canterbury, in commemoration of the Diamond Jubilee, took place on Sunday week. Some fragments of ancient glass have been carefully placed at the bottom of the present window. In the small spaces at the head appear the two dates 1837 and 1897, and a representation of the Queen. Two of the lights are devoted to scenes in the life of St. Alphege, and the third depicts the scene of the meeting between Ethelbert and Augustine at Ebbs Fleet.

A new hall and institute were opened at Cwmaman on Monday. The building comprises reading-room, billiard-room, game-rooms, and library, and has cost over £3,000.

The Bristol Town Council on Tuesday, after a discussion lasting 3½ hours, instructed the Docks Committee to promote a bill in Parliament next session for constructing a new dock and other works at Avonmouth, at a cost of over a million and a half. The scheme provides for a dock of forty acres in extent with a depth of 30ft., an entrance lock 850ft. long, a graving dock 810ft. in length, and granary transit sheds, landing-stage, two piers in the Avon, &c.

A new Station Hotel has been erected at Pelaw near Gateshead, from designs by Mr. James W. Frazer, A.R.I.B.A., of 49, Grey-street, Newcastle-on-Tyne; the contractor being Mr. G. H. Hodgson, of Sunderland. The accommodation provided, besides the usual bar and sitting-room, is a dining-room, a billiard-room, and bedroom and sitting-room accommodation for visitors. Stabling accommodation is provided at the rear of the premises in a yard. The building faces, and is in close proximity to, Pelaw Station, and is carried out in red bricks with stone dressings, the two gables on the front being half-timbered.

The new Camberwell School of Arts and Crafts, which will be held in the Leighton memorial building presented to Camberwell Vestry by Mr. J. Passmore Edwards, will be opened at the end of October or beginning of November. It has not been possible at present for the London Technical Education Board to make any definite announcement as to the classes that will be held; but it is probable that special provision will be made for the art training of those who are engaged in the different branches of the building trade.

On Sunday the mosaic work and the alabaster dado on the east wall of the sanctuary of All Saints' Church, Aden-grove, Stoke Newington, were dedicated by the vicar. The work was designed and executed by Mr. Daniel Bell.

Crediton's memorial in commemoration of the Queen's reign has taken the form of a drinking fountain, which has been erected on a site given by General Sir Redvers Buller, the lord of the manor, situate at the junction of East-street and Charlotte-street. The fountain, which was designed and built by Mr. Hubert Berry, is of Yorkshire stone from the famous Robin Hood quarries. It is 9ft. high, and 8ft. 6in. wide at the base, and it has two drinking troughs for cattle, one for dogs, and there are cups for wayfarers. The fountain was inaugurated on Saturday by Sir R. Buller.

A new technical institution is commencing its work at Hackney this session. This is the Hackney Technical Institute at Cassland House, South Hackney, which has been started by the London Technical Education Board in connection with the education committee of the Hackney Vestry. It is hoped that, if sufficient funds are forthcoming, this institute may become the nucleus of a future polytechnic. The work of the institute is at present devoted entirely to the building trades, classes being provided in carpentry and joinery, painters' and decorators' work, plasterers' work, and plumbing.

The joint public health committee of Selkirk Town and County Councils have resolved to proceed with the erection of a joint hospital for infectious diseases for burgh and county at Milnshot Park, and offers amounting to £1,810 have been accepted. Mr. James Bartie, county surveyor, is the architect.

COMPETITIONS.

Harrisburg, Penn.—All the plans received in the late abortive competition to secure an architect for the Pennsylvania State capitol to be built at Harrisburg have been returned to the competing architects. The protest of Governor Hastings against the action of the Commission in rejecting all the plans and calling another competition has been followed by the resignation of Profe sor Warren P. Laird, the representative of the Commissioners on the Board of Experts.

Many and various aids have been brought before the monumentalist and marble-worker to enable him to obtain a smooth surface free from scratches and a good finished appearance, where the lead combines with the marble, as in the case of leaded letters. "This," writes a correspondent, "is accomplished quickly and surely with the application of a well-known brand of soap and the ordinary polishing felt. The mason will find it a useful addition to his kit; but it 'won't wash clothes.'"

A new infants' school and classroom addition to the girls' school at Bitterne, near Southampton, were opened last week. The new erection, constructed on the south end of the Bitterne Church of England Schools, provides accommodation for 172 infants, while the girls' school has been extended so as to accommodate 66 more pupils. The infants' school is built of red brick, with slate roof. It measures 48ft. by 22ft., and the classroom 22ft. by 20ft. The girls' classroom is of white brick, in unison with the old buildings. The buildings have been constructed by Messrs. C. and A. Witt, of Bitterne, under the supervision of Messrs. Mitchell, Son, and Gutteridge, architects, of Southampton, at a cost of £1,050.

The Birmingham Board of Guardians on Wednesday resolved to proceed with alterations and additions to the block for male epileptics at the workhouse infirmary, at a cost not exceeding £1,600; with the erection of a new laundry at the cottage homes, Marston Green, and to the laying of water-mains at the homes, at a cost of about £1,050; and with the provision of a new dining-hall and storage accommodation at the workhouse, at an expenditure of about £2,300.

The new public halls just erected at Uddingston, N.B., were formally opened on Friday. The building is near the Caledonian Station, and comprises a large hall to seat 1,000, and a lesser hall to accommodate about 250. Besides, there are two cloak-rooms and two committee-rooms. Under the stage there are dressing-rooms and kitchen, and on the stage level a green-room. The total cost has been £3,500.

At their last meeting the city council of Coventry decided to raise the salary of Mr. Coddington, the manager of the sewage works, from £275 to £300 a year. They also agreed to purchase for £50,275 land at Bagington for the purposes of the new sewage scheme and disposal works.

As a permanent memorial of the Queen's Diamond Jubilee, improvements are being carried out at Berwick Infirmary, under the supervision of Mr. John L. Miller, architect. The new accommodation consists of two nurses' bedrooms, servants' double bedroom, bathroom for attendants, and the heating of the institution. The cost of the work will be nearly £500.

The corporation of Ipswich accepted, with thanks, at their last meeting the gift from Mr. J. Dupins Cobbold of 11¼ acres of high-lying land situate on the old Racecourse, on the south-eastern side of the town, as a public recreation ground. At the same meeting it was decided to exchange 15½ acres of outlying land for 2¼ acres adjoining the high-level reservoir in Park-road, and to take steps for building a new fire brigade station in New Bond-street in lieu of the existing one in Waterworks-street, the site of which will be absorbed into the waterworks, now owned by the corporatian.

There was considerable excitement at Barmouth on Friday in consequence of a Sheriff's officer having taken possession of the offices of the district council for a claim of £1,800 made by the contractors of the drainage works.

At the adjourned licensing meeting at St. Columb, last week, a provisional license was granted for a new hotel, to be built in front of Dennis House, Padstow. The architects are Messrs. Crickmay and Son, and one of the firm stated to the Bench that the estimated cost, exclusive of furnishing the interior of the premises, was £8,000.

A report issued by the town clerk of Blackburn shows that the following public works are to be undertaken for that town as necessity arises:—Tramway purchase and conversion to electricity, £100,000; sewerage, £38,000; recreation-ground, £12,000; markets, £28,000; municipal lodging-house, £17,000; wood-paving, £11,000; cemetery extension, £12,000; refuse destructors, £15,000.

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ILLUSTRATIONS.

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Our Illustrations.

NEW BUILDINGS, LIVERPOOL.

These buildings are being built for Mr. Thomas H. Ismay, and are intended to be occupied in part by the well-known White Star Steamship Company. The site at the bottom of James-street, and fronting to the Goree Piazza, has a commanding view of the River Mersey, from which the building is an object of considerable importance, owing to its boldness of parts and its great height above the surrounding buildings. The materials are Aberdeen granite for the base, Edwards's red Ruabon brick facings, Portland stone dressings, and green roofing slates. The floors are fireproof throughout; the entrance-hall and staircase are faced with polished grey granite, and form a spacious and stately entrance to the various offices. There are two electric elevators, and arrangements are made for a mail-chute, with a letter-box on each floor. There are spacious vaults in the sub-basement, and on the upper floors there are toilet arrangements for both males and females on separate floors, with keepers' residences on the upper floor. The ground and first floors are handsomely fitted up for the White Star line in oak and walnut, a special feature being the rubber flooring in the main corridor, and the marble counters, with gunmetal and glass screens, inclosing the clerks from the main corridor. The works have been executed by Messrs. J. Henshaw and Sons, of Liverpool, under the supervision of Mr. Allen Lloyd, clerk of works. The architects are Messrs. R. Norman Shaw, R.A., and Mr. J. Francis Doyle; the drawing was exhibited at the Royal Academy.

ROOD LOFT, LIMOGES CATHEDRAL.

This work is dated 1533 A.D., and its detail is exceedingly refined and thoroughly characteristic of its period. The freedom of the boldly-treated scrolls flanking the central composition of this bay calls for special remark, with the spiritedly-modelled boys bearing torches. The same feeling is illustrated by the figure work in the pilasters, of which enlarged details are given in the accompanying drawing, to which a National Silver Medal was awarded to Mr. Rowland D. Rawcliffe, who made this study from the cast in South Kensington Museum.

"MOUNTFIELD," MEADVALE, REDHILL.

This house was built for Mr. Alfred Machin, from the designs of Mr. H. D. Searles-Wood, F.R.I.B.A., of 157, Wool Exchange, Colman-street, E.C., by Messrs. Bagaley and Sons, of Meadvale. The walls are of local red brick, the upper part of half-timber and rough-cast. The roofs are covered with Broseley tiles.

NEW BANKING PREMISES FOR THE LONDON AND MIDLAND BANK (COVENTRY BRANCH).

The old banking premises belonging to the London and Midland Bank, and formerly the Coventry Union Banking Company, situated at the corner of High-street and Little Park-street, Coventry, have been pulled down, and new premises have been erected by Mr. Charles Haywood, jun., Coventry, from the designs of Mr. Frank Barlow Osborn, architect, Birmingham. The frontage to High-street is 30ft. and to Little Park-street 90ft. The new buildings, which have been designed in the Elizabethan style of architecture, are executed in Hollington stone and red bricks, and comprise, in addition to the banking premises, several suites of offices, situated on the ground, first, and second floors. The fine and spacious banking-room, which is 40ft. long and 34ft. wide, is arranged to accommodate 26 clerks, and is approached from a vestibule at the corner of the two thoroughfares. The internal fittings are made of polished walnut, and the bank counter, which is 32ft. long, is arranged to accommodate five cashiers. The manager's office faces High-street, and is so arranged as to be easy of access from the vestibule, banking-room, and private speaking-box; the vestibule is lined with glazed faïence. The strong-rooms, which are very spacious and secure, are situated in the basement, a hydraulic lift being provided, communicating with the banking-room over. The remaining portion of the basement is appropriated to the use of store-rooms, lavatory, heating chamber, &c., the whole being executed in a thoroughly fire and thief-resisting manner. The banking premises are lighted by electric light. The total cost was about £10,000.

DESIGNS FOR BRONZE DOOR FURNITURE.

The hinges, &c., illustrated, were designed with the intention of combining a fresh and decorative treatment with utility; first, considering the practical end to be gained, and then weaving into the construction as much appropriate symbolism as possible. The hinges are based upon the T-shaped arm, with branches above and below, which, gathered into a conventional mass, grasp and strengthen the timbers of the door, while, on analysis, the knocker presents the primitive form of a hammer, resting against a plate to receive its blows.—Phil. W. Smith.

"MISS CRANSTON'S," GLASGOW.

This pencil drawing, from the Royal Scottish Academy Exhibition, shows the vestibule of some business showrooms at Glasgow, in which some very richly-elaborated wainscot work has been carried out from the designs of the architect, Mr. G. Washington Browne, A.R.S.A. We have not been favoured with any particulars.

HOUSE AT NEWMARKET.

This house has recently been erected at Newmarket for Mr. E. H. Leach, the well-known veterinary surgeon. The house is faced with red bricks from Mr. Mark Gentry, Sible Hedingham, Essex. The windows have brick mullions, with red Mansfield stone heads, transomes, and sills. The roofs are covered with permanent green slates. There is stabling for eleven horses behind the house, with food-lofts, &c., over. Messrs. Heaton and Gibb, of Newmarket, are the architects, and the work has been carried out by Mr. A. J. Bateman, the contractor.

NEW PREMISES FOR MESSRS. J. ARNOTT AND CO., LIMITED, BELFAST.

For over fifty years the Belfast branch of the well-known firm of John Arnott and Co., Limited (Dublin, Belfast, and Cork), have occupied extensive warerooms in Bridge-street, and it is but natural that in the extending requirements of their business they should acquire the historic corner site, abutting on High-street, just adjoining their Bridge-street premises, and so obtain an entrance from High-street as an auxiliary to their other entrances. We present an illustration of the new buildings and extensions now in course of erection on this corner site, from the design of Messrs. J. J. Phillips and Son, 61, Royal Avenue, Belfast; the builders are Messrs. H. Laverty and Sons, of Cambridge-street, Belfast.

The three-light west window in St. Laurence's Church, Alvechurch, has been filled with stained glass as a Jubilee memorial, and was unveiled on Monday. Messrs. William Pearce and Co., of Bridge-street, Birmingham, carried out the work.

CHIPS.

The members of the Eastleigh Urban District Council have raised the salary of their surveyor, Mr. J. Evans, from £150 to £200 a year.

The Barrow-on-Soar District Council have instructed Messrs. Simpson and Harvey, architects, surveyors, and sanitary engineers, of Alliance Chambers, Leicester, to prepare an entirely new system of drainage for the parish of Birstall.

A stained-glass memorial window has just been placed in the chancel of the parish church of Haseley, Warwick, the subject being the visitation of the Virgin Mary to Elizabeth. The work has been carried out by the firm of Hardman and Co., Birmingham.

Sewerage works are in progress at Princetown on the summit of Dartmoor. For nearly 20 years a scheme has been in contemplation by the Duchy of Cornwall, Local Government Board, or Prison Authorities, all of whom are interested in the question. Plans have now been prepared by Mr. Bellamy, of Plymouth, which have obtained the approval of all parties. The contractor is Mr. E. Duke, of Plymouth, who has already a strong body of men at work. The work on the prison property will be done by the convicts. The cost of the whole scheme will be nearly £3,000.

At Annersley, where the extension of the Great Central Railway to London will effect a junction with the existing system of the company, progress is being made with large sorting sidings, and a number of men are actively occupied in the erection of an engine-shed of large proportions. A signal cabin has been opened at the point where the London extension actually commences. At the Nottingham Central Station excavations at present occupy nearly the whole attention of the contractors. Substantial progress has been made with the steel work of the Parliament-street bridge at Nottingham. The stations at Ruddington and East Leake are approaching completion.

An ornamental drinking fountain will be erected in the Diamond at Clones in honour of her Majesty's Diamond Jubilee. The fountain will be 12ft. in height, and 6ft. wide at the base. It consists of an octagonal base, with eight columns, above which are eight semi-circular arches, with cusps. On these arches are eight shields, with devices on each shield. The whole will be surmounted with a dome and ornamental finial. The contract for the fountain and its erection has been intrusted to Messrs. M'Mahon and Gray, Clones.

On the summit of a hill, known as How Tallon, Yorkshire, nearly 1,500ft. above sea level, a barrow has been opened, and some discoveries made. The barrow is 60 yards in circumference and 6ft. high. A quantity of human bones, a stone cist, four flint arrow-heads, and a flint scraper were found in the portion dug into. One of the arrow-heads was barbed, the others leaf-shaped, and the edges are serrated. A small pottery urn, with a worked pattern upon it, was found interred with the remains of one human body.

The contractors (Messrs. J. and W. Lowry) in demolishing some old buildings behind Collingwood-street, in Newcastle-on-Tyne, to make way for the erection of a new block of offices, have come across a very large number of dressed and wrought stones, which have evidently formed part of some ecclesiastical structure at present unidentified, and, indeed, the old stable-walls would appear to have been almost entirely built from the remains of some previously demolished church. The mouldings bear evidence of belonging to various periods, from Early English to Late Decorated.

For three centuries there existed over the monument of Cardinal Pole in Canterbury Cathedral a representation of the arms of the late Prelate, supported by two angels, and, the escutcheon being historically interesting, the late Canon Jenkins proposed before his death that these arms, which contained sixteen quarterings, some of them of families which have since become extinct, should be repainted. It is this work which Cardinal Vaughan and the other Roman Catholic visitors of a fortnight since have undertaken to provide funds for, as a recognition of the kindly welcome and courtesy extended to them. The tomb will be left exactly as it is, simply being enriched by the reproduction of the arms.

The parish church of Bothwell, N.B., is about to be restored from plans by Dr. Rowand Anderson, of Edinburgh. At the same time, the buildings facing Main-street, at present obstructing the view of the church, will be removed, and an entrance gateway will be provided at the west end of the grounds, with gate, lodge, and conservatory, also inclosing the grounds there with parapet-wall and railing. In addition to this, it is proposed to erect a monument to the memory of Joanna Baillie, daughter of Dr. Baillie (minister of Bothwell parish in 1762), the well-known poetess and dramatist. The monument is to be of brown-buff terracotta, will stand about 16ft. high, and have four faces, panelled, enriched, and suitably inscribed.

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FOR · MESSRS ARNOTT & Co LD
MESSRS J. J. PHILLIPS & SON ARCHTS
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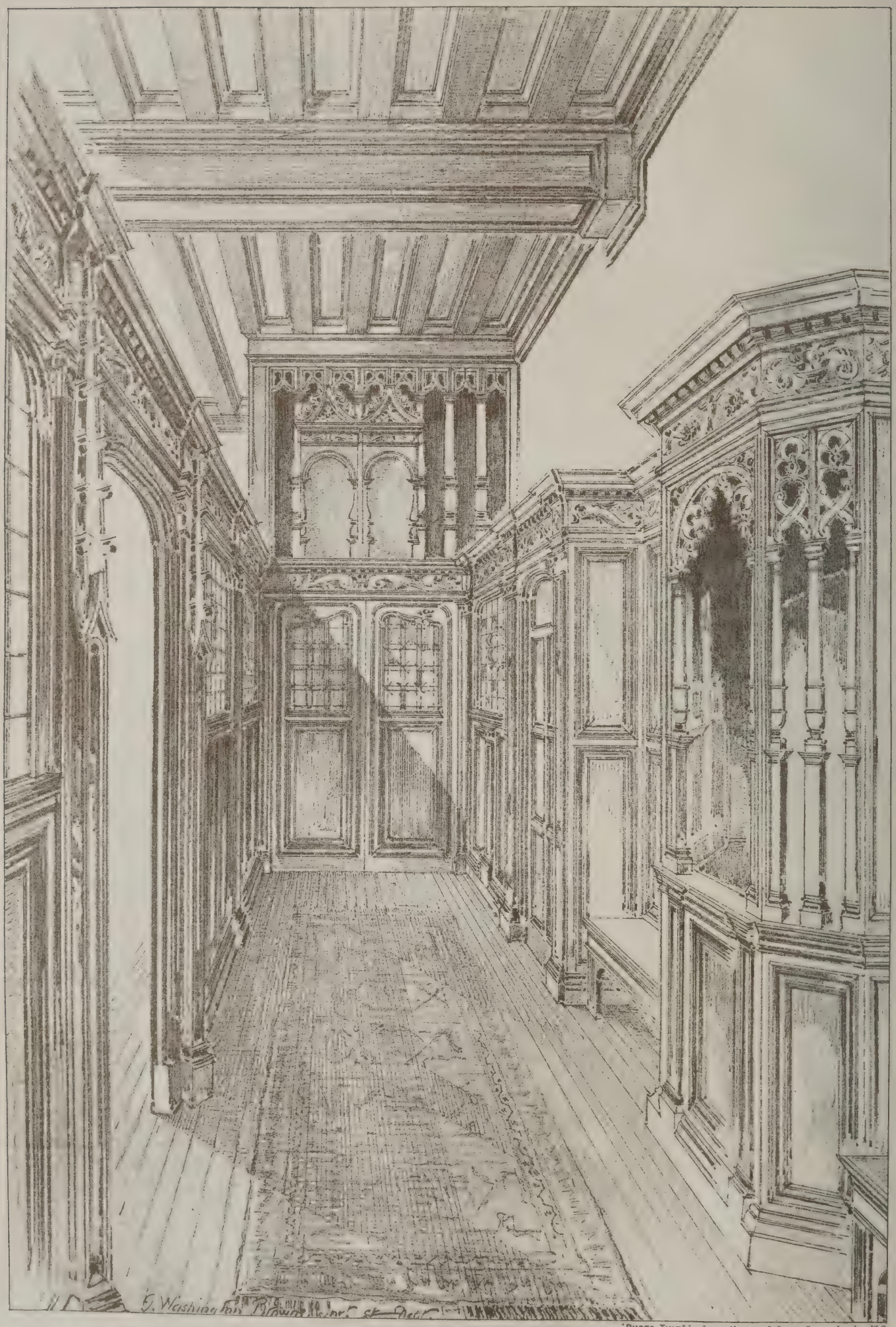

"PHOTO-TINT" by James Akerman, 6, Queen Square, London, W.C.

"MISS CRANSTON'S" GLASGOW SKETCH IN VESTIBULE G. WASHINGTON BROWNE ARSA ARCHT.

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STONE ROOD-LOFT LIMOGES CATHEDRAL
BY ROLAND D RAWCLIFFE

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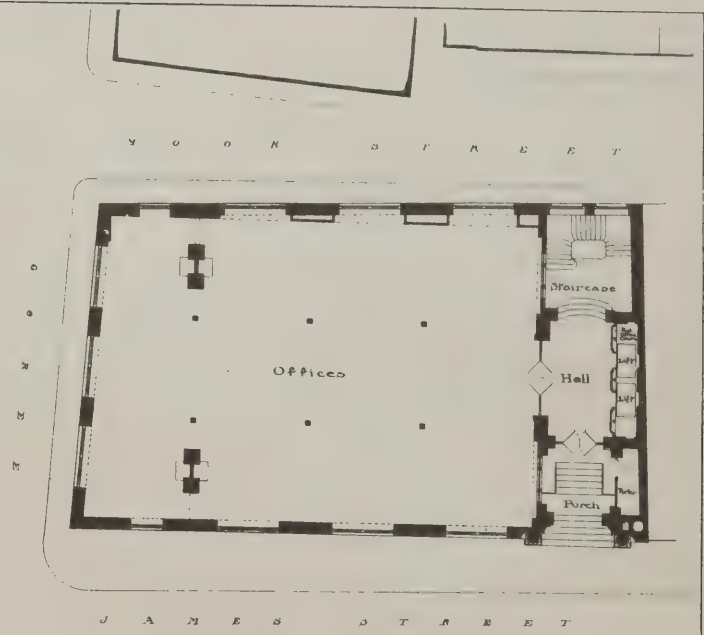
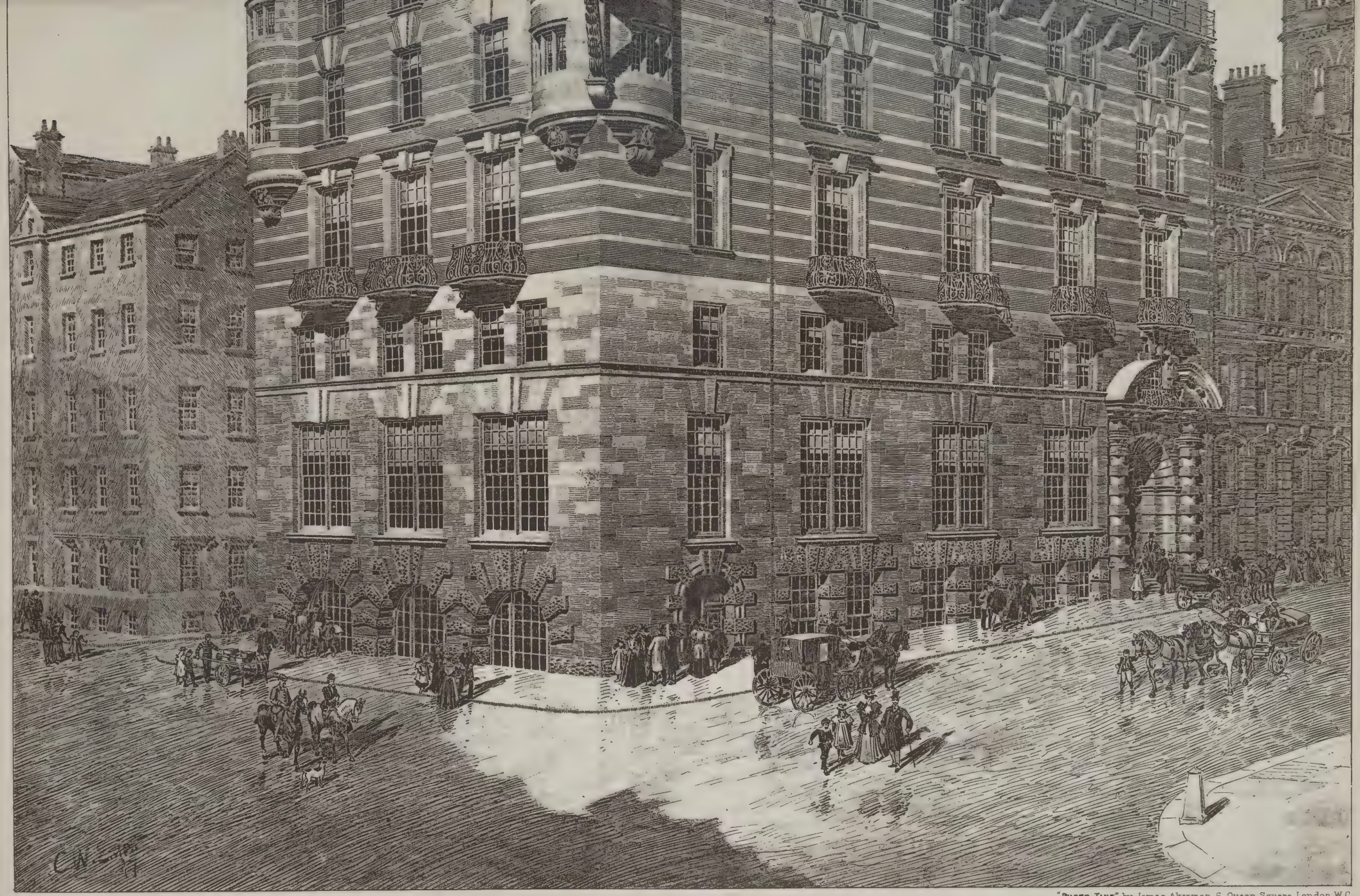


Ground Plan

Scale



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NEW BUILDINGS · LIVERPOOL · R. NORMAN SHAW R.A. AND J. FRANCIS DOYLE ARCHTS

"MOUNTFIELD" · REDHILL H D SEARLES-WOOD FRIBA ARCHT

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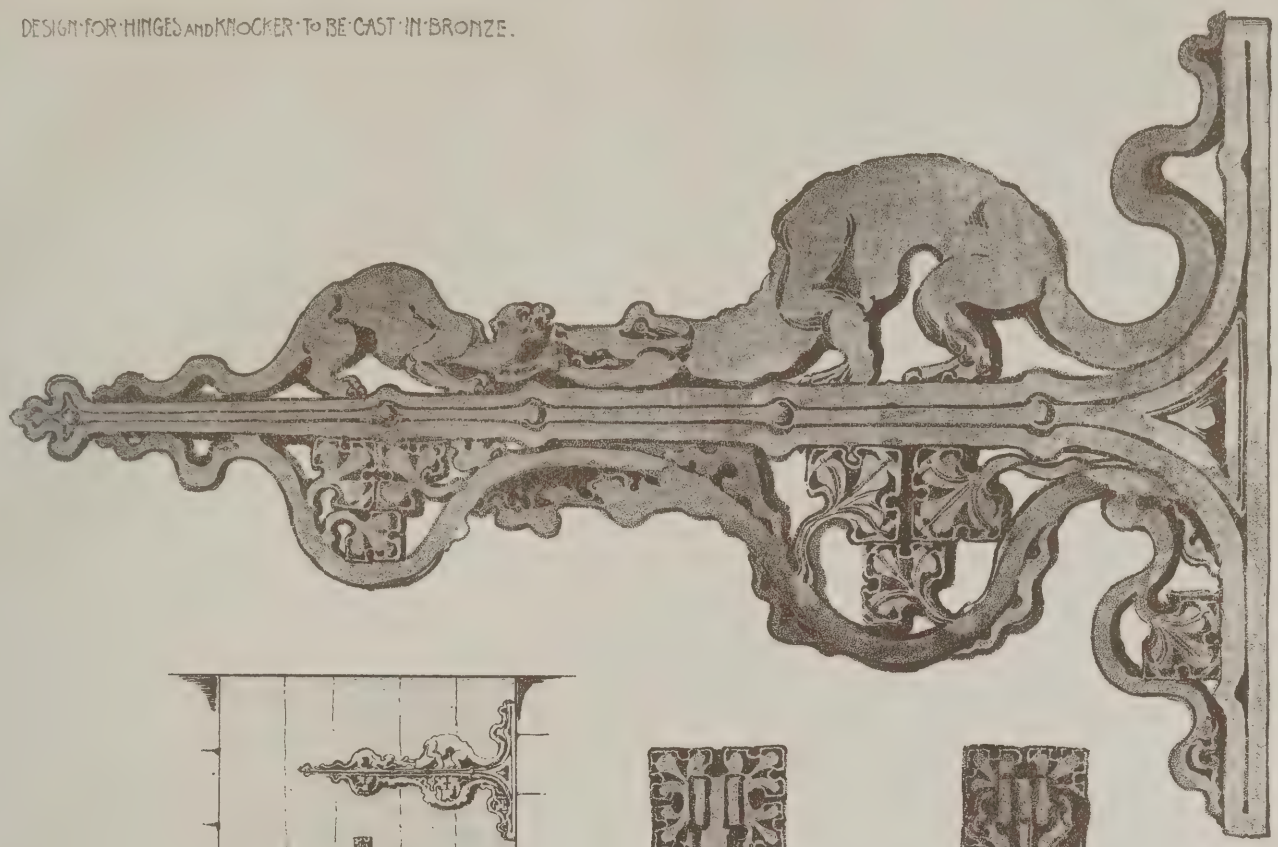
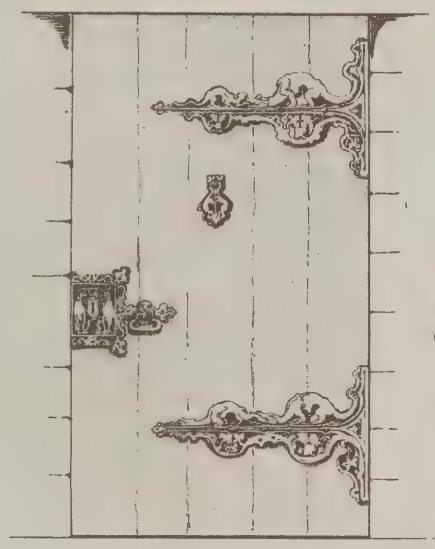
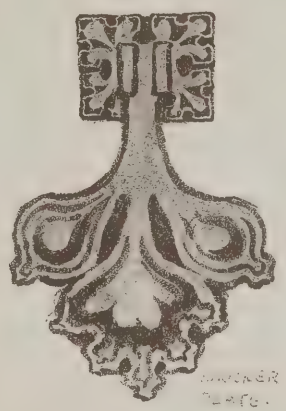
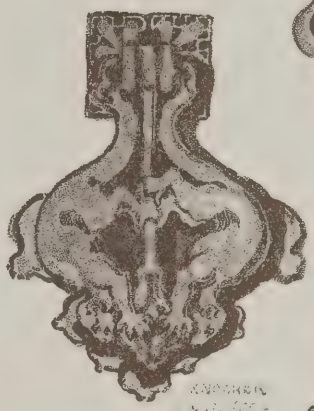
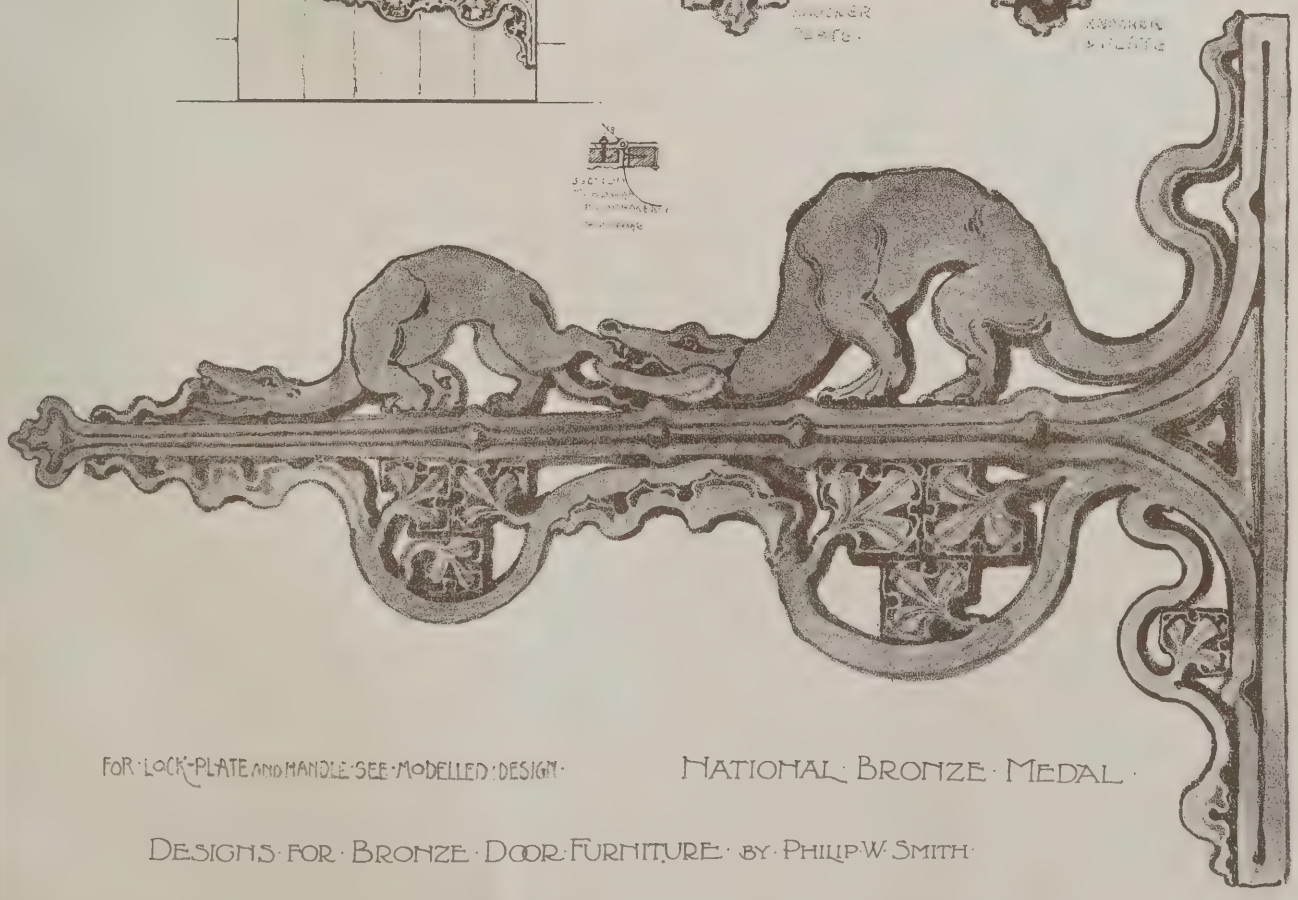
DESIGN FOR HINGES AND KNOCKER TO BE CAST IN BRONZE.









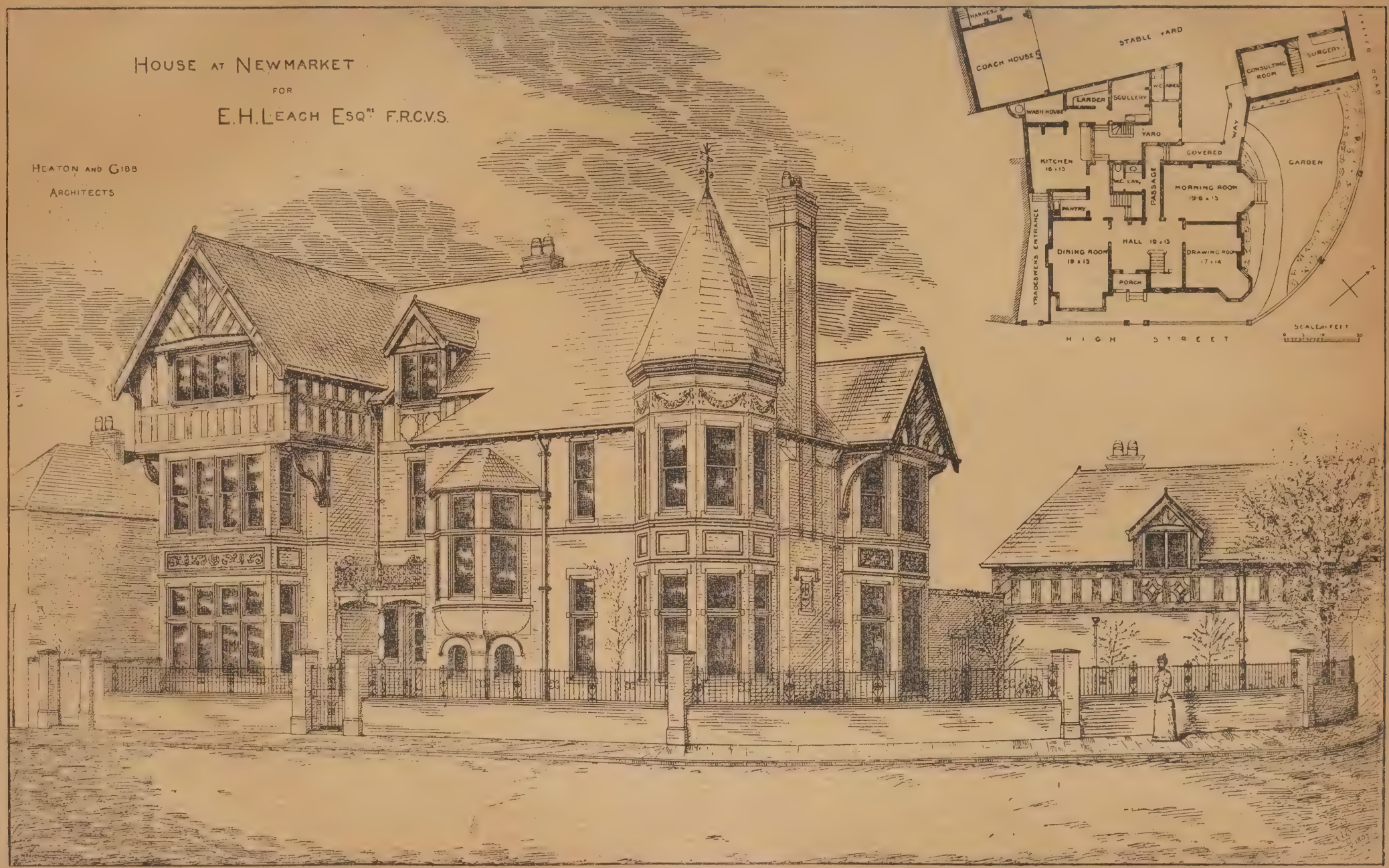


FOR LOCK-PLATE AND HANDLE SEE MODELLED DESIGN.

NATIONAL BRONZE MEDAL.

DESIGNS FOR BRONZE DOOR FURNITURE BY PHILIP W. SMITH.

"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.


HOUSE AT NEWMARKET
FOR
E.H. LEACH ESQ^RE F.R.C.V.S.
HEATON AND GIBB
ARCHITECTS
HARNESS
STABLE YARD
COACH HOUSE
SURGERY
CONSULTING ROOM
LARDER
SCULLERY
WASH HOUSE
YARD
WAY
COVERED
GARDEN
KITCHEN 16 x 13
W.C. LAV.
PASSAGE
MORNING ROOM 19·6 x 13
PANTRY
TRADESMENS ENTRANCE
HALL 19 x 13
DINING ROOM 19 x 13
DRAWING ROOM 17 x 14
PORCH
HIGH STREET
SCALE OF FEET

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Dundee Institute of Architecture. — The annual report of this institute states that the number of members remains as last year, 45, and also that of honorary members at 10, whereas, of the associates, one died and 15 have resigned, leaving a total of 123. The finances are in a healthy state, the balance in hand being £29 10s. 6d., the total expenditure being under £90. A feature of the report is that full abstracts are given of the various addresses delivered before the members during the past season.

The Glasgow Institute of Measurers.—The seventeenth annual meeting of the Glasgow Institute of Measurers was held in the Building Trades Exchange, Glasgow, on Monday, Mr. Colin Young, I.M., president, in the chair. The annual report of the council was submitted. The funds of the institute amount to £289 12s. 9d., an increase of £13 0s. 1d. during the year. The successful competitors in the professional examination for assistants and apprentices, conducted by the council, were present, and received their prizes and certificates. A grant was made (as in previous years) to the Technical College for prizes in the architectural and building construction classes. The office-bearers for the ensuing year are:—President, Colin Young; vice-president, John Currie; secretary and treasurer, Thomas N. Hill, F.S.I., 180, Hope-street; auditors of professional accounts, John H. Ramsay and John Muirhead; other members of council: Robert Reid, G. B. Walker, James Cameron, Archibald B. Watson, James D. Herbertson, John Baxter, John H. Allan.

Liverpool Architectural Society.—The first ordinary meeting of the fiftieth session of this society was held at the Law Library, Union-court, on Monday evening. A large number of members attended. Mr. W. E. Willink, M.A., president, in his opening address, contrasted the population and buildings of Liverpool fifty years ago with the present time. Liverpool in 1848 was not what she will be in 1898. Then the total number of her inhabitants was well under 353,000, not much more than half of the present population. The buildings of the town, public and private, showed little of the affluence which was so evident in the streets of to-day. The number of men who appeared in the directory under the heading "architects and surveyors" was then 85—now it was 240. He urged upon the students —study. No good work was done by ignorance, and bad work was not likely to be the result of the humble and conscientious examination of great work of the past. Whatever they studied, let them study to develop the artistic conscience, that faculty of criticising their own work by the application of unvarying standards, by which alone they could enjoy the conviction that, whatever their faults, they were on the right lines. A vote of thanks was proposed by Mr. T. D Barry (one of the founders of the society) and seconded by Mr. George Bradbury.

Perth Architectural Association.—This association was formed last Wednesday week, and the following office-bearers and committee appointed:—President, Mr. George P. K. Young, A.R.I.B.A.; vice president, Mr. Robert J. Gildard; secretary, Mr. William M. Page; treasurer, Mr. John S. Jarvie; committee, Messrs. Wilson, Dan A. Stewart, John Anderson, and Thomas McLaren. It is intended to have classes in design, construction, &c., for the students under able leadership, with monthly lectures, and the session opens in a few weeks' time with a lecture by some prominent architect, by which time also a complete syllabus will be drawn up.

Sanitary Inspectors' Association. — The annual meeting of the Sanitary Inspectors' Association was held on Saturday evening at Carpenters' Hall. Mr. W. W. West, of Walthamstow, presided. The annual report showed that there were 583 members on the books. The Institute of Certificated Sanitary Inspectors had thrown in their lot with the association. As the Superannuation Bill, intended to help the members, in conjunction with other public servants, had not met with the success expected, the council had decided to take the necessary steps to have the measure framed by the association reintroduced, in the belief that the claims of the association would be conceded by Parliament. In this connection the council expressed their pleasure in acknowledging the continuance of the policy of the Local Government Board, in urging local authorities to appoint their inspectors permanently. Owing to the death during the year of the president, Sir B. W. Richardson, Sir John Hutton had been elected to fill the vacancy. The invitation to hold the provincial meeting next year at Newcastle has been accepted. On the motion of Mr. Dee, seconded by Mr. Gardner, of Worthing, the report was adopted. The financial statement indicated that there was a small balance in hand. Mr. T. G. Dee, of Westminster, then took the chair as the elected chairman of the council for the coming year. In alluding to the Maidstone epidemic, the chairman said he thought the case of that town only showed that where there was no Government analysis of the water supply of a town, the sanitary inspector should be empowered to see that water companies supplied a pure article. The question of the admission of lady members to the association was adjourned.

Society of Engineers.—At a meeting of this society, held at the Royal United Service Institution, Whitehall, on Monday evening, Mr. G. Maxwell Lawford, president, in the chair, a paper was read by Mr. James Croll, entitled "Filter Presses for Sewage Sludge." The author first referred to the filter press as being the most commonly adopted method for reducing the moisture contained in sewage precipitation works, and then described the two methods of introducing the sludge into the machine. He next described the filter-pressing machinery at the works of the Richmond Main Sewerage Board. This consisted of six filter presses and appliances for the direct forcing and the air-pressure systems. The advantages and disadvantages of the different processes were discussed, together with trials of the various filtering materials, lime, &c.

CHIPS.

The newly-restored Protestant church at Cronberg, near Friedrichshof, was consecrated on Wednesday week, in the Empress Frederick's presence.

Mr. T. Honess, owner of three houses in Beresford-street, Walworth, was summoned to the Lambeth Police-court on Friday for neglecting to comply with an order of the court to carry out certain work on the property. For the defence it was stated that the houses were to be sold, and that the holidays had caused delay in completing the sale. The magistrate ordered the defendant to pay a penalty of £30 and costs.

The harbour trustees of Dundee have adopted a report by Mr. Buchanan, their engineer, recommending that the wall at the Eastern Cattle Wharf be reconstructed at a cost of £9,000, the wharf having recently shown symptoms of moving forwards towards the river.

At Grange-over-Sands a public hall is about to be added by subscription to the offices for the urban district council to be erected on the site of Laurel Bank. The public room is to be 70ft. by 30ft., and will accommodate 500 persons, with an ante-room 21ft. by 11ft. 6in., dressing-rooms and a cloak-room. A gallery can be added afterwards if desired. The total cost will be £1,380. The plans have been prepared free of charge by Mr. Ward, a local architect.

The Earl of Dumfries, elder son of the Marquis of Bute, accompanied by his brother, Lord Ninian Crichton-Stuart, performed the ceremony of laying the foundation-stone of a new Roman Catholic church at Mountain Ash. The church is situated near the main road between Mountain Ash proper and the village of Penrhiwceiber. The architect is Mr. Bernard Smith, F.R.I.B.A., Gray's Inn-square, London, and the contractors are Messrs. Collins and Godfrey, of Tewkesbury. It is estimated to cost over £3,000, of which sum £1,600 is now in hand.

The resignation of Mr. H. Percy Boulnois, city engineer of Liverpool, was submitted to the health committee of the corporation on Thursday in last week, and was accepted with much regret. It is understood that Mr. Boulnois has decided to enter into private practice in London as a consulting engineer.

Some 20,000ft. of tallow wood have been forwarded from Grafton, New South Wales, to the order of the Lancashire and Yorkshire Railway Company. Orders are in course of execution for other English railway companies.

The scheme for the decoration of the interior of the Royal Exchange is rapidly approaching completion. The ninth picture—that presented by Sir Samuel Montagu, Bart., representing Charles I. demanding the surrender of the five members at the Guildhall—is almost complete, and will be unveiled by the Lord Mayor very shortly. It is from the brush of Mr. Solomon J. Solomons, A.R.A.

Mr. John Kelley, building inspector of Boston, Mass., died in that city on September 19.

The formal opening of new union offices at Leigh took place yesterday. The cost of the extensions, which comprise offices, boardroom, tramp wards, and laundry, has been about £12,000.

The members of the Dublin branch of th National Association of Operative Plasterers held their first annual dinner in the Burton Restaurant, Duke-street, Dublin, on Saturday evening. There were seventy seated to dinner. The toast of the "N.A.O.P." was proposed by the president of the branch, Mr. Joseph Kelly, and was responded to by Mr. J. D. Hopwood and Mr. Thomas Smythe. The toast of "Our London Brothers" was acknowledged by Messrs. Allwood and Lindo. After the toasts were drunk a concert was held in the billiard-room.

Burlington Baptist Chapel, London-road, Ipswich, has been reopened after the execution of internal repairs, alterations, and decorations, the work including the rearrangement of the gas-fittings, the provision of incandescent burners, and the substitution of cathedral for quarry glass in all the windows. The works have been carried out from plans by Messrs. Eade and Johns, of Ipswich, by Messrs. Stearn and Son, of the same town. At the same time the organ has been altered and enlarged by Messrs. Bishop and Co., of London. The total outlay exceeded £600.

At the last meeting of the City Court of Common Council, the town clerk read a letter from Mr. Edwin Lawrence, M.P., offering to present to the corporation a portrait—presented by the Ward of Walbrook —of his brother, the late Alderman Sir J. Clarke Lawrence, and also a picture, given to him by the King of the Belgians at the same time as that presented to the late Mr. Alderman Besley, and now the property of the corporation. The Rev. R. H. Hadden also offered, on behalf of the subscribers, the memorial portrait, by Mr. A. C. Cope, of the late Prebendary Rogers. The gifts were accepted, with thanks, and it was stated that Lord Rosebery would unveil the Rogers portrait early in December.

The Government laboratory has been removed from Somerset House to new buildings in Clement's Inn-passage, Strand, which were opened last week. Of the 38 rooms, the largest is devoted to the staple function of testing and estimating the alcoholic strength of the exciseable liquids, and is fitted up with retorts, electric agitators, and evaporating chambers. A polariscope room adjoins the chief laboratory, and a cold storage-room close by is kept at the requisite low temperature by a brine-producing engine. A photographic room has the Röntgen rays apparatus fitted up for use, and another laboratory is devoted to bacteriological work and water analysis. The building has been constructed from plans prepared by Dr. Thorpe, the principal chemist, and put into shape by Sir John Taylor, K.C.B., of H.M. Office of Works, under whose directions the laboratory has been erected. It consists of three floors and a basement, and accommodates about a hundred workers.

The death took place on Friday of Alderman William Chadwick, of Heywood, at his daughter's residence, in Manchester. The deceased, who was in his 70th year, was one of the best-known men in the district. Originally a weaver, he became the first lamplighter in the district, but afterwards amassed wealth as an auctioneer. At one time he was partner in an extensive building business. A staunch Radical, and in early days a Chartist, he represented his party on the old local board, and, since the town was incorporated, on the town council, having been three times elected an alderman.

Messrs. Garrett and Haysom, of East-steet, Southampton, have recently completed, for erection in the Roman Catholic Cathedral at Demerara, a tablet to the memory of a late official of the Royal Mail Company, Mr. Maguiness, subscribed for by his fellow officers. The tablet has been executed from a design by Mr. J. D. Haysom. It is carved in statuary marble, on a red marble background, and takes the form of a shield, with oak and laurel springing from behind it.

A meeting was convened at Castletown, Isle of Man, on Thursday in last week, of employers of labour interested in the building trade of Castletown, with the object of forming a Masters' Association. Only seven employers turned up, and, after some discussion, a committee was appointed to wait on the absent employers and ask them to join the association if one was formed. The meeting was adjourned to receive the committee's report.

The Library, Museum, and Arts Committee of the Liverpool Corporation have decided to accept the tender of Messrs. Joshua Henshaw and Sons, for the erection of the museum extension and the technical schools on a site running from the present museum to Byron-street, at a cost of £89,224. The work is to be carried out from the designs of Mr. E. W. Mountford, F.R.I.B.A., of London, which were selected in competition.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Front-page Advertisements 2s. per line, and Paragraph Advertisements 1s. per line. No Front-page or Paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and Sixpence for every eight words after. *All Situation Advertisements must be prepaid.*

NOTICE.

Bound copies of Vol. LXXII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

RECEIVED.—S. B. W.—R. J.—T. F.—M. H. and Co.—C. H. S. (Dudley).—G. P.

Correspondence.

"TEAK" AGAIN.

To the Editor of the BUILDING NEWS.

SIR,—I have not the numbers with me for reference, but I remember that there are contained in the letters of two of your last correspondents statements that teak is not oily because it is gritty, and that it must not be fastened with iron, because both iron and teak will rapidly decay in contact.

The popular idea of teak is that it is very hard. That is not so: it wears under attrition as much as would the best dense yellow deal, taking, for instance, Dantzic deals as a standard. When worked and shaped to use it does not crack or shake, and it keeps its shape without warping; but is is not difficult to split if it is desired so to use it. It is about as hard as black walnut. Probably, the reason why it is thought to be so hard is that it resists the attacks of both fungus and worms, its secretions being acrid and bitter, and relished by neither. It is also difficult and expensive to work, not because it is hard, but because it contains in its pores the so-called "grit" which turns the edges of the tools. Although not of excessive hardness for wear under foot as in stair treads, it has the advantage of giving good safe foothold and not wearing slippery; this, probably, also on account of the filling of the pores referred to. I have been talking the matter over with a builder who was, twenty years ago, a shipwright-carpenter at Blackwall, and his idea is that the so-called grit is a very hard gum or resin, which fills the pores, and which, when attacked by the tool, granulates into minute hard particles, so making the wood difficult to work, much in the same way as is shown in some kinds of hard, dry pitch-pine, to the condition of which some saw-mill men apply the term "brassy." But, whatever is the cause of the "grittiness," it is a fact that the wood is both oily and gritty. One of your correspondents appears to wish to imply that if the wood is gritty it cannot be at the same time oily;—there he is in error, there is nothing incompatible in the simultaneous existence of the two conditions.

As to the decay of teak and iron in contact, I should like to read more definite particulars. What does your esteemed correspondent Harry Hems say? At first I thought that this must be the effect of the wood and metal in contact in presence of sea-water; but my shipwright friend knows nothing of such a result, and does not believe it. He was engaged about twenty years ago in the building of the *Kaiser* warship for the German Government, and the *Independencia* for the Italian Government. In those vessels, built by Samudas and Dudgeons respectively, both firms of eminent shipwrights with great experience of teak timber, the vessels were built of iron ribs with 1¼in. iron plates. Iron armour was attached outside with teak packing under from 7in. to 14in. thick, and the inside was lined with 1½in. teak boarding, and both boarding and packing were attached to the iron by means of iron bolts.—I am, &c., W. R.

ON THE USE AND ABUSE OF THE OPEN CHANNEL IN SANITARY DRAINAGE.

SIR,—The open-channel, straight and curved (both semicircular and ¾-round in section), as now made in beautiful glazed ware, is of the greatest value, both for the bottoms of manholes to convey sewage, and also above ground for rain water and clean waste conduits; but, directly it is used above ground for carrying greasy or impure wastes, as from urinals, it becomes an intolerable nuisance, only rendered less in degree by constant attention and cleaning, in itself an insanitary and disagreeable operation.

The leading feature in all true sanitary work is to reduce all fouled surfaces as much as possible, and the man who makes a scullery sink or a urinal discharge into a long open-channel, which in turn discharges into a gully, shows either his ignorance of, or contempt for, the above-enunciated canon of sanitation. Curiously enough, this insanitary practice is asked for in two such dissimilar and divergent districts as Croydon, which owes so much of its healthfulness and repute to sanitation, and Cambridge, which, to put it mildly, does not come up to the Croydon standard.

It is too often overlooked that this bad custom is simply a relic of barbarism. In the days of our grandfathers such waste-pipes were either directly connected with drains or made to discharge untrapped over traps (too frequently "bell-traps.") Any smell arising in, or from the trap then promptly passed up the waste-pipe; but, in these more civilised days, a smooth-drawn lead trap is fixed immediately under the fitting, the waste-pipe of which then discharges into a circular self-cleansing gully outside the house. No smell from the gully can pass up the waste-pipe, and the introduction of a long or short open channel, with the object of preventing a thing which is already impossible, is a work of supererogation as well as an evil.

Recently, I have had to alter the drainage of an important institution where a tremendous amount of cooking is done, and consequently a vast quantity of grease accumulates, or, I may now say, used to accumulate. I found the scullery sinks discharging into open glazed channels with much splashing and fouling of channels, walls, &c. Not satisfied with this large and entirely unnecessary fouled area, the authors of the scheme had caused these channels to discharge their offensive contents into large rectangular grease-traps which retained the grease upon the premises, and the sour smell of the putrifying grease in these channels and traps pervaded the place, the grease offending the eyes and the stench the nose; in fact, sickness and sore throats were attributed, no doubt justly, to the horrid effluvia.

All this has been swept away. The sinks now discharge properly through ventilated and trapped lead waste-pipes (with expansion joints) into circular flushing-rim gullies in the open air, and large automatic flush-tanks discharge through flushing pipes of ample area into these gullies at sufficiently frequent intervals to break up all the grease and sweep it through and out of the drainage system without trouble or attention. All smell has been removed simply by reducing fouled surfaces to a minimum.

This is only another proof, among many, that this old-fashioned and sanitarily bad requirement should be removed from sanitary by-laws.—I am, &c., CHAS. E. GRITTON, A.M.Inst.C.E., Mem.Soc.Architects.

IRISH AND ENGLISH ARCHITECTS.

SIR,—You note in the last issue of the BUILDING NEWS, an animated controversy *re* bells for St. Patrick's Cathedral being obtained from England, which has called forth a letter from an Irish architect, naming English architects now doing work in Ireland. To those acquainted with the majority of modern architecture in Ireland it will be welcome news to hear that such men as Sir A. Blomfield and W. D. Caröe are among those adding to the architecture of Ireland. Of course, it is not to be presumed that there are no able architects in the country. There are several who will equal the English architects, and their work is a credit wherever seen; but, on the other hand, there are some whose work, to say the least, might be improved by many pupils of one one or two years' training, and yet some of these men are doing the greater part of the work there. It is a well-known fact, too, that a great deal is done by English draughtsmen and "ghosts," few of the leading offices being without their English assistant; in fact, I know of several architects who will not have their own countrymen as assistants, and always go to England if in want. The necessity is well known by those acquainted with Ireland, and Mr. Thomas Drew, the president of the Royal Institute of Architects of Ireland, has drawn attention to the fact that, if they want any extra help, the backwardness of Irish assistants necessitates them sending their work to England to be done. It is not, however, to be presumed by this that there is plenty of chance for English assistants; on the other hand, there is a necessity for such a caution as was seen in your advertising columns some 18 months ago. Concerning the importation of English bells, we know there is always a shouting when opportunity is giving against anything English; yet I know Irish architects who always (or nearly so) go to England for various work, not only bells, for their Catholic churches. What is to be done if Irishmen won't keep up to the times? Their own countrymen are not likely to send the orders to England if obtainable in their own land, especially for their own churches.—I am, &c., GOTH.

POOR MORTAR.

SIR,—If your correspondent "H. C. S." will tell "his" readers why air is in a pulverulent state when freely exposed to lime, he will "have something to say worth occupying your space with." In the course of forty-five years' intimate connection with building operations and building operatives, the term "oxide of lime" has never once been applied to lime by chemists or non-chemists in my hearing. Your correspondent misses the point of my letter to you—it was merely to plead for accuracy and simplicity in the use of scientific terms when describing materials used in building, and their inter-action one with another. "H. C. S.," for instance, applies to a common well-known substance the names "lime," "oxide of lime," "calcic oxide," "oxide of calcium," and "CaO," all in a few lines. If "H. C. S." writes for people who are already well acquainted with the subject this does not matter; but if for students or the general public, then, applying so many different names to the same substance may lead to confusion. With reference to the closing paragraph of Mr. Busbridge's letter, it is probable that the Romans kept their lime moist in covered pits. Like most others engaged in building, the writer had an idea that lime once set was useless as a cementing material. Experiment showed this notion to be false; for lime, which had been made into putty and allowed to set—that is, to get quite dry and hard—was stronger when pounded up and made into mortar the second time. Briquettes, 1in. square in section, carried only 8¾lb. after a month in the first case, whilst, in the second case, the briquette sustained a weight of 13½lb. before fracture.—I am, &c., W. E. M.

The death was announced on Friday of Mr. John Faill, of Messrs. A. and J. Faill, contractors, Glasgow. He had been in business for over forty years, and his firm laid all the tramway lines in Glasgow.

Intercommunication.

QUESTIONS.

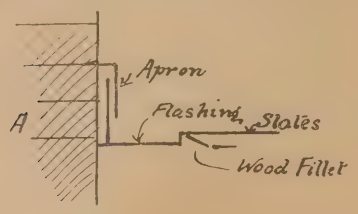
[11798.]—**Rough Cast.**—It is desired to have a portion of building done in rough-cast plastering of a good rich chrome colour. How is this done, and how should it be specified, and with what proportions?—W. C. De B.

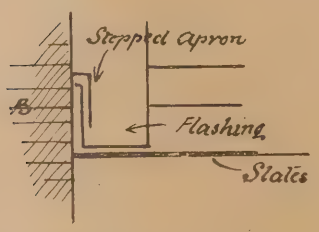
[11799.]—**Woodwork of Windows.**—Will some reader inform me which way to take out quantities for painting the woodwork of windows?—Student.

[11800.]—**Ink.**—Several ink perspectives which I have lately seen had a moist appearance, as if the ink were still wet. Can any of your readers inform me how this effect is produced—whether it is by a special kind of ink, or by a wash laid on when the ink is dry?—A. Inglis.

[11801.]—**Essex.**—Can any of your readers inform me which is the best local stone and facing brick for a large building near to Shoeburyness?—Inquirer.

[11802.]—**Flashings.**—I should be glad to know the advantages and disadvantages of the two methods (A and B) of flashing the side of a chimney head. The former is





generally used in Scotland, and the latter quite common in the South of England, but with lead soakers underneath the slates or tiles. What is the *full* definition of the term "flashing"? Does the apron constitute a part of the flashing, as all the flashings are not specified to have aprons? Should a flashing ever be without an apron? If so, in what position?—Gallatown.

[11803.]—**Surveyor's Chains.**—I would feel much obliged if some of your readers would inform me where to obtain 100ft. surveyor's steel chain, and what would be the price? Each link 1ft. in length. Chain to be used for railway line.—Romeo.

[11804.]—**Building Construction.**—I wish to know the best books to use for Honours stage (S. and A.) Building Construction? I know of Rivington's; but it is not sufficient to answer questions on architecture, sewerage, plumbing, &c.—Honoris.

[11805.]—**Fireproof Plaster.**—Will some reader kindly give me any particulars of a material that will not crack or crumble or peel if exposed to great heat? Is the "Asbestic" suitable, and how can I use it?—Tyro.

[11806.]—**Fixing Marble Slabs to Inside Walls.**—Which is considered the best way of fixing marble in thin slabs to a new brick wall? Are there any precautions necessary to prevent fracture in case of the settlement of the brickwork? I should be glad to have any advice.—A. H. R.

[11807.]—**Bath and Sink Wastes.**—What trap for outside the wall of a house will satisfy the provisions of the Local Government Board? These wastes are to be discharged in the open air over a channel to a trapped gully. Information will oblige a—Constant Reader.

[11808.]—**Disconnecting House-Drains.**—Many methods for doing this are before the profession, but they are too elaborate and costly for general use. Is there a simple and inexpensive way of disconnecting the house-drains from sewer?—A Builder.

REPLIES.

[11794.]—**Parpoint Facing with Brick Lining.**—Parpoint wall facing with brick lining makes a very good and strong bond, if properly specified and carried out. This class of stone walling should be specified 3in. to 5in. deep, and 5in. in the bed, backed with either 4½in. or 9in brickwork, as required, walled with a cavity and a through stone every superficial yard, thus making the wall strong and well tied in.—Albert C. Freeman, 21, Green-street, Morecambe.

[11796.]—**Joists.**—If the ceiling joists are well seasoned, they will last for many years; the lime of the concrete is a preservative to some extent. No doubt it is better to ceil to laths fixed to joists than to plaster on the concrete. Ventilation or a current of air could be secured by boring holes through each of the ceiling joists in a few places, and to ventilate the space by a small opening in the outer wall. But there is a better way by using the expanded metal lathing for the plaster, and so avoid all wooden joists—the metal lathing is secured by hooks fixed in the concrete. The ceiling is thus suspended by small hooks below the concrete, thus allowing an air space and making a capital fire and sound proof ceiling. Send to the Expanded Metal Company, Ltd., Upper Thames-street, E.C., for particulars.—G. H. G.

[11797.]—**Contracts.**—I am very doubtful if any claim can be made under the circumstances related by "Surveyor," as the contract was accepted and carried out, and the contractor can plead that his tender was accepted as a whole unconditionally. If the items were liable to correction, there may have been some ground for making the claim. Has the error been pointed out? As to liability for inaccurate quantities, a builder can obtain relief in equity if he finds a mistake in the bill of quantities, if he can show that the architect knew of it; and that being so, it is fair that any mistake the contractor on his side makes should be rectified. The case of "Neill v. Midland Railway" may help "Surveyor."—H. T.

[11797.]—**Contracts.**—"Surveyor" has opened an important question. Supposing the contractor had extended the 50s. as 50d., which of the two sums would "Surveyor" have considered he would have been entitled to place to the credit of his client? I have always considered a provisional sum in a bill of quantities to be a "fixed" one, entirely under the control of the architect (or surveyor), no matter how it has been treated by the contractor. If he ignores it (and probably obtains a contract by so doing), is the client to have the cost of his building increased if the provisional work be executed, or suffer by it not being done, through a contractor's negligence or wilfulness? If a provisional sum be magnified, it militates against the tender being the lowest; if it became a rule to deal with the "extended" sum (if it differs from the provisional amount), difficulties must arise. Having stipulated that a contractor shall provide a certain sum of money in his tender for something (seen or unforeseen) to be done, nothing more, nor less, should be considered when squaring-up the contract; whether he increases, reduces, or omits it is entirely his affair. In the quantities for the erection of a large public institution in a suburb of London, the provisional sum of £2,000 was inserted for carving. The contractor omitted to "extend" it; nevertheless the carving was executed, and no extra was allowed.—Thomas S. Jerome, F.S I.

CHIPS.

Colonel C. H. Luard, R.E., an inspector of the Local Government Board, held an inquiry in the council chamber, Cowpen, Blyth, on Friday last, into an application by the Cowpen Urban District Council to borrow £4,700 for works of private street improvement.

Ald. Hind, J.P., of Stockton, has just been elected and installed Master of the Worshipful Company of Plumbers. When Mayor of Stockton, in 1884, Ald. Hind was invited to become a member of the Company, and thereafterwards made a Liveryman and Freeman of the City.

At the Parochial Hall, St. George, Bristol, on Friday, Mr. C. March held an inquiry respecting the application made by the St. George Urban Council for loans of £6,898, £5,041, and £520, to be used for works and street improvements.

The Victoria Hall, Ancoats, erected by the Manchester and Salford Mission at a cost of about £9,000, was opened on Thursday in last week.

Considerable progress is being made with the demolition of slum property in Southampton, embracing the square between Blue Anchor-lane and Simnel-street. The work is being carried out under the supervision of the borough engineer, Mr. W. B. G. Bennett. Very little brickwork remains to be seen above the hoarding, and Blue Anchor-lane is closed to the public, together with King John's Palace.

At Shrewsbury last week, a block of board schools in St. Michael's-street were formally opened. The schools have been erected from the plans of Mr. A. E. Lloyd Oswell, architect, of Shrewsbury, and the contract was taken by Mr. T. Pace, also of Shrewsbury. The ground floor—the girls' school—consists of a general room, from which open out two classrooms (each capable of accommodating 60 children), cloakroom, and lavatories. On the mezzanine floor are the schoolmaster's rooms. The boys' school, which is situated on the top story, is a counterpart of the girls'.

Colonel A. J. Hepper, R.E , Inspector of the Local Government Board, held an inquiry at Wombwell, on Friday, in reference to an application to borrow £4,000 for the purposes of street improvement. There was no opposition to the application.

Trinity College Parish Church, Edinburgh, which has been in the hands of the painters and electricians, was reopened on Sunday, after renovation and decoration of the ceiling, walls, and iron columns. These decorations contrast well with the grey stone walls of the apse, which is constructed with the material that formed part of the original church built in 1462. Electric light installation has been introduced. The work was carried out by Messrs. J. and T. Harvey, painters, Forth-street, and Messrs. John White and Co., plumbers, South St. Andrew-street, Edinburgh.

Dr. Thomas held an inquest on Friday at St. Giles's Coroner's Court on the body of Thomas Henry Yeomans, aged 56, master builder, lately residing at 24, Marchmont-street, Bloomsbury, who on the previous Tuesday night was found dead, suspended by the neck from a beam in the store-room at his workshop in Drury-lane. After hearing the evidence of the son and brother of deceased, the jury returned a verdict of "Suicide while of unsound mind.'

LEGAL INTELLIGENCE.

Cases under the Building Act.—Sections 56 (3), 59 (1), Part VII. First Schedule and By-laws.—Wooden Inclosures, Party Walls, &c.—(A. Payne district surveyor of East-Hackney (South) and North Bow v. William Slater. North London Police Court, before Mr. Frederick Mead.)—Mr. W. Slater appeared in person. The district surveyor said defendant had made a washhouse addition at back of 21, Lauriston-road, Hackney, converting the wall of adjoining house into a party-wall, without carrying out the rules as to party-walls with regard to it. He had erected an inclosure at the back of yard, of wood, with door and two windows, instead of a brick wall; he had also erected a copper and irregular chimney; he then allowed some time to elapse, and converted the whole into a building by putting a roof on. Defendant had carried out an addition at the same premises before in 1893, and stated that the things complained of had been done a long time before, and tried to mix up the case with the work done in 1893. The magistrate took some time to consider his decision and gave judgment on Oct. 1, 1897. He stated that he had come to the conclusion that the work done by the defendant came within the Act, and must be done according to the rules. He inflicted a nominal fine of 10s. and 12s. costs, and intimated that if the work was not amended to the satisfaction of the district surveyor, the defendant would be liable to further penalties.

There was but little improvement in business at the Auction Mart last week, the absence of saleable properties being very marked. The aggregate amount of sales effected was £35,499. There was, however, a notable increase of successful transactions in the provinces, the demand for land continuing to show a firm upward tendency.

Although the restoration of the priory church of St. Bartholomew the Great is practically completed, further portions of the original building are still being found. During the last fortnight some 20ft. of the exterior wall of the north side of the Lady chapel have been uncovered whilst removing the earth from the site of Lady Saye and Sele's almshouses, which, until recently, abutted on to this side of the church. This wall will now be left permanently exposed.

The memorial stone of intermediate schools at Newtown, Mont., was laid on Thursday in last week. The building will be of brick with slated roofs, and will accommodate 70 boys and 65 girls. There will be an assembly hall seated for 150, six classrooms, laboratory, workshop, cooking and laundry rooms. The total cost will be £3,700 including site. Mr. W. H. Thomas, of Oswestry, is the contractor.

At the instance of the Strand Board of Works, the owner of five houses in White Horse-yard was summoned to Bow-street Police-court on Friday to show cause why they should not be closed. When the case was called there was no response, and it was stated that the landlord had not been near the houses for four or five months, even to collect the rents. It was also said that the dwellings, in which forty-three people were housed, were in a very dilapidated state; some of the staircases were dangerous; the water had been cut off, and the sanitary arrangements were defective. Sir James Vaughan made a closing order, but suspended it to enable the tenants to obtain other lodgings.

The ceremony of laying the corner-stone of a new chapel in connection with the Convent of the Little Sisters of the Poor, Gilmore-place, Edinburgh, was performed on Friday by Archbishop Macdonald. The building, which has already been commenced, is being erected by Messrs. Wm. Beattie and Sons from plans by Mr. James M. Monro, Glasgow. It is in the Romanesque style, and is intended to accommodate about 260 persons. Besides the chapel proper, there will be behind the sanctuary a number of sacristies for the use of the Sisterhood. The cost will be about £3,000.

A meeting of the General Purposes Committee of the Blackpool Town Council was held on Wednesday week, when the question of providing a tower for the new town hall was discussed. The design of Mr. R. B. Edmondson was submitted, and a tender handed in for the work, the amount for which was in advance of the last by £2,000. In answer to a question the town clerk stated that the cost of the new town hall, including the site, but not the tower, had been £40,172 so far. After several objections had been made to the heavy expenditure, a resolution was moved recommending the council to accept the tender.

At Tuesday's meeting of the London County Council it was agreed, on the motion of Dr. Longstaff and Mr. Benn, to instruct "the Parliamentary Committe to take steps to insert a clause in one of the Council's Bills empowering the Council to purchase or contribute towards the cost of purchasing or otherwise incur expenditure in connection with the preservation of buildings and places of historic or architectural interest."

WATER SUPPLY AND SANITARY MATTERS.

Cardiff Water Supply.—In continued development of the new water supply for Cardiff, from the Breconshire Beacons, another reservoir, No. 1, was opened on Thursday in last week at the foot of the Beacons, about 10 miles beyond Merthyr and 34 from Cardiff. The embankment is 1,200ft. long across the Taff Vawr Valley, and incloses a storage which will amount, it is estimated, to 335,000,000 gallons, and afford an additional supply to Cardiff of 3½ millions of gallons daily. The cost of this reservoir approximates to £200,000. The work has occupied in construction four years and a half. The construction of other reservoirs in the Beacons district is regarded as a question of a few years only.

Middleton, Lancs.—By the completion of the Middleton sewage scheme, which was celebrated on Friday by the opening of the new outfall works, the condition of the Irk, whose murky waters as they flow into the Irwell have long been a reproach to Manchester, will be considerably improved. Instead of pouring raw sewage into the river, the Middleton Corporation will now be able to discharge a clear and apparently inoffensive effluent. The whole cost of the sewerage and sewage disposal works, which have now occupied the attention of the health committee for a year or two, will be at least £50,000. The scheme provides for a present population of between 24,000 and 25,000, and for any considerable increase which there may be for many years to come. The sewage works opened are at Land's End, near Rhodes, and there is ample ground for their expansion as the needs of the town —of late growing somewhat rapidly—may demand. The committee decided to adopt the International system of sewage treatment, now very well known in this country. The cost of the works will amount in all to about £13,500. Mr. H. L. Hinnell is the engineer. The sewage passes through clarifiers to the filter-beds, where it is united with polarite. The process of pressing the sludge from the sewage tanks into cakes for manure was shown at the inaugural ceremony.

CHIPS.

At Friday's meeting of the Stirlingshire County Council, Mr. G. T. Gough was appointed sanitary inspector for the western division of the county.

Lady Kennaway unveiled, on Wednesday week, a lychgate which has been placed at the entrance to Alfington churchyard, near Ottery St. Mary. The church was built in 1849, and the contractor for the gate, which is of oak on masonry foundations, was Mr. William Bastern.

The steam tramways at Stockton, Thornaby, and Norton were discontinued on Monday, this course being rendered necessary by the forward condition of the work of laying the lines for the new electric system. As far as Blair's works in Norton-road have been reached from Norton, and work has been commenced from the Brewery Bank, Thornaby, down the Middlesbrough-road. On Monday operations will be commenced in the Stockton High-street, and the Norton and Thornaby gangs will work towards this centre. Some hundreds of men are employed, and the progress made has been very rapid. The system is expected to be in running order by May.

At Hope Park U.P. church, Edinburgh, on Friday, a memorial tablet to the late pastor, the Rev. Thos. McEwan, was unveiled. Let into the vestibule wall opposite the main entrance to the church, the medallion, which is in bronze, and represents Mr. M'Ewan in the act of preaching, rests on a dark marble slab. It is the work of Mr. Pittendrigh Macgillivray, sculptor, of Edinburgh.

The Clergy Daughters' Schools, Casterton, Kirkby Lonsdale, are being warmed and ventilated by means of Shorland's patent Manchester grates, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

The extension scheme of the Church of Scotland in Govan parish was advanced another step on Saturday, when the foundation-stone of St. Margaret's Church, Polmadie, was laid. The new edifice, which is to be Early Norman in style, will be seated for 800 persons, while 300 more will be accommodated in halls adjoining. The interior will be finished in undressed stone, the roof will be of open timber, and the congregation will be seated on chairs. The total cost is estimated at £4,000. Two other churches are also in course of erection in the parish of Govan as part of the same movement. One, that of St. Bride in Partick, will be opened this month, and the other, that of St. Kenneth in Linthouse, has just been commenced.

The forthcoming archæological report of the Egypt Exploration Fund for 1896-7 will contain Mr. B. P. Grenfell's report of his excavations at Behnesa (Oxyrhynchus), and also a collation by Mr. A. S. Hunt of four chapters of Thucydides, from a papyrus of the first century.

Our Office Table.

A lecture upon Art, considered on its practical side, was given before the Art Society at Southampton, on Thursday evening in last week, by Mr. G. D. Leslie, R.A. The author prefaced his lecture by remarking that he had been accustomed to the smell of paint from his infancy, and had had the benefit of visiting the workshops of brilliant artists during the past fifty years. Not only had he talked to and asked questions of them, but had in many instances seen them actually at work, and, furthermore, in his own work, having been extremely fond of trying all sorts of technical dodges and experiments, it occurred to him that possibly it might be of interest to them, if he were to give them a few of the results of his experience of some of the various methods, mediums, and materials by which artists expressed their ideas. This he proceeded to do, and referring in passing to pen-and-ink work, he advised all who had children who were artistically inclined, to let them draw in pen and ink, and never mind the mess they made with the ink. It was splendid material for them to learn in, and there was always a living for the person who could draw well in line. After a brief reference to water-colour painting, the artist remarked that fresco painting was entirely unsuited to our climate. Mural decoration in England seemed to be a failure on account of the smoke and gas, though in churches and other clean places a mixture of ordinary oil-colours with turpentine and wax was very effective and durable. He painted a small reredos in this way thirty-five years ago, and it had lasted admirably. In the course of some instructive hints with reference to painting in oils, Mr. Leslie said that if there were fewer exhibitions better work would be accomplished. If painters could take two or three years over a picture they would do better.

The Superior Jury at the Brussels Exhibition have confirmed the awards made to the following British artists:—Médaille d'Honneur.—L. Alma-Tadema, R.A. First-class Medals (painting.)—Frank Dicksee, R.A., E. J. Gregory, A.R.A., Seymour Lucas, A.R.A., H. Herkomer, R.A., Sir J. D. Linton, P.R.I., J. W. Waterhouse, R.A., J. C. Hook, R.A., J. S. Sargent, R.A.; E. Onslow Ford, R.A. (sculpture.) Second-class Medals (painting.)—W. Q. Orchardson, R.A., S. J. Solomon, A.R.A., J. Aumonier, R.I., G. Clausen, A.R.A., Charles Green, R.I., D. Murray, A.R.A., Mrs. Allingham, R.W.S., R. Macauley Stevenson, J. Lavery, J. W. North, A.R.A., W. W. Ouless, R.A.; J. L. Pearson, R.A. (architecture); G. Frampton, A.R.A. (sculpture), A. Drury (sculpture); D. Y. Cameron (engraving). The exhibition authorities have purchased the picture "Apple-blossom and Tulips" (No. 118), by Alfred Parsons, A.R.A., for the Grand Lottery.

The utter lack of capability on the part of some of our clergy to grasp the merits of things architectural is aptly illustrated by the following recent incident:—A case was tried in a Consistory Court in the West of England last week, the rector being desirous of erecting oak stalls in his chancel at his own expense, and the principal farmer of the parish opposing on the score of stalls being Roman innovations. The parson won the day, and the farmer was mulcted in costs. When asked by a correspondent who the architect was under whom the proposed new work would be carried out, the reverend gentleman replied there was none, and explained that he had gone to a ready-made provider of such things. To use his own words he said:—"The work was so small a matter it did not seem to me worth while to employ an architect. . . . I simply went to him" (*i.e.*, the universal provider), "and bought half a dozen stalls just as I might have bought half a dozen surplices." Comment is needless.

The distribution of prizes to the students of the architecture and building construction and wood-carving classes was held on Thursday evening in last week at King's College. The Rev. Dr. Robertson, principal of the college, occupied the chair, and was supported by, amongst others, Sir Henry Harben, and the master, clerk, and warden of the Carpenters' Company. Professor Banister Fletcher reported that the competition for the two free scholarships, given by the Carpenters' Company, took place at the college on September 27. There were twelve candidates, of whom ten sat for the examination, the successful candidates being Mr. A. C. Remnant (126 marks) and Mr. C. J. T. Dadd (123 marks). In conclusion he announced that since the opening of last session the whole of the original diagrams and drawings prepared by the late Sir Gilbert Scott, R.A., and his pupils, numbering some 400 drawings, had been presented by his son, Mr. John Oldrid Scott, F.S.A., to the architectural school of the college. Sir Henry Harben presented the prizes to the successful students, and afterwards delivered a short address to the students present. The Rev. Dr. Robertson, in proposing a vote of thanks to Sir Henry Harben, observed that a great deal of the success which the classes had achieved was due to the support received from the Carpenters' Company. Mr. Joseph Henry Gibbins, Master of the Carpenters' Company, seconded the vote, which was carried unanimously. A *conversazione* was held afterwards, various exhibits in connection with the architectural classes being thrown open to the guests.

Public interest will be revived in the discovery a few years since of the remains of the famous pleasure triremes of the Emperor Tiberius, at the bottom of lake Nemi, about 17 miles south-east of Rome, from the fact that last week the Court at Rome ordered the castle and lake of Nemi to be offered by public auction for debt. The present owner of the Nemi estate is Don Filippo Orsini, Prince Assistant at the Pontifical Throne, the highest lay position at the Papal Court. The remains found include several massive metal mooring rings, fixed in the mouths of well-modelled bronze heads of Medusæ, lions, and wolves, all in an excellent state of preservation. The stakes to which the Tiberian vessels were moored to the quay are also in a good state of preservation, and it is conjectured that the remains, possibly some portions of the famous triremes themselves, are still submerged in the lake.

The fourth annual convention of the National Association of Master House Painters of England and Wales was opened in the Albert Hall at Sheffield, on Tuesday, by the Duke of Norfolk, who was followed by an address from the President, Councillor J. Smith, of Sheffield. The attendance of delegates and guests has been about 300. A portion of the Albert Hall has been set apart for an exhibition of wall decoration, brushes, paints, varnishes, &c., used in the trade, was thrown open to the public since Friday last. On Tuesday afternoon, the reports of the various committees were taken, and in the evening Mr. J. T. Cooke, headmaster at the Sheffield School of Art, read an interesting paper on "Art and Technical Education and Art Classes," which was followed by a discussion. The two papers read on Wednesday morning were one discussing "The Desirability or Otherwise of Painters' Standards," by Mr. Alex. G. White, Liverpool, and one by Mr. Goodier, namely, "A Review of the Modern Practice of asking for Tenders, with some Suggestions for the Remedying of the Abuses Therein." Mr. Hugh Stannus, F.R.I.B.A., gave an address in the afternoon on "The Development of Counter-Change in Colour," and "Some Notes on the Artistic Side of our Craft" were given by Mr. Thomas Bonnar, F.S.A. On Wednesday evening the President's "At Home" took place, and yesterday (Thursday) the annual excursion to Chatsworth and the annual dinner furnished a pleasant wind-up to the proceedings. To-day (Friday) several of the famous works in the city will be visited.

A meeting of the Newquay Urban District Council was held last week to consider the plans submitted by Mr. Silvanus Trevail, F.R.I.B.A., of Truro, for an hotel to be built at Headland, concerning which site, it will be remembered, there is an animated dispute, which recently culminated in riotous proceedings as to an alleged right of way. The surveyor reported that the plans were in perfect accordance with the local by-laws, and some of the members still proposing to delay coming to a decision, the clerk pointed out that the members must approve or disapprove of the plans, and assign a reason within a month, in accordance with section 158 of the Public Health Act of 1894. He further reminded the members that no reference to a right of way ought to influence them in passing or rejecting plans; but they might, in a separate communication, draw attention to the alleged public rights over the land. It was eventually unanimously resolved to disapprove of the plans on the ground that the drainage outlet was not thought suitable; and further, to disapprove of them on the ground that it would obstruct public rights of way, and a committee of the board and of outside townsmen

was appointed to contest the latter point, if necessary.

The annual distribution of prizes and certificates awarded to the students attending the plumbing classes at the Regent-street Polytechnic during the season 1896-7, took place on Monday night. The teacher's report was of a highly satisfactory character. One hundred and forty students were on the class roll, and of 70 taking part in the examinations, 15 had passed in honours (one obtaining a medal and money prize), 15 in the ordinary grade, and 18 in the preliminary section. Eight students, moreover, had gained scholarships presented by the Technical Education Board of the London County Council. Sir Philip Magnus occupied the chair, and while distributing the prizes, observed that there was no class of tradesmen in whom the public seemed to take so deep a concern, and so intelligent an interest, as the plumbers. This was probably due, to some extent, to the fact that the public recognised its dependence for comfort and sanitary conditions on the intelligence, skill, and morality of those engaged in the plumbing trade. They heard a great deal of foreign competition and of foreign workmen beating down the wages of our own artisans, but he had never seen a foreign plumber in this country. On the contrary, we exported our plumbers to all parts of the world, and found them busily occupied in nearly every important city on the Continent. If they wanted to know where to reside in a sanitary hotel at Nice or Naples, Cairo or Constantinople, they should not consult Baedeker, but go to some of the large English plumbing firms and find out where they had been doing their work abroad. Young plumbers must clearly understand that they were expected to possess other qualifications than knowledge and skill in their work. They must have thorough trustworthiness, love of truth, and a determination that they would never cover up any work that was not good. The plumber must work with his hand, brain, and soul; he must be intelligent, skilful, and truthful. This was a high ideal to set before them; but unless they accepted it, they would never succeed in satisfying their own consciences, or in doing the good work that was expected of them.

The British Consul at Gothenburg, in his annual report on the trade of his district, says that along the coast from the Norwegian frontier as far as the Gullmar Fjord there is an almost uninterrupted stretch of splendid granite, with an average breadth of about three miles, while there are good and safe harbours and anchorages where vessels may load under almost any circumstances, and, as a rule, without hindrance from ice in winter. Southward near Warberg and Holmstad, and farther on in the neighbourhood of Carlshamm and Carlscrona, there are also granite fields of considerable extent. Quarrying has been carried on for many years, but not on such a large scale as of late. Germany and Denmark used to be the chief consumers; but since the industry has grown into one of importance, other markets have been found, and orders have been received from across the Atlantic. Polished granite is not much exported or used within the country; the granite is supplied to buyers in a semi-rough state, and they finish it to suit their own requirements. The granite of the different districts is suitable for all purposes—for architectural and ornamental work, as well as for paving streets and for making docks and quays. The colours are of great variety and beauty, and the Consul thinks there are excellent opportunities for British importers obtaining raw material at a moderate price, since vessels carrying coal, salt, iron, or coke out are always willing to accept a low freight home.

The jubilee of the ministry as vicar at St. Peter's Church, Plymouth, of the Rev. G. R. Prynne, M.A., was to have been celebrated on Tuesday by the dedication of a colossal statue of our Lord, which was to stand in his church within a carved niche, just erected for that purpose, in the limestone wall facing the main entrance by the south-west porch. The new work has been designed, in keeping with its immediate surroundings, by Mr. Geo. H. Fellowes-Prynne, F.R.I.B.A., of Queen Anne's Gate, Westminster, the son of the vicar, and architect of the church, and during the past week members of the staff of Messrs. Harry Hems and Sons, of Longbrook-street, Exeter, in whose studios the sculpture and its accessories were carried out, have been engaged in its erection. On Saturday, however, on opening, in the church, the large case containing the statue, it was found that in transit over the railway it had come to grief, being broken in twain, the damage being quite past remedy. A new statue—a replica—will have to be made, representing a labour and serious delay of several months. The damaged statue represented a figure of our Lord some 8ft. high, carved, like the niche, in Caen stone. In the meanwhile, the new niche must remain vacant until Messrs. Hems and Sons can carve a new statue.

THE ARCHITECTURAL ASSOCIATION.

CLASSES COMMENCE OCTOBER 11th .. 6.30 p.m.
STUDIO OPENS „ 12th .. 6.30 p.m.
Pamphlet containing full particulars and nomination forms for membership may be obtained upon application to the Hon. Secs., at 56, Gt. Marlborough-street, W.

E. HOWLEY SIM, G. B. CARVILL, } Hon. Secs.

CHIPS.

It is estimated that there are nearly 300 houses in course of erection or recently completed in Peterborough.

The Horseferry Wesleyan Chapel at Pontefract was reopened last week after having been decorated by Messrs. Henry Butler and Sons, of Pontefract, from specifications and designs by Mr. Thomas Bottomley, of Crosshills, near Keighley.

A strike of some 7,000 builders' workmen is in progress in New York, Brooklyn, and Jersey City. The strike will be a sympathetic one. Its purpose is to help the slate and metal roofers and the cornice and skylight makers to gain their demands for higher wages.

St. John's parish church, Edinburgh, was reopened on Sunday after internal decoration in colour and the introduction of the electric light, effected at a cost of £600.

The new Royal County Theatre, Kingston-on-Thames, was reopened on Monday night. The house, which is of small proportions, is built for the Kingston Theatre Co., Ltd., and seats 1,250 persons, of which the pit and gallery accommodate 500 each. The theatre is lighted by electricity, and hydraulic machinery sufficient to cope with any outbreak of fire has been provided.

The Right Rev. Dr. Temple, Archbishop of Canterbury, paid his first visit to Maidstone on Friday for the purpose of conducting the formal reopening of the church of Holy Trinity, after the completion of renovation and decoration at a cost of over £500, and the dedication of the new chancel screen which has been erected at St. Paul's Church. The interior of the latter church has, during the past two years, undergone many improvements. The seating is entirely new, as well as the pulpit and organ stand and cover. The pulpit is a work of art, and on its panels are carved scenes illustrating Biblical passages. The organ cover and stand is also carved, and the chancel screen is said to have been designed by the late Archbishop Benson, and it has been, at all events, carried out strictly in accordance with his wishes.

The arbitration on the claim of Messrs. Watson and Wilson for extras in connection with their contract with the Manchester Corporation for a section of the Thirlmere aqueduct has been going on this week and all last week before Mr. Hayter. The inquiry, which has been of a protracted character, involving much expense, is expected to be concluded in another week.

The Hammersmith Vestry inaugurated on Friday a new scheme for electric lighting. Under the supervision of Mr. A. H. Preece, a generating station has been erected in Fulham Palace-road, from which electricity is distributed under the high-pressure alternating current system. Between sunset and midnight the streets are lighted by arc lamps, giving a light equal to 1,200c.p. After that hour glow lamps are used. Sixpence a unit is charged to private consumers for the first two hours, and fourpence a unit for succeeding hours, a unit of electricity being equal to the light of a gas-burner consuming 120c.ft. of gas. The alternative scale is that of the Board of Trade—2½d. per unit, with a fixed charge of 1s. 3d. per quarter for every 8c.p. lamp. The cost of the installation has been £40,000, and between 8,000 and 9,000 lamps must be in use before a profit can be made.

Mr. William Blythe, C.E., Edinburgh, has been consulted by the Dee District Fishery Board with regard to the proposals of Aberdeen Town Council as to the sewage outfalls in the Dee. On Saturday he made an inspection of the ground for the purpose of submitting a report on the subject.

The master builders in Yorkshire have formed themselves into a society under the title of the Federation of Building Trade Employers. The association, the object of which is the furtherance of the employers' interests, already numbers nearly 700 members.

On Thursday in last week a man named Grant, employed by Messrs. Perkins Brothers, contractors for the redecorating of the Cardiff Conservative Club, was discovered dead, and fearfully mutilated, at the bottom of a lift employed for the conveyance of food. A verdict of "Accidental death" was returned by the coroner's jury.

Sir Augustus Webster, who is having a mansion built for himself at an estimated outlay of £20,000 at Rose-hill, a fine position near the old Roman road between Mottisfont and Broughton, Hants, inspected the works on Tuesday. Messrs. Jenkins and Sons, of Southampton, are the builders.

The movement for the erection of a clock tower on the Eastgate at Chester, in commemoration of the Diamond Jubilee, was again the subject of discussion on Friday, at a meeting of subscribers, presided over by the mayor. It was stated that the money in hand was £660, and it was decided to ask Messrs. Douglas and Fordham, architects, to prepare a design of light iron framework, on the centre of the Eastgate, to receive the clock which Colonel Evans Lloyd offers to present to the city.

The opening of the new County Council offices now in course of erection in Wakefield for the West Riding C.C. at a cost of £100,000 has been postponed from December 1st until the 23rd February next, on account of the backward state of the buildings.

On Saturday the Bishop of Lichfield dedicated a reredos which has been erected in St. Chad's, Lichfield, to commemorate the forty years' pastorate of the late rector, the Rev. Prebendary John Graham, M.A. The reredos is of carved oak, with a representation of Christ as the Good Shepherd in the centre panel, and has been erected, from designs of Mr. J. Oldrid Scott, by Mr. R. Bridgeman. The floor within the communion rails has been relaid with black-and-white marble, and a brass tablet has been placed on the south wall of the chancel.

A Local Government Board inquiry was held at the town-hall, Westbury, Wilts, on Friday, before Col. J. T. Marsh, R.E., in respect to the application of the rural district council of the Westbury and Whorwellsdown Union for granting a loan of £8,000 for carrying out a water supply for the parishes of Westbury and Dilton Marsh. Mr. J. Callaway, clerk to the district council, explained that the population of the proposed area affected was 4,559, and the ratable value £18,156. The well and reservoir were in the parish, and a provisional agreement had been made for the purchase of the land at £500. Mr. W. H. Stanley, surveyor, presented the plans and estimates. No objection was raised to the scheme.

The West United Presbyterian Church at Alloa, N.B., which has just been repainted and decorated, was reopened on Sunday. The interior has been painted from designs by Mr. Bonnar, Edinburgh, while the lighting and ventilation have been improved.

At Hollywood Petty Sessions, Belfast, on Saturday, Philip Dugan, builder and contractor, and his wife, were committed for trial charged with the manslaughter of their son, aged 10½ years, at Bloomfield on Aug. 16.

"A History of Renaissance Architecture in England, 1500-1800," by Mr. Reginald Blomfield, M.A., of Exeter College, Oxford, will be published shortly by Messrs. George Bell and Sons. It will be in two volumes, and will be illustrated with about 150 illustrations from pen drawings by the author, and 90 plates in collotype and half-tone from photographs, drawings, and prints.

St. Jude's Church, Hardwicke-street, Liverpool, was reopened on Sunday after internal decoration in colour, carried out by Messrs. G. H. Morton and Son, of Bold-street, in that city.

Sir George Newnes has intimated his intention to build on Clarke's Garden, Lynmouth, a town hall, municipal buildings, and a literary institute for the parish. The scheme will cost over £4,000. At the recent meeting of the Lynton Urban District Council Mr. B. Jones, the architect, explained that Sir George proposed to build, on a piece of land he had purchased in Lee Lane, some buildings, to include a public hall, which would accommodate between 400 and 500 people, a council room, with offices, magistrate's chambers, free library, which he would furnish with books, men's institute, and caretaker's rooms, subject to the council's approval. A hearty vote of thanks was passed to the donor. A committee was appointed to meet Mr. B. Jones, who has been requested by Sir George to prepare plans, &c., to consider the necessary arrangements for the buildings.

In order to avert a repetition of the scarcity of water experienced in Sandycroft during the recent drought, the Hawarden Waterworks Company are constructing a reservoir near the entrance to Moor-lane, which will have a water capacity of 76,800c.ft., equal to 479,000 gallons. The bottom of the reservoir is about 90ft. above the level of Sandycroft. The work is being done under the supervision of Mr. Simmonds.

LIST OF COMPETITIONS OPEN.

Dorking—Workhouse Infirmary (65 beds, £4,000 limit)	(No first) £15, £5	Geo. Scales, Clerk, High-street Dorking	Oct. 13
Pickering & Kirbymoorside—Gravitation Water-Supply Scheme	No Premium	Robert Kitching, Clerk to Pickering R.D.C., Pickering	„ 16
Colne—Technical School, Free Library, and Public Hall (£5,500 limit)	£50, £35	Alfred Varley, Town Clerk, Town Hall, Colne, Lancs.	„ 20
Wolverhampton—Free Library (selected Architects)		The Town Clerk, Wolverhampton	„ 28
Eastcote and Northwood, near Ruislip—Sewerage Scheme	£40 for Combined Scheme, £15 for Eastcote, and £25 for Northwood.	C. Woodbridge, Clerk, R.D.C., 38, High-street, Uxbridge	„ 30
Byfleet—Village Hall and Workmen's Club (£1,500 limit)	25 Guineas	F. C. Stoop, Hon. Sec., Albany House, Byfleet, Surrey	Nov. 13
Southend—St. Alban's District Church	No premium offered; no Assessor named	Rev. E. C. Kimber, Avenue-terrace, Southend-on-Sea	„ 20
Mexico—Legislature Palace (1,500,000dol. limit)	15,000dol. Mex.	Secretary Public Works, Mexico City	„ 30
Cardiff—Town Hall and Law Courts (A. Waterhouse, R.A., Assessor—£200,000 limit)	£500 (merged), £300, £200	J. L. Wheatley, Town Clerk, Town Hall, Cardiff	Dec. 4
Nottingham—Laying-out and Planting Basford New Cemetery.	£100, £50	Samuel G. Johnson, Town Clerk, Nottingham	„ 15
Nottingham—Designs for Basford Cemetery Buildings: Chapels, Crematorium, Lodges, &c.	£100, £50	Samuel G. Johnson, Town Clerk, Nottingham	„ 15
Carlton, Victoria—Children's Hospital	£100, £50, £25	J. Nicholson, Hon. Sec., Pelham-street, Carlton, Australia	(1898) Jan. 30
New York—Sun Dial (Plaster Model)	500dol., 250dol.	Sec. National Sculpture Soc., 215, West 57th-street, New York	(1898) Feb. 28
Newcastle-on-Tyne—New Infirmary (local Architects)	(No first) £150, £100, £50	Secretary Building Committee, Newcastle	(1898) Mar. 1
Brighton—Artisans' Dwellings (local Architects only)	£75, £25	F. J. Tillstone, Town Clerk, Brighton	—
Boscombe—Hospital Enlargement, Shelley-road		J. Pratt, Assistant Sec., 126, Christchurch-road, Boscombe	—
Carlisle—Board School (530 places)	£20, £10	S. Cartmell, Clerk, 27, Lowther-street, Carlisle	—
Tottenham—School Board Offices		J. F. Adams, Clerk, School Board Offices, Tottenham, N.	—
Bexhill-on-Sea—Promenade Pier and Garden		Secretary, Pier Co., 7, Sackvill-road, Bexhill	—
Blackburn—R.C. Infant School, Dean-street	(No first) £5	The Rector, 48, Islington, Blackburn	—
Lichfield—Nursery Home and Invalids' Kitchen	£10, £5	R. R. Redmayne, Secretary, 22, Dam-street, Lichfield	—
Dukinfield—Town Hall (£7,000 limit)	£40, £20	Samuel Hague, Surveyor U.D.C., King-street, Dukinfield	—

LIST OF TENDERS OPEN.

BUILDINGS.

Mullingar—Chronic Block & Farm Buildings, Lunatic Asylum.	Board of Control	H. Williams, Secretary, Custom House, Dublin	Oct. 9
Abergwynfi—Calvinist Methodist Chapel		W. Daniel, 1, Station-road, Abergwynfi	„ 9
Cardiff—Timber for Showyard Buildings	Bath Agricultural Society	T. F. Plowman, 4, Terrace-walk, Bath	„ 9
Bradford—Stable and Coach-House, Whetley Hill		Rycroft & Firth, Architects, Bank Bldgs., Manchester-rd., Bradford	„ 9
Elgin—Three Blocks of Semi-Detached Cottages at Maisondieu	Elgin Building Company	G. Sutherland, A.R.I.B.A., 51, High-street, Elgin	„ 9
Aberavon—Eleven Houses and Shops		Thomas and James, Architects, Port Talbot	„ 9
Sheffield—Stores, Abbeydale-road	Ecclesall Industrial Society	Secretary, 201, Napier-street, Sheffield	„ 9
Bedale—Additions to Buildings, Diamond Hill Farm		S. T. James, Hornby Castle, near Bedale	„ 9
Weston-super-Mare—Cottages	E. M. Whitting	S. J. Wilde, Architect, Weston-super-Mare	„ 9
Portland—Dwellings on St. Martin's Estate		Webster and Co., Architects, Fortune's Well, Portland	„ 9
Haswell—Cart Shed	Co-operative Provision Society	Geo. J. Hunter, Secretary, Haswell	„ 9
Halstock—Two Cottages and Alterations of Farm Buildings		John Pring Halstock, Yeovil	„ 9
Elgin—Three Blocks Semi-Detached Cottages, Maisondieu	Elgin Building Co.	G. Sutherland, A.R.I.B.A., Architect, 51, High-street, Elgin	„ 9
Forres—Works, Bulletloan Farm, St. Leonards-road		P. Foulton, Architect, Rambodde, Forres	„ 9
Blaenavon—Classroom at Garn Schools	School Board	Lansdowne and Griggs, Architects, Newport, Mon.	„ 9
Lynn—Alterations, Auction Mart, Cattle Market		L. F. Eagleton, Bank Chambers, Lynn	„ 9
Glasgow—Two Ranges of Two-Story Good Sheds (1,476ft. and 1,444ft. long, by 75ft. wide) on South Pier, Prince's Dock	Trustees of the Clyde Navigation	James Deas, Engineer, 16, Robertson-street, Glasgow	„ 11
Castleford—Residence in Pontefract-road		Arthur Hartley, Architect, Carlton Chambers, Castleford	„ 11
Porth—Alterations, Cymmer-road Schools	Ystradyfodwg School Board	W. G. Howell, Clerk, Pentre	„ 11
Southend—Rebuilding Railway Tavern, Scratton-road		Thompson and Greenhalgh, Architects, Bank Chambers, Southend	„ 11
Chester—Repairs at Workhouse, Hoole	Guardians of Chester Union	William Turncock, Clerk, Union Offices, Hoole, Chester	„ 11
Buckley—Extension of Infant School		J. H. Davies and Sons, 24, Newgate-street, Chester	„ 11
London—Three Blocks of Artisans' Dwellings, Moira-place	Shoreditch Vestry	Mansfield Robinson, Clerk, Town Hall, Old-street, E.C.	„ 11
Rothes—Town Hall		R. B. Pratt, Architect, County Bank House, Elgin	„ 11
Burnley—Stable at Altham	Corporation	G. H. Pickles, A.M.I.C.E., Borough Surveyor, Burnley	„ 11
Ramsgate—Thirty-four Cottages in Church-road		Hinds and Son, Architects, 57, Queen-street, Ramsgate	„ 11
Great Snoring—Additions, Workhouse	Guardians of Walsingham Union	R. S. Butcher, Clerk, Fakenham	„ 12
Halifax—Drapery Warehouse, Rawson-street		Jackson and Fox, Architects, 22, George-street, Halifax	„ 12
North Woolwich—Stores and Offices, near Beckton	London County Council	C. J. Stewart, Clerk, Spring-gardens, W.	„ 12
Batley—House, Deighton-lane		C. H. Marriott and Son, Architects, West Park-street, Barnsley	„ 12
Bromley—Fire Brigade Station and Stables, West-street	Urban District Council	Fredk. H. Norman, Clerk, District Council Offices, Bromley, Kent.	„ 12
Aberlowr—Fleming Cottage Hospital		Stewart and M'Isaac, Solicitors, Elgin	„ 12
Bradford—Boiler-House, &c, at Workhouse	Guardians of Bradford Union	Thomas Crowther, Clerk, 22, Manor-row, Bradford	„ 12
Abercorn—Fleming Cottage Hospital		Stewart and McIsaac, Solicitors, Elgin	„ 12
Glasgow—Tenements, 167-175, Stobcross-street	Corporation	D. Marwick, Town Clerk, City Chambers, Glasgow	„ 12
Barnsley—Four Houses and Shop, Hayland Common	British Co-operative Society	G. Moxon, Architect, Church-street, Barnsley	„ 12
Worsborough Dale—Four Houses, Clarkson-street		Wade and Turner, Architects, 10, Pitt-street, Barnsley	„ 12
North Woolwich—Stores and Offices at Main Drainage Works.	London County Council	C. J. Stewart, Clerk, County Hall, Spring-gardens, S.W.	„ 12
Halifax—Goods Offices at North Bridge Station	Joint Railways Committee	A. Guille, Secretary, King's Cross Station, G.N.R., London	„ 12
Stockwell—South-Western Hospital, New Pavilion and Reconstruction of Drainage	Metropolitan Asylums Board	T. Duncombe Mann, Clerk, Norfolk-street, Strand, W.C.	„ 13
Crook—Sixteen Cottages	North-Eastern Railway Company	William Bell, Architect, York	„ 13
Aberdeen—Monument in Duthie Park	Town Council	John Rust, City Architect, Union-street, Aberdeen	„ 13
Castleford—Extending Dandelion Porter Brewery	Morrison and Townend	John Townend, Morrison-street, Castleford	„ 13
Wavertree—Alterations and Additions to Richmond Lodge, Church-road	Guardians of Toxteth Park	J. Moulding, Clerk, 15, High Park-street, Liverpool	„ 13
Cardiff—Additions to Canton Police-Station	Corporation	J. L. Wheatley, Town Clerk, Town Hall, Cardiff	„ 13
Haverstock Hill—Gate Porter's Lodge, North-Western Hospital	Metropolitan Asylums Board	T. Duncombe Mann, Clerk, Norfolk-street, Strand, W.C.	„ 13
Bury, Lancs—Shelter for Casuals at Workhouse	Guardians	James Isherwood, Union Clerk, Bury	„ 13
Winchmore Hill—Isolation Hospital at the Northern Hospital	Enfield Urban District Council	T. W. Scott, Clerk, Court House, Enfield	„ 13
Seghill—Six Cottages	North-Eastern Railway Company	C. N. Wilkinson, Secretary, York	„ 13
Wednesfield—Timber Stable for Four Horses	Midland Railway Co.	Jas. Williams, Secretary, Derby	„ 14
Wibsey—Store and Six Houses	Bradford Provident Industrial Socy.	Rycroft and Firth, Architects, Manchester-road, Bradford	„ 14
Drogheda—Alterations to Workhouse	Guardians	P. Dowdall, Clerk, Workhouse, Drogheda	„ 14
Walworth, S.E.—Additions, Workhouse, Westmoreland-road	Guardians of St. Saviour's Union	H. C. Jones, Clerk, Union Offices, John-st. W., Blackfriars-rd., S.E.	„ 14
Langton-on-Swale—Additions, Schools		Clark and Moscrop, Architects, Darlington	„ 14
Lancaster—Fixing Lancashire Boiler, Electricity Works	Electricity Committee	T. Cann Hughes, Town Clerk, Town Hall, Lancaster	„ 14
Devonport—Laundry at Workhouse	Guardians of Stoke Damerel	Albert Gard, Clerk, 19, St. Aubyn-street, Devonport	„ 14
Hacconby—House and Shop	Mrs. Lea	F. G. Shilcock, Architect, West-street, Bourne	„ 14
Derby—Additions, Engineers' Offices	Midland Railway Co.	Jas. Williams, Secretary, Derby	„ 14
Devonport—Head Master's Residence, Boarding-House, at the High School	Alonzo J. Rider	Robt. H. B. Neal, Architect, Central Exchange, Plymouth	„ 15
Bletchingley—Workhouse Alterations	Godstone Board of Guardians	E. A. Head, Clerk, Union Offices, East Grinstead	„ 15
Buckfastleigh—Additions to Farm Buildings at Torr Dean, and Additions to Stables at Bigadon House		J. Fleming, 9, Biliter-square, London, E.C.	„ 16
Silsden—Twelve Houses	Co-operative Society	R. P. Holdsworth, Secretary, 1, St. John-street, Silsden	„ 16
Callan—Fifty-Eight Labourers' Cottages	Guardians	John F. Shelly, Clerk, Board Room, Callan	„ 16
Bradford—Nineteen Houses, Cornwall-road		Milnes and France, Architects, Bradford	„ 18
Notting Hill—Nurses' Home	St. Marylebone Board of Guardians	Hy. T. Dudman, Clerk, Guardians' Offices, Northumberland-st., W.	„ 18
Alnwick—Additions to Training School		R. R. Templeley, Clerk of Works, Alnwick Castle	„ 19
Coventry—Additions to Red-lane Board Schools	School Board	G. and I. Steane, Architects, 22, Little Park-street, Coventry	„ 20
Morecambe—Concert Pavilion on Pier Extension	Pier Co.	E. Hill, Secretary, Morecambe	„ 20
Morley—Public Baths, Fountain-street	Corporation	Town Clerk, Town Hall, Morley	„ 20
Kingston-on-Thames—Victoria Hospital Buildings		Town Clerk Office, Clattern House, Kingston-upon-Thames	„ 21
Belfast—City Hall	Corporation	Sir Samuel Black, Town Clerk, Belfast	„ 21
Eastbourne—Model Common Lodging-House	Sanitary Committee	W. Chapman Field, Borough Architect, Town Hall, Eastbourne	„ 22
Winchfield—Cottage Home	Hartley Wintney Board of Guardians	F. S. Chandler, Clerk, Odiham, Hants	„ 22
Kennettmouth—Distillery, Houses, and Cottages		C. C. Doig, Architect, Elgin	„ 22

BUILDINGS—*continued.*

Lowestoft—Batteries and Drill-Shed	Royal Navy Reserve	Director of Works, Admiralty, Northumberland-avenue, W.C.	Oct.	22
West Mersea—Schools for 365 Children	School Board	J. W. Start, F.S.I., Architect, Colchester	,,	22
Windsor—New Passenger Station	Great Western Railway Co.	G. K. Mills, Secretary, Paddington Station, W.	,,	26
Hampstead—Enlargement and Alterations, Fire Brigade Station	London County Council	C. J. Stewart, Clerk, Spring-gardens, S.W.	,,	26
Leeds—Public Baths, Meanwood-road	Baths Committee	Walter Hanstock, Architect, Branch-road, Batley	,,	26
Manorhamilton—Repairs to Courthouse		E. O'N. Clarke, County Surveyor, Carrick-on-Shannon	Nov.	1
Barry Dock—Offices	Barry Railway Company	W. Mein, Secretary, Barry Railway Company, Barry Dock	,,	1
Barnes, S.W.—Six Shops and Houses, Rocks-lane		F. and W. Stockers, Surveyors, 90, Queen-street, Cheapside, E.C.	,,	2
Bromborough—Detached Villa		Bell, Williams, Son, & Co., Surveyors, 40, North John-st., Liverpool	—	
Kendal—Enamelling-House, Stramongate Bridge	Herbert Croft	John Stalker, M.S.A., Architect, 57, Highgate, Kendal	—	
Bromsgrove Lickey—Residence		F. J. Yates, Architect, 1, Newhall-street, Birmingham	—	
Carlisle—Warehouses, Scotch-street		T. Taylor Scott, F.R.I.B.A., Architect, Carlisle	—	
Portadown—Convent	Sisters of Sacred Heart	J. J. Macdonnell, Architect, 27, Chichester-street, Belfast	—	
Gwersyllt—Additions to National Schools		J. Plant, Wilderness Works, near Wrexham	—	
Pontypool—Two Houses, Wainfelin-road		C. Foxwell, 14, Wainfelin-road, Pontypool	—	
Bournemouth—Wesleyan Church and Schools, Westbourne		R. Curwen, Archt., Hamilton House, Bishopsgate-st. Without, E.C.	—	
Water Fulford—Farm Buildings	Captain Key	Digby Cayley, 7, Blake-street, York	—	
Enfield—Terraces of Cottages		Eugene Beaumont, Architect, 78, Fleet-street, E.C.	—	
Pensford—Schools	Stanton Drew School Board	J. Ace Beynon, M.S.A., Sunnyside, Coleford, near Bath	—	
Swanage—Burlington Hotel		Pearce and Offin, Dorsetshire Bank Chambers, Bournemouth	—	
New Ferry—Mortuary	Lower Bebington U.D.C.	Joseph Young, Surveyor, 78, Stanley-terrace, New Ferry	—	
Roths, N.B.—Town Hall		R. B. Pratt, Architect, County Bank House, Elgin	—	
Bletchingley—Workhouse Enlargement	Godstone Board of Guardians	E. A. Head, Clerk, East Grinstead	—	
Camberwell—Pair of Semi-detached Villas, Benhill-road		S. Evans, Architect, 36, Heron-road, Herne Hill, S.E.	—	
Long Eaton—Alteration of a Shop	Leeds and Leicester Boot Co.	Ernest R. Ridgway, M.S.A., Architect, Long Eaton	—	
Llanelly—Additions and Alterations to Brynawel New-road		W. Griffiths, Architect, Llanelly	—	
Stockton-on-Tees—Buildings and Chimney, Bridge-road	Imperial Tramways Co.	Clifton Robinson, C.E., Bridge-row, Stockton-on-Tees	—	
Revolving Observation Towers—Twelve		Secretary, Revolving Observation Tower Syndicate, Gt. Yarmouth	—	
Leeds—Extension of Mill Premises, East-street	Roberts, Mart, and Co., Limited	Ambler and Bowman, Architects, 9, Park-place, Leeds	—	
Hexham-on-Tyne—Square Chimney (75ft. high)		John Fenwick and Sons, Limited, Hexham-on-Tyne	—	
Holbeach—Public Hall	Holbeach Public Hall Company	Joseph Sawyer, F.R.I.B.A., 63, Chancery-lane, London, W.C.	—	
Stalybridge—Conservative Club, Mottram-road		Eaton, Sons, and Cantrell, Architects, Stamford-st., Ashton-u-Lyne	—	
Swansea—Additions, Waterloo Hotel, Oxford-street	F. Bradford	Margrave and Peacock, Architects, Metal Exchange, Swansea	—	
Hunslet—Extensions to Jericho-street Mission Chapel		J. M. Fawcett and Son, Architects, 26, Albion-street, Leeds	—	
Moreton—Footbridge	Wareham Rural District Council	W. W. Fookes, Surveyor, Wareham	—	
Halton—Four Houses, Graveleythorpe		C. W. Lambert, 39, Whingate, Armley	—	
Skegness—Pair of Villas, Algitha-road	J. Chapman	H. Harper, Architect, Market-place, Nottingham	—	
Kirkby Lonsdale—Alterations and Additions, Royal Hotel		John Kassell, Architect, Kirkby Lonsdale	—	
Roundhay—Pair Semi-Detached Houses, Lidgelt Park Estate	Kirby Banks	Ambler and Bowman, Architects, 9, Park-place, Leeds	—	
Hillsborough—Two Houses		T. Peckett, 19, Wood-road, Hillsborough	—	
Preston—Sixteen Houses	L. and N.W. Railway Company	G. F. Aveline, Estate Office, Central Station, Preston	—	
Rothes—Town Hall		R. B. Pratt, Architect, County Board House, Elgin	—	
Roundhay—Detached House	Miss Lilly	Ambler and Bowman, Architects, 9, Park-place, Leeds	—	
Braemar—Stables and Office Houses at Invercauld Arms Hotel		R. G. Foggo, Invercould Office, Braemar	—	
Leeds—Caretaker's House, Whingate-road School	Leeds School Board	W. Packer, Clerk, School Board Offices, Leeds	—	
Armley—Two Houses in Whingate		Ambler and Bowman, Architects, 9, Market-place, Leeds	—	
Whitehead, Belfast—Villa Residence	D. J. Lanigan	Thomas Pentland, Architect, 35, High-street, Belfast	—	
London—Additions to House at 5, Whitehall Gardens		R. Curwen, A.R.I.B.A., 149, Bishopsgate-street Without, E.C.	—	
Aylesbury—Three Shops and Houses, Cambridge-street	H. J. Goodey	W. F. Taylor, Architect, Aylesbury	—	
Ilkley—Pair of Semi-Detached Houses		Isitt, Adkin, and Hill, Architects, Prudential-buildings, Bradford	—	
London, E.C.—Three Blocks of Artisans' Dwellings in Moira-place and Plumbers'-place, City-road	Shoreditch Vestry	H. Mansfield Robinson, Clerk, Town Hall, Old-street, E.C.	—	
Hillsborough—Two Houses		T. Peckett, 19, Wood-road, Hillsborough, Sheffield	—	
Ashton-under-Lyne—Cottages	A. B. Wilkinson	Eaton, Sons, and Cantrell, Architects, Stamford-st., Ashton-u-Lyne	—	
Haydon Bridge—Cottage Villas		George Tyzack, Tyne View, Haydon Bridge	—	
Carlisle—Offices at Caldewgate	Carr and Co.	Johnstone Bros., Architects, 39, Lower-street, Carlisle	—	
Harrogate—Detached Villa, Ripon-road		H. E. and A. Bown, Architects, Harrogate	—	
Headingley—Stables, Shops, and House, Cottage-road	H. R. Kirk	Albert E. Kirk, A.R.I.B.A., 13, Bond-street, Leeds	—	
Bridlington Quay—Villa		John M. Dossor, A.R.I.B.A., Architect, 2, Manor-street, Hull	—	
Aston-cum-Aughton—Additions, Swallow-Nest Schools	School Board	W. Dust, 40, Bank-street, Sheffield	—	
Harrogate—Cabman's Shelter		H. E. and A. Bown, Architects, Harrogate	—	
Stowe—Small Farmhouse, Lea Heath	Stowe Charity	W. H. Walley, Architect, Queen-street, Burslem	—	
Sowerby Bridge—House in Clifton-street		S. Wilkinson, Architect, Sowerby Bridge	—	
Rushwood—Lodge	T. Willans Nussey, M.P.	H. E. and A. Bown, Architects, Harrogate	—	
Barnsley—Eleven Houses		Wm. McCoy, Wellington-street, Barnsley	—	

ENGINEERING.

Andover—Sinking Stormwater Well		Alfred Purkess, Borough Surveyor, Town Hall, Andover	Oct.	9
Sike, Thirsk—Rebuilding of Highway Bridge	North Riding County Council	Walker Stead, M.I.C.E., Northallerton	,,	9
Ramsgate—Three-Lift Gasholder	Gas and Water Committee	W. A. M'Intosh Valon, Engineer, Hardres-street, Ramsgate	,,	11
Southborough—Laying Gas Main (10in., 2,400 yards run)	Urban District Council	P. Hanmer, Clerk, Southborough	,,	11
Hemel Hempstead—C.I. Pipes (four miles)	Rural District Council	L. Smeathman, Clerk, Hemel Hempstead	,,	11
Bradford—Steel Lattice Footbridges, Workhouse	Board of Guardians	G. Wall, Clerk, Haxstead-road, Bradford	,,	12
Cymmer—Water Mains (5,400 yards)	Glyncorrwg U.D.C.	Cuthbertson and Powell, Clerks, 58, Water-street, Neath	,,	13
Compton Bishop—Water Supply Works	Axbridge Rural Sanitary Authority	Wm. Reed, Clerk, Axbridge	,,	14
Inverness—Heating Hospital Wing of Asylum		Ross and Macbeth, Architects, Queen's-gate Chambers, Inverness	,,	15
Nice—Steel Bridge over the Paillon	Official	Le Mairie, Nice	,,	18
Southend-on-Sea—Pumping Machinery	Corporation	William Gregson, Town Clerk, Alexandra-st., Southend-on-Sea	,,	18
Baldock—Mill Machinery		John Randall, Stotfold Mills, Baldock, Herts	,,	18
Budleigh Salterton—Gasholder and Tank	Gas Company	W. A. Padfield, Gas Offices, Exeter	,,	19
Glasgow—Electrical Equipment, Springborn to Mitchell-street Tramways	Corporation	J. D. Marwick, Town Clerk, City Chambers, Glasgow	,,	20
Leeds—Widening Works, Burley-street	Corporation	Town Clerk, Town Hall, Leeds	,,	20
Llyn Fawr—Reservoir	Rhonda Urban District Council	Walter H. Morgan, Clerk, Treforest, Pontypridd, Glam.	,,	20
Pontrhydyfea—Railway (two miles)	Rhondda and Swansea Bay Rly. Co.	H. S. Ludlow, Secretary, 8, Fisher-street, Swansea	,,	23
Renwick—Oblique Bridge Across the Raven, Sickergill	Penrith Rural District Council	C. N. Arnison, Clerk, Penrith	,,	23
Knighton, Radnor—Nine Miles of Aqueduct from Knighton to Downton (Two Lines of Cast-Iron Mains, 42in. Diameter)	Corporation of Birmingham	E. Orford Smith, Town Clerk, Council House, Birmingham	,,	
Hull—Electrical Equipment of Tramways (9 miles Double Track)	Corporation	A. E. White, City Engineer, Town Hall, Hull	Nov.	5
Leeds—Sinking Well in York-street	Yorkshire Pure Ice Company	W. S. Braithwaite, Architect, 6, South Parade, Leeds	—	
Galway—Steel Joists, Iron Roof, and Balcony for Convent		James Costello, Sea-road, Galway	—	

FENCING AND WALLS.

Hemsworth—Works of Wood Fencing	Rural Sanitary Authority	Joshua Scholefield, Clerk, Hemsworth	Oct.	12
Redruth—Fencing the Public Park		Horace W. Collins, Architect, Penryn-street, Redruth	,,	15
Nottingham—Walling-in Garden, Mansfield-road		W. H. Radford, Architect, Pelham Chambers, Nottingham	—	
Fairfield, North Derbyshire—Retaining Wall to Village Green	Urban District Council	Garlick and Flint, Architects, Buxton	—	
Fort William—Hill Fencing 1,000 yards)		N. B. Mackenzie, British Linen Bank, Fort William	—	
Ramsgate—Iron Fence (1,650ft. run)	Gas Committee	W. A. McIntosh Valon, Engineer, Ramsgate	—	

FURNITURE AND FITTINGS.

Guildford—Royal Surrey County Hospital		Assistant Secretary to Hospital, Guildford	Oct.	9
Brentwood—142 Blinds and Fittings, County Asylum	Visitors	Committee of Visitors, County Asylum, Brentwood	,,	16
Crewe—Technical Institute	Town Council	J. A. Jenkins, Secretary, Municipal Offices, Crewe	—	

PAINTING.

Cardiff—52, Charles-street	Guardians	Arthur J. Harris, Clerk, Queen's Chambers, Cardiff	Oct.	9
Bideford—Cemetery Lodge and Shelter	Urban District Council	H. Chowin, Borough Surveyor, Bideford	,,	9
Brynmawr—Rehoboth Chapel		W. Jones, 11, Clydach-street, Brynmawr	,,	9
Cockermouth—Offices	Urban District Council	John Fearon, Clerk, Cockermouth	,,	9
Leicester—Fountain, &c., in Town Hall-square	Estate Committee	E. Geo. Mawbey, C.E., Borough Surveyor, Town Hall, Leicester	,,	9
Heywood—Municipal Buildings		James Diggle, C.E., Engineer, Municipal Buildings, Heywood	,,	11
Wigan—Artisans' Dwellings, Vauxhall-road and Pottery Areas	Corporation	J. J. Charnock, Town Clerk, Municipal Buildings, Wigan	,,	19
Selby—Thirty Houses (outside only)		T. C. Fawcett, Ousegate Maltkin, Selby	—	
Wrexham—Twelve Houses in Regent-street		J. Squire, 10, Temple-row, Wrexham	—	
Dewsbury—Twelve Houses in Reform-st., and Four at Fall-lane		J. C. Thornes, 1, Ashworth-terrace, Dewsbury	—	
Northallerton—Langton Grange Farmhouse and Buildings		W. R. West, Solicitor, Thirsk	—	
Keighley—Eight Houses at Stoney Bank, Skipton-road		Robert Tomlinson, Builder, Keighley	—	
Derby—24 Houses, Dashwood-street		101, Normanton-road, Derby	—	
Halifax—Bowling Dyke Mills and Sheds and Haley Hill Mills and Sheds		J. S. Lees and Co., Southgate Chambers, Halifax	—	

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HYGIENIC BUILDINGS.

OUR citizens have yet to learn what health in their surroundings means. The average dweller in our towns and suburbs imagines all is done that can be done if his house is fairly well built and drained, and has a little outlet or so-called "garden" in the rear, if he is well away from offensive trades and so on. And he is right so far as things are arranged for him now. If he has to endure the hardship of a rough unmade road not "taken over" by the parish in a new estate, with all the unpleasantness of dust and rubbish in dry weather, and a mud pond to wade through in rainy weather, he puts up with it contentedly for a time at least. During the winter months he and his family remain at home as much as possible, though he has to put up with excruciating wall-paper, badly-made doors, windows, and fireplaces, all ill-fitting and letting in draughts and smoke. But he does not really know what he has to endure even within his own walls. The fumes of cookery from his own kitchen, when he returns home, are at least appetising, but he little dreams that within those not unwelcome vapours may be concealed the most deadly gases as well, and that he is actually inhaling the vitiated atmosphere of the whole house—sewer gases and all other intruding enemies in gaseous form. The smell of cookery at least ought to make it clear to him that his house is badly ventilated. Again, when he sits in his parlour near a comforting fire and experiences draughts, he may content himself there is nothing like plenty of air; but is he certain that it comes from a pure source, and not through crevices and floors, and up from basements and cellars, impregnated with poisonous germs? If from the windows or front door, these currents may be pure though unpleasant, and may lead to nothing more serious than aches and rheumatic pains. We instance these common defects as showing how people are apt to disregard points which are of real importance to their health and the comfort of a dwelling house. Both these mistakes could be avoided by proper means being taken for ventilating basements and kitchen offices by separate channels, instead of allowing the staircase to become a ventilating shaft, and by providing an inlet for fresh air to the fireplace, so as to avoid the necessity for feeding the fire through doubtful channels and crevices in the floor. What can be more depressing in a house than a staircase landing on the upper floor without window or ventilator, a dark unwholesome space or reservoir filled with mephitic air, and so intensely close that a sense of giddiness and oppression seizes anyone who remains in it for a moment or two. The stopped corridor or passage leading at one end to a cupboard or closet, and having bedrooms along its route, is a veritable channel for the conveyance of vitiated air, but how common is it in large houses, hotels, and like buildings. No one thinks of altering these arrangements: they are common and convenient.

Then, on questions of aspect of light in our buildings, we are far from being perfect. The architect has not, it is true, *carte blanche* in this matter: the site is often chosen before he is called in; but does he avail himself of the opportunity to give his best rooms a fair share of sunlight, especially in the morning? In a street house, of course, he has only one choice of aspect; but in the country he can turn his building round, or so shape his plan as to catch the sun, and at the same time to avoid the cold winds. We fear it must be admitted that many a country residence has been spoiled by inattention to this fundamental essential of health, and that an ornamental elevation or a regard for picturesque grouping has been the ruling motive. How often we see windows placed on the coldest side, north or east, and the most pleasant aspect faced by a blank wall. When the ground is large enough, the architect has the option of so disposing his plan as practically to catch the sun for his principal rooms. He can dispose the wings of his building so that they both face the south-east. And he can make more frequent use of his chimneys, as a means of economising heat, sometimes by placing them on those sides of the building which are exposed to the cold winds, but always with thick walls outside the flues. We have not yet realised the art of retaining heat in our buildings. The ideal is to be able to warm oneself all round, while still retaining the open fire. Hot water and steam radiators we cannot have everywhere; but if we only modified our construction, some approach to uniform temperature might be made. By making our walls solid and without openings in the colder sides, more warmth may be retained; and is it therefore contrary to rule to suggest that we might even make our walls thicker on those sides? But routine in these matters supersedes common sense. While the ordinary Englishman shivers on his own hearth, he is actually wasting his heat and allowing it to be conducted quickly away by thin walls and roofs, or conveyed up the chimney in smoke and flame.

In our great city offices, banks, and warehouses the lives of our youths are being sacrificed by inattention to hygienic conditions or bad sanitation. Who has not seen the stifling, overcrowded shop, badly lighted and ventilated by day and over-heated by gas-burners by night, crowded by young men or women, whose weary frames and tired, aching heads betray the pernicious inhalation of a vitiated atmosphere. One or other extreme has to be combated. In one shop we find it dark and dingy at the inner end; there is no light save a small skylight, and the lamps are burning all day and night. No ventilating arrangement is seen, and, if existent, it is not put in operation. The air-space is reduced by bales of goods, and the air has to be re-breathed over and over again. In another, the attendants, instead of being broiled in an atmosphere rendered impure by the products of combustion, have to endure the torture of a constant draught, aggravated every time the doors are opened by customers, or the over-heated attendant is exposed one minute to the temperature of a bath-room, and the next moment to a current of cold air. Or, if we enter a City bank, full of clerks, we hear complaints, at this season, of intensely cold feet, while their heads are close to powerful gas-burners which seriously impair their eyesight and their health. The underground warehouses and gas-lighted saloons are even worse instances of these defects. Again, are not our industrial dwellings in flats means of spreading infection, should any epidemic break out? They have been instanced as veritable incubators of disease, the "flat system" favouring conditions which are known to be injurious. The staircase shaft, common to every group of dwellings, has the drawback of communicating the contagia of any case in the block despite the utmost precautions.

Not only in the building, but in the planning, of our cities we are helplessly at the mercy of circumstances. If we had any choice, we should probably be more careful in arranging our main thoroughfares with some regard to the sun, so that at some portion of the day they would get sunshine and warmth. The hygienist would probably plan every street with its axis north and south, or nearly so, so that the blocks of houses on either side would receive some of the beneficent rays. The best position for a row of houses is that where they face south-east; but the other side would be less advantageously placed. At any rate, the least exposure to the north is desirable. Taking the Strand, we find this condition well satisfied on the north side, while Fleet-street runs in a more direct east and westerly direction, and in most of our great towns this is the general trend of the main streets. The influence of direction in the laying-out of our streets is an undoubted hygienic factor, and we have several arrangements—first, the irregular and indeterminate plans of our old cities, London and York, for example, where there are one or two main streets intersected by others promiscuously; the rectangular system, as seen in New York, Philadelphia, and other cities of the States; the radiating system observed in the newer parts of Paris; and, more particularly, the "spider-web" plan seen in Vienna, where a belt of spacious boulevards or rings encircle the old city or Stadt. For architectural effectiveness the radiating plan stands high, especially when the streets are wide or there is a ring-space round the city, as in the Ringstrasse of Vienna. Is there not something health-giving and exhilarating about such noble spaces as the Place de la Concorde, from which stretches in stately perspective the beautiful avenue of the Champs Elysées, wooded on either side; or the intersecting Rue Royale, terminating in the great Classic church of the Madeleine? Right through the very heart of Paris flows the river Seine, fringed by the garden of the Tuileries and the spacious court of the Louvre. In London we have also the more spacious Thames with its newly laid out boulevard or embankment, dividing the seething masses of a vast population, bringing sunlight and air. These arteries have made the cities of Paris and London what they are; but they have been supplemented by spacious places and squares and parks, which are practically "lungs" to the inhabitants. Whether river or boulevard, ring or platz, these are the chief means by which our city life can be made at least tolerable, and invested with the air of health and beauty. But there are other, though less conspicuous, means. One of these is the arrangement of our town dwellings. If we have plenty of parks and open spaces in our midst, so have we a surrounding mass of overcrowded dwellings, with in many cases no outlet, except yards, for light and air. The tendency is to build higher buildings, and at the same time to render useless large areas of ground that have been swept clean of the poorest dwellings, without making any corresponding effort to provide tenements for the displaced masses. Is not this the case in the lately-demolished areas north of the Strand, Covent Garden, Drury-lane, Clare Market, and other parts? Old and unsanitary houses have been removed; but, to the discredit of ground landlords, no adequate accommodation has been made for those who are compelled to live near their living or market. The consequence is that the remaining houses and lodgings become densely packed by labourers who are obliged to remain in a certain district. The huge blocks in flats become thronged, certainly the most dangerous form of overcrowding. Dr. Poore, in a recent work, has opened the floodgates of his wrath on these buildings, and he is not alone. The fact is that the cubic contents is too great for the area of the building in the case of a several-storied London house; it entails enormous labour, as he says, on the servants—a fact that may be proved mechanically by considering the "work" done by a servant in

mounting the stairs with the weight of her supplies, which, at a moderate reckoning, he says is about four "foot-tons." To some extent the same argument applies to the tall block of flats, where the tenant has to climb 60 to 100 steps. The exertion or the wasted energy must tell cruelly on the ill-fed labourer and his wife, especially when sickness assails the family, and it ought to be enumerated among the non-hygienic conditions of tall buildings.

The building regulations in London have favoured the cubic capacity development of building. The space provided in the rear of new houses in new streets (150sq.ft.) is ridiculously inadequate, and, worse than all, it may be covered over in some cases by a shop. Then the rule as to an angle of 63° 5′ allows the house to be twice its depth in height, both of which regulations permit the erection of houses of large cubic capacity. But what is worse is that the Council allow houses to be built as high as 80ft., or even higher if consent is given. Thus it is that the Building Act in London at least encourages the erection of lofty buildings, and makes sanitation impossible except by providing certain fixtures and drainage; and the "model" by-laws of the Local Government Board are very little better. What may be necessary in London by no means ought to be right in the country, where land is cheaper. Strange to say, however, the open yard spaces for houses 25ft. high is preposterously small—25ft. deep, the same depth being allowed for houses up to 100ft. Such are a few of the causes which militate against hygienic buildings in our towns. Our open spaces may be ample; but the regulations in force are inoperative as to buildings which abut on a front and back street, or which are built round large spaces. With one hand we lavish money on wider streets and open spaces, with the other we practically drive the masses of our town into dwellings and blocks of flats upon concentrated and smaller areas, and this process is going on year by year.

PROVISIONAL AMOUNTS.

In the specification for a building to be carried out by contract, it is very usual to stipulate that the contractor shall provide a certain sum of money in his tender for a particular purpose, or the prime cost of the article is specified, the object of which is to avoid anything inferior being introduced, as would probably be the case if the cost were left to the contractor to do as he pleased. Sometimes manufacturers are selected who affix their own prices for the work. Without these precautions there is a temptation to evade the letter and spirit of the provision, to get a price quoted that will enable the contractor to make a profit out of the transaction. Suppose it is an iron verandah. If the contractor can get an iron-firm to supply the work according to the specification at the lowest price, or, what is sometimes done, to obtain a price from the manufacturer who gives the largest trade discount, no one will be any the wiser; but the employer will be the loser, and get a structure of inferior make. It may be a piece of decoration or carving for which no definite provision is made, in which case there will be a large margin for any dealings of this kind. To prevent any such transaction, the custom of specifying a sum is adopted, and this sum is extended in the bill of quantities, and included in the tender. Even in the various trades specified, it is a good plan to insure completeness by inserting clauses after all trades about which there may be any doubt, as, for example, "Provide and fix under the contract — cubic feet of stone," or "— feet of plain work." But the provisional amount is a special matter which ought to be under the architect's control. One of the chief reasons why certain amounts are stated is that the architect or owner may use his own discretion in selecting the article, and in seeing that the design is properly carried out. If the article is priced in the ordinary way, by the contractor, he naturally exercises his own taste, subject to the architect's approval. The latter is apt to approve or pass what he has no power to interfere with. Let us take the iron verandah as an instance. Smith, the contractor, goes to a few large manufacturers, and selects the one from whom he gets the largest consideration. Of course, the design and quality are of a kind kept in stock, or, if the architect's design is followed, the iron merchant is allowed to use his own discretion as to details and sizes. The architect cannot interfere with the result. Or suppose it is a supply of stoves;—what is easier than for the contractor to obtain quotations from a few firms? The patterns may be selected by the architect or owner; but, of course, they have no choice as to design, which is limited. In both these instances the owner would have been the gainer if he had kept these fixtures on his own hands, or had left them to his architect, and the character of the building would have been preserved. When the question is a piece of metal-work, say a grille, which the architect wishes to be executed from his own design, or the decoration of a building, over which he desires to exercise his taste, it is utterly futile to depend upon the contractor carrying out the work to give perfect satisfaction. The only way is to place the design into the hands of an art-craftsman who will comply with its spirit. The designer must be brought into immediate touch with the craftsman. These are points patent to all architects who wish to see their designs carried out in their integrity, and we only refer to them here because modern tendering has made it so fatally easy to ignore them. The so-called "art-furnisher," with all his blandishments, is now filling up the gap between the contractor and the genuine artist, and his goods and prices can be quoted "on 'Change." The late Geo. Gilbert Scott said art will be bought only by commission when honesty and happiness has a quotation in the stock and share list; but we have now a substitute for good and honest workmanship which can be quoted as easily as the price of bricks, and what is worse, it is elastic. The art furnisher is willing to supply anything, to suit his price to the requirements of the purchaser. These are the facilities which have made low tendering so successful. If our architects wish to reserve to themselves more control over their designs, they can only do so by means of providing specified sums for particular works. But in the adjustment of these sums there is much misunderstanding. A correspondent in our "Intercom." column put a question the other day which shows that the practice is not uniformly understood by contractors. "Surveyor" instanced a case in which a contractor had made the mistake of extending the amount of £50 in the money column for a sum of 50s. provided for unforeseen work, but allows only the latter; and he asks for information whether the £50 can be claimed for his client. Another correspondent very reasonably considers the provisional sum a "fixed" sum entirely under the architect's control, for if the tenderer ignores it, and gets thereby a contract, why should the client have the cost of his building increased, or suffer by it not being done through the builder's neglect or wilfulness? Therefore he considers that if a certain amount is stipulated for something to be done, nothing more or less should be considered when squaring up the contract; if he increases or omits it, it is entirely the contractor's own affair. No doubt this opinion will be generally acceptable to the profession, for if a contractor puts down a larger sum than provided, and does not use it, the owner ought certainly to obtain the correction in his favour. If a man pays his butcher or his tailor more money than the debt amounts to by mistake, he naturally expects the tradesman will be honest enough to repay the difference, and so with a builder who undertakes to build for so much. Still, there is a doubt whether a total amount of tender can be interfered with after the contract is signed. Tenders are to be dealt with as totals; but before the contract is signed the items of the quantities should be examined. By this means of testing or checking the castings and extended amounts, all errors are expunged, and it would be almost impossible to find a provisional sum placed in the wrong column. Much difficulty would be averted, and the adjustment of accounts facilitated, if architects inserted special clauses as to the deduction of provisional net sums. A certain sum of money—say, a hundred pounds—may be provided for carving or ironmongery; but it is often a difficulty to adjust the amount as to what has to be paid to contractor at the completion of the building. The invoice should be obtainable, and when the trade discount (perhaps 20 per cent.) and profit are known, there ought to be little trouble in arranging the amount. Most surveyors adopt certain rules as to these deductions or additions. Sometimes the contractor fixes his own profit, say, 5 per cent., and adds it to the sum extended in the bill, which will appear as "Provide for ironmongery £105, &c." Then it is only necessary to deduct this amount, making the necessary allowances for discount from invoice, but adding the profit. Having the invoice amount, these adjustments can be made without any difficulty. Perhaps the more satisfactory way is for the whole amount to be spent by an architect and deducted from the contract, which saves much trouble in the adjustment of the accounts at the end.

ELECTRIC LIGHTING NOTES FOR ARCHITECTS.—VI.

By an Assoc. Inst. Elect. Engs.

Generators continued. — Direct-current dynamos differ, as regards type of machine, by reason of the various methods of winding the magnets, and the different arrangements and number of pole-pieces which may be employed. When we remember that the function of the magnets is to provide an intense magnetic field in which the armature rotates, and also that generators are now employed for a great variety of purposes, necessitating high and low pressures, constant currents at varying pressures, varying currents at constant pressures, and high efficiences both for full and light loads, it is evident that the ingenuity of the engineer has had full scope, even if not taxed to the full, to meet the many demands made during the period of development, both of lighting and the transmission of power plants. The announcement of Faraday's discovery of induced currents was like the setting-of-fire to an inflammable substance. The latent energies of many engineers were aroused, and one of the most efficient machines ever constructed—i.e., the dynamo—is the result. In the earliest machines permanent magnets were used; but these were costly to build up, and they were also liable to a gradual diminution of strength. Consequently, more progress was made after Wilde, of Manchester, supplanted the permanent magnets by using electro-magnets, the current for the coils of which was supplied by a separate machine of the older permanent magnet type. Wilde's type of machine is known as the separately-excited machine, of which, in so far as the excitation is concerned, the modern alternator is an example. The most important improvement, however, was that of dispensing with the permanent magnets altogether, and it is somewhat remarkable that the idea which gave birth to the principle upon which all modern machines (continuous-current) are constructed, occurred independently to Mr. Varley, Sir C. Wheatstone, and Dr. W. Siemens thirty years ago (1867). They proposed simultaneously to utilise the current produced by the machine itself for the pupose of exciting its own electro-magnets,

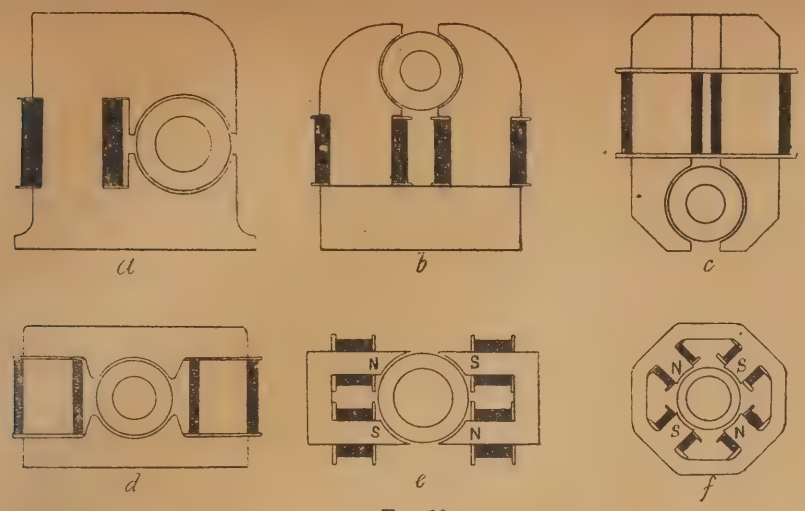


Fig. 10.

and thus introduced the self-exciting or mutual accumulation principle. This principle is based upon the fact that iron, when it has been magnetised, retains almost permanently a small amount of residual magnetism. A moment's reflection will suffice to show that this residual magnetism maintains a state of stress around the armature at all times, and thus at the very commencement of a run the armature will rotate in a magnetic field, which, although weak, enables a small current to be produced in the armature if the circuit be closed. Then all that remains to make use of this current for magnetising purposes is to connect the brushes to the coils of wire forming the electro-magnets, with the result that the magnetism will be intensified. A stronger magnetic field gives rise to a corresponding increase of current, and the process of using the current produced to intensify the magnetic field very quickly enables the machine to become properly excited and to render the energy required. It must, however, be observed that although this compound interest principle is applied in self-exciting machines, a limit exists to the increase of the magnetisation of the cores of the electro-magnets. When the iron is magnetised to saturation an increase in the exciting current does no good. It is for this reason that a limit to the output of a generator exists.

We may also mention in passing that the shape of the field-magnets varies considerably; but, as this is a matter for the designer to consider rather than the user, we shall not do more than give sketches of the more common forms. Broadly speaking, there are two general types of field-magnets, known as the bipolar and multipolar types. The bipolar is represented by figures *a*, *b*, *c*, and *d* in Fig. 10; whilst *e* and *f* represent the multipolar. *a*, *b*, and *c* are typical of single-magnetic-circuit bipolar field-magnets, and *d* of the double-magnetic-circuit bipolar field-magnets.

For our purpose, however, the method of winding the field-magnet coils is of more importance than the disposition and shape of the iron parts, since by arranging the exciting coils of a generator in a certain manner relatively to the armature coils and the external circuit we can produce that particular kind of regulation most suitable for the work that has to be done. In fact, continuous-current dynamos are usually classified according to the method of exciting the field-magnets, with the result that we have the series-wound machine, the shunt-wound machine, and the compound-wound machine.

The Series-wound Dynamo.—As is probably well known, arc lighting was introduced at an earlier date than incandescent lighting, and as the number of arc lamps required at first was comparatively small, the primitive and simplest method of connecting them in series (see Article IV., page 466) was found convenient, and was universally adopted. The dynamo used exclusively at that time for arc lighting had its field-magnets excited by the full armature current, which was taken directly from the armature around the field-magnets, and thence to the external circuit (arc lamps in series) back to the armature. A machine excited in this way was found particularly adapted for series-lighting. Such a machine is shown in Fig. 11, from which it will be observed that there is only one circuit, which is composed of three parts—the armature coils, the field-magnet coils, and the external portion. These are connected in series, and since

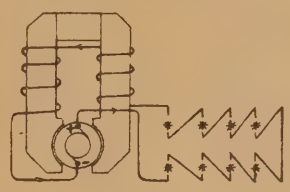


Fig. 11.

the field-magnet coils are connected in series with the armature, this type of generator is termed a series-wound dynamo. This is obviously the simplest way of producing self-excitation, as the whole of the current produced passes round the field-magnets. The section of the wire forming the magnet coils must, therefore, be large—consequently the number of turns will be few.

It is clear that since the complete circuit (including the parts of the generator and the lamps) is a simple series circuit, the current strength will be the same at all points; further,

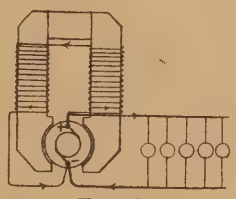


Fig. 12.

arc lamps take usually 10 ampères, therefore the series-wound machine must be a constant-current generator. And, although the number of arc lamps alight at one time is usually constant for any particular circuit, there are times when the number varies, and in all cases means exist for preserving the continuity of a circuit should a lamp be turned off. It is therefore evident that a series-wound machine is required to give a constant current, and at the same time to vary its terminal pressure. The exciting current is, of course, constant, and the entire variation of

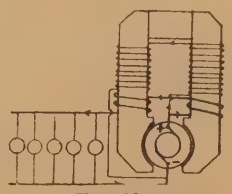


Fig. 13.

E.M.F. required is produced by changing the position of the brushes on the commutator. Again, from what we have said previously, it is known that the total electrical pressure or terminal voltage of a dynamo to light *n* arc lamps connected in series will be *n* times the pressure required for each lamp, and since each arc lamp requires at least 50 volts, it follows that the series-wound dynamo is a high-tension machine. Modern arc-lighting dynamos give from 1,000 to 3,000 volts; but even with these pressures there is considerable difficulty in insulating the commutator segments—consequently generators for more than 3,000 volts are not constructed. It will be seen now why arc lamps are connected in series. A wire which will carry 10 ampères is all that is required to connect the lamps, and since the voltage is high, the high resistance is readily overcome, and a great saving in the cost of copper in the line is the result.

The main objection to the series-wound dynamo is that it does not start action below a certain speed, or if the external resistance is too great. It furthermore possesses the disadvantage of being liable to reverse its polarity should the speed fall when there is any source of counter-E.M.F. in the circuit. Consequently it is altogether unsuitable for charging accumulators, or for electro-metallurgical work generally. This type of dynamo also does not automatically regulate itself to the work it has to do. Thus, for instance, if several lamps are turned off simultaneously, the resistance of the external circuit falls, and the current increases; but an increase in current strength means increased excitation, and consequently a higher E.M.F., when really less is required, because of the diminution in the number of lamps. This necessitates the regulation at the brushes already referred to. It is obvious that immediately the circuit is broken at any point, the excitation is removed, and we get no current on open circuit. On the other hand, however, if the terminals of the machine be short-circuited, the intensity of the resulting current is enormous.

Shunt-wound Dynamos.—A little reflection will suffice to show that when incandescent lamps were introduced some modification of the series system was necessary. In the first place, the number of lamps used in an installation was materially increased, and, inasmuch as the voltage required by each lamp was from the first 100 volts, it is clear that the limit of 3,000 volts for a series machine was soon reached, and a different method of arranging the lamps was soon devised to overcome the difficulty. The way out of the difficulty was to connect the lamps in parallel (see Article IV. p. 466) between mains maintained at a constant potential by constant-potential generators. These generators differ from the series-wound machines in having many turns of fine wire wound on the field-magnets and connected as a shunt—*i.e.*, in parallel—with the main circuit. For this reason they are termed *shunt-wound* dynamos, and the arrangement of the coils is shown in Fig. 12, and it must be observed that, by making the resistance of the shunt coils great, the greater fraction of the armature current will flow through the external circuit, since there is the choice of two paths, and

$$\frac{c_e}{c_s} = \frac{r_s}{r_e} \text{ and } c_s = \frac{r_e}{r_e + r_s} C_a \text{ (see p. 466)}$$

where c_e, c_s, and C_a are the currents in the external circuit, shunt circuit, and armature respectively, and r_e and r_s the external and shunt resistances respectively.

With this type of machine, designed to give constant pressure, it is clear that the excitation will approximately be the same if the pressure at the brushes is constant, and in tracing the changes which take place during a fluctuation in the load, we must remember that the external resistance decreases as we increase the number of lamps alight, and increases as we turn lamps off, because the lamps are connected in parallel. This gives a fairly automatic regulation so far as current is required; but it is clear that the arrangement tends to diminish the E.M.F. as the load increases, partly because less current passes round the field-magnets. To overcome this change in the pressure, an adjustable resistance is usually added in the field-magnet circuit, so that the excitation may be varied to suit the circumstances. The shunt-wound dynamo is also suitable, and much used for chemical and electro-metallurgical work, since there is no possibility of this machine reversing its polarity. Therefore, the shunt-wound dynamo should always be used for charging accumulators and in plants where accumulators are used.

Compound-wound Dynamo.—As we have indicated, some regulation is required both with the series and with the shunt-wound dynamo, and

when hand-regulation is not desirable, the generator may be made automatically regulating by making use of a combination of the series and shunt winding. Such a machine is known as the *compound-wound* dynamo, and is shown in Fig. 13. By adopting this method of winding we obtain all the advantages of the series and shunt-wound machine, and since the excitation due to the series coil varies with the main current and that due to the shunt-coil is proportional to the terminal voltage, the compound-wound machine is perfectly self-regulating for constant pressures. Such a machine is, therefore, useful for isolated plants.

THE ARCHITECTURAL ASSOCIATION.

THE fifty-first session of the Architectural Association was inaugurated on Friday evening at 9, Conduit-street, W., when there was a large attendance of members and visitors, including several ladies. The newly-elected President, Mr. Hampden W. Pratt, F.R.I.B.A., who also retains the office of honorary treasurer, which he has held since 1888, was greeted with hearty applause on taking the chair.

Mr. A. Beresford Pite, the retiring President, proposed, and Mr. Francis G. F. Hooper seconded, the adoption of the report for 1896-7 and the balance-sheet, which were taken as read, Mr. Pite remarking that the work of the past session had been, on the whole, very encouraging. The past year had seen the largest membership roll yet recorded, there being a net increase of 77 members, bringing the total to 1,190. All the classes had been maintained in a healthy condition; but some of them were a little anxious as to the future of the Advanced Class of Design, which was formerly one of the most interesting, and which they hoped would be well supported this session. As to that hardy annual, the question of the acquisition of new premises, it had now become a little more definite, for the special committee of past-presidents convened to arrange for the celebration of the A.A. Jubilee in May last had the matter in hand, and hoped to be able shortly to announce that this had been made a permanent memorial of that occasion. Financially, the Association was now in a very good position; but it must not be forgotten that the classes were conducted on an unremunerative scale, and that they were dependent on their friends to make ends meet.

The motion was carried unanimously.

On the motion of Messrs. Banister F. Fletcher and E. Howley Sim, a vote of thanks was passed to the hon. auditors of the accounts for the past session, Messrs. H. P. G. Maule and Matthew Garbutt, and Mr. Sim also proposed a vote of thanks to Messrs. H. T. Hare, G. H. Fellowes Prynne, and A. Hessel Tiltman for permitting visits to works in progress during the summer. This was also unanimously accorded.

PRESENTATION OF PRIZES.

The President then proceeded to distribute the medals, prizes, and certificates gained by students during the past session, in accordance with the following list:—

A.A. Travelling Studentship, value £25, and bronze medal, E. H. Evans; second prize, not awarded.

Architectural Association Silver Medal and £10 10s.; H. Inigo Triggs; hon. mention, F. Dare Clapham.

Essay Prize, value £10 10s., and silver medal, Alexander Wood.

The Andrew Oliver Prize, 1st prize (value £3 3s.) and 2nd prize (value £2 2s.), not awarded.

The Arthur Cates Scholarship, value £10 10s., H. T. Bromley.

Measured Drawings Prize, value £5 5s., C. H. F. Comyn; hon. mention, H. Faquharson.

Discussion Section Prize and Architectural Union Company's Prize, not awarded.

School of Handicraft (Masonry) Bronze Medal, H. C. Lander.

Lecture Side.—Division I.: R. H. Spalding (silver medal and certificate, A. Wood (bronze medal), H. White (hon. mention). Division II.: G. S. Nicol (silver medal and certificate), H. C. Trimnell (bronze medal), E. Hale (hon. mention).

Studio Side.—Division I.: V. Wilkins, silver medal and certificate; T. Bee, bronze medal; R. H. Spalding, hon. mention. Division II.: W. H. Ward, silver medal and certificate.

Order of Merit.—Division I.—Greek and Roman Orders: C. Brée (certificate), H. White, J. E. Franck. Elementary Construction and Materials: C. Brée (certificate and book), W. C. Butterworth, W. J. Davies. English Architecture: Alexander Wood (certificate), J. E. Franck, R. H. Spalding. Elementary Physics, Formulæ, and Calculations: J. E. Franck (certificate and book), R. H. Spalding, H. White. Plane and Solid Geometry: R. H. Spalding (certificate and book), R. C. Hall, J. E. Franck. Mensuration, Land Surveying, and Levelling: J. D. Hunter (certificate), L. G. Detmar, R. H. Spalding.

Division II.—History of Architecture: G. S. Nicol (certificate and book), H. Badcock, S. E. Barrow. Materials, their Nature and Application: H. C. Trimnell (certificate and book), H. Badcock, G. S. Nicol. Stresses and Strains: G. S. Nicol (certificate), F. J. O. Smith, T. W. Aldwinckle, jun. Construction: P. Morris (certificate and book), H. C. Trimnell, G. S. Nicol. Hygiene (Drainage and Water Supply): F. J. O. Smith (certificate and book), T. W. Aldwinckle, jun., H. C. Trimnell. Hygiene (Materials and Construction, Ventilation, Lighting and Heating): F. J. O. Smith, (certificate), G. S. Nicol, T. W. Aldwinckle, jun. Specifications and Estimates: S. E. Barrow (certificate), H. C. Trimnell, T. W. Aldwinckle, jun. Professional Practice: T. W. Aldwinckle, jun. (no certificate awarded, as only seven students entered in lieu of a minimum of eight, as prescribed by the rules), G. S. Nicol, S. E. Barrow. Elementary Class of Design: F. N. Reckitt (silver medal, with scholarship value £5 5s. and certificate), C. L. Brierley (bronze medal and certificate), T. F. Green (hon. mention and certificate), J. S. Lee (hon. mention).

PRESENTATION TO MR. D. G. DRIVER.

The President said he had now a very pleasing duty to perform—that of making, on behalf of the committee and instructors and some few members, a small acknowledgment of the active services rendered the Association by their friend, Mr. D. G. Driver, their assistant secretary and registrar. They found that when Mr. Driver returned from his holiday in August he had brought back with him a lady, and they felt it would be pleasant to express their good wishes for Mr. and Mrs. Driver's happiness, and to make some little recognition of the services which their friend had so continuously and faithfully rendered during the past five years, in which period he had done an enormous amount of work. Uncovering a handsome silver tea and coffee service, the President formally presented them, expressing at the same time the best wishes of all for Mr. and Mrs. Driver, and the conviction which all felt that he would serve the Association as faithfully in the future as he had done in the past.

Mr. Driver, who was warmly cheered, acknowledged the presentation in a few well-chosen words, and remarked that in the discharge of his duties he had been helped very materially by the good fellowship which existed among the members.

REINSTATEMENT OF MEMBERS.

The following old members were reinstated:—Messrs. G. H. Smith, F. A. Lamb, A. W. Pocock, jun., A. Lovejoy, G. E Withers, A. G. Turner, and G. Bailey; and a long list of nominations for membership was read.

The President then delivered his

INAUGURAL ADDRESS.

There are certain periods, he observed, in the history of an intitution when it is convenient and customary, not to say interesting and instructive, to review the past; also to consider the present, and look forward to the future. For fifty years the Architectural Association has striven to supply the needs and promote the welfare of the architectural student, and it must be very gratifying to the founders of the Society, a few of whom happily survive, to look upon the flourishing body that still bears the name of the Architectural Association.

THE OBJECT OF ESTABLISHING THE ASSOCIATION

was "to enable young men who are studying architecture to meet for general improvement in the various branches of their art." In a circular issued at the origination of the society it was pointed out that "the great advantages a scheme like this, if carried out, would offer to the architectural student, must be obvious at a glance. By this institution all the future members of the profession, their objects, their labours, their studies, would become known to each other. The incalculable advantages this knowledge and acquaintance would afford to those engaged in the same study; the mutual instruction and valuable assistance each could afford, the honourable spirit of emulation that would be engendered; the furtherance of their art in general, and the happy effect that must be produced by all the future architects becoming a band of friends, intimately associated with each other in their plans and projects, must and will prove of the greatest advantage to all those connected with the scheme." This forecast has been

FULFILLED TO THE LETTER,

and we may truly say that the bonds which unite us to-day are as strong and as powerful as ever they were. There is scarcely anything recorded of the early years of the Association. Its proceedings were not reported as they now are, and it is mainly through the unpublished minutes of its meetings that we are able to glean something of its history. The question of public competitions seems to have been early considered, for in 1850 a code of regulations was drawn up and issued; this interesting document contained some excellent suggestions which the agitation of many years has not succeeded in satisfactorily settling. As evidence of a desire to enlarge its scope, we find that Mr. R. Kerr, in 1852, laid before the committee a scheme for the formation of an Architectural Academy, comprising courses of study, professorships, lectures, graduation, &c., and a resolution was passed to the effect that "the proposition is well worthy the consideration of the profession generally, and that any assistance towards the furtherance of this object that can be rendered by the Association shall be liberally given." Unfortunately,

FINANCIAL TROUBLES

proved a stumblingblock to the smooth working of the society, chiefly owing to the members getting into arrear with their subscriptions—an experience not confined, by the way, to the infancy and youth of the Association, as subsequent treasurers can testify; but it led to the appointment of a committee of investigation in 1855. This committee reported that they "found the Association in a state of apathy, torpor, and depression unparalleled in former sessions"; the financial statements had been misleading owing to the concealment of heavy liabilities, and the management of the Society called for improvement. It was further suggested that a lending library should be formed, and an "Architectural Association Magazine" might, if published, be expected to pay its own expenses. The report concluded with an earnest appeal for a renewal of the enthusiasm which characterised the members at the formation of the society. Following closely upon the reception of this report came a proposal to

MEMORIALISE THE INSTITUTE "FOR THE ESTABLISHMENT OF AN EXAMINATION

which should eventually serve as the basis for the issue of such a diploma as shall certify that the holder thereof is fully qualified to practise as an architect." A reply was received from the Institute in 1856 to the effect that the council felt it was premature to pronounce an opinion upon so important a subject, and that before they could recommend the Institute to undertake such a charge, it would be necessary to ascertain the opinion of the profession generally; at the same time they would be able to come to a sounder judgment after some experience of the District Surveyors' Examination recently instituted. Disappointment followed this decision, interest in the society continued to flag, and in May, 1856, a special meeting was held, at which a resolution was brough forward to terminate the existence of the Association; this, however, was defeated by a large majority, thus indicating that there was, at any rate, some vitality among st the members. In the following month an important letter was received from the Institute suggesting an amalgamation of the Association with that body. This communication was duly considered, and a resolution passed to the effect that it is not expedient for the Association to join the Institute on the terms suggested. The crisis through which the Association passed in 1856 was followed by an awakening interest in its welfare, and a committee was appointed to take into consideration the defective means of architectural education and the desirability of forming classes for the special study of subjects immediately connected with professional practice. In January, 1857, a *conversazione* was held, at which Mr. Ruskin was present, and read a paper on "The Use of Imagination in Modern Architectural Design." Mr. Ruskin said: "If they were asked abruptly, and required to answer shortly, what were the qualities which distinguished great artists from mean artists, he believed they might reply: first, their imagination; second, their industry. Some of them might doubt the justice or the necessity of attaching so much importance to this latter quality, because there might be dull men who were industrious, and clever men who were indolent; but though the industrious man might be dull, and the indolent man might be clever, he had never known a great man who was not industrious. But though this quality of industry was essential to an artist, it did not make an artist; for many people were always busy whose doings are of little worth. Neither did feeling make the artist; but the gift which distinctly made the artist—

without which he would be feeble in life and forgotten in death,—was that of imagination. Imagination was not manipulation, or calculation, or attention; it was something more, something higher than all or any of these. If an architect lays his bricks and stones well, we praise him for his manipulation; if he keeps well within his contract, we praise him for his calculation; and if he arranges his beams so that nobody drops through his floors, we praise him for his caution. But, if he is to be a great architect, he must do something more than possess and exercise these qualities." Concluding an eloquent address, Mr. Ruskin said, "So soon as they desired to build largely, they would find that their work must be associative; one could not carve a whole cathedral himself: either their own work must be disgraced, or they must raise their fellow-designers to some correspondence of power. They would take the lead in disposing of their building; but they must trust to the genius and invention of others in the disposal of its detail; and in doing this, too, they must rejoice in the very powers that may promise to rival them. If they endeavoured to depress or disguise the talents of their subordinates, they were lost to their art, for it was their own prosperity they were seeking, and their own skill that they were striving to perpetuate. He placed no utopian standard before them; he had said that they must surrender their own pre-eminence to their love of building, and whomsoever they found better able to do what would adorn it than they were, that person they were to give place to, and rejoice at seeing their edifice growing more beautiful under his chisel, and next rejoicing that they had done kindly. The man who sees capacity in another, and does not acknowledge it, or assist in bringing it forth, is not the refuser of a kindness, but the committer of an injury. They had the sweet consciousness that as their art embraced a wider field than all others, so it was more profound and holy than all others. The artist, when his pupil is perfect, must see him leave his room that he may pursue his destiny perhaps as an opponent in toil; but architects alone were called by kindness to fraternity of toil. Those massive piles which rise above the domestic roofs of our ancient cities have a meaning more profound and true than is commonly attached to them. Men say they are good for worship—but so is every mountain, glen, and rough sea-shore; they have the indisputable and distinguished glory that their mighty walls were raised by men who have given aid to each other in their weakness, and the strength of their structure has its foundations on manly friendship, which conduces to awaken the sweeter cadences and symmetry of the human soul." What effect

MR. RUSKIN'S ELOQUENT ADDRESS

had on the members is not recorded, but it is pleasing to find that the committee were able at the commencement of the next session to congratulate the members on the general improvement which had taken place in the prospects and financial position of the Association, which was at length freed from its embarrassments, a fund having been raised for the purpose. A movement was on foot at this period to provide a home for architectural bodies in London; the Architectural Union Company had been formed and was erecting a building in Conduit-street, and, after prolonged negotiations, the Association removed from Lyon's Inn Hall, holding its first meeting at 9, Conduit-street, on April 1, 1859. In that year, for the first time, a prize was awarded in the Class of Design, and a Prize Essay instituted, the subject being "Street Architecture and its Proper Treatment." The acquisition of new premises might have been expected to mark a renewal of vigour in the work of the Association; but, strange to say, only twelve months had elapsed when a resolution was passed regretting the want of support afforded by the members, and asking the committee to consider and report whether there was any course short of closing its operations. The committee recommended that all office bearers, with the exception of three, should for the next session be members who had never held office before; accordingly some new blood was introduced into the direction of affairs. A circular having been issued by the R.I.B.A., inviting suggestions on the establishment of a

VOLUNTARY EXAMINATION,

the Association held two meetings at the close of 1860, and after fully discussing the matter passed two resolutions:—(1) "That in the opinion of the Architectural Association a strictly voluntary examination should be instituted with a view of guiding the student in architecture to such a course of study as would enable him to arrive at competence in his profession." (2) "That in the event of a professional examination being insisted upon, it should be limited to those subjects which bear directly upon the practice of the profession, and this Association is apprehensive that any examination upon the principles of taste might lead to results unfavourable to the progress of art." In 1860 Botany and Modelling classes were formed, the latter proving very successful. In 1862, the library, which had been in course of formation for some time, was at length opened. In the same year, Saturday Afternoon Visits were organised, the first being to Westminster Abbey, a prize being given for the best account of the visit. At the conversazione in October, 1862, a musical programme was introduced for the first time, the services of the artistes being gratuitous. In 1863 the Voluntary Examination Class was established for the study of practical subjects, with special reference to the examination then instituted, the Association having pledged itself to use all its influence to induce the members to qualify themselves for it. In the following year a class for the study of Figure Drawing was formed, under the direction of Mr. (now Sir) E. J. Poynter, and was so attractive that 50 members joined it. A Water-Colour Class was subsequently started. In 1867 the A.A. Sketch Book was commenced, the parts being issued monthly at a subscription of one guinea per annum, as now, and an excellent publication it has always been. At this time the Class of Construction was formed, to carry on the work formerly undertaken by the Voluntary Examination Class; and a year later the Elementary Class of Design was started. The Association had now settled down to steady work, for in session 1868-69 a number of sub-committees were appointed, and a balance-sheet was published for the first time, showing an income of about £240 and a substantial sum in hand; it became necessary, also, to compile a catalogue of the library, and this was issued in 1869. We next come to an important report drawn up in 1869 by a joint committee of the Institute, the Academy, the Architectural Museum, the Association, and the Architectural Exhibition, on the question of establishing a

"SCHOOL OF ART ACCESSORIAL TO ARCHITECTURE."

This committee carefully investigated the scheme of the voluntary examination, and arrived at the conclusion that its failure was due to: 1. The absence of a formal certificate of having passed the examination. 2. The want of such a stimulus or pressure as would make the passing of the examination professionally necessary. 3. Inefficient preliminary education. 4. Want of system in architectural education. They accordingly recommended: 1. That a textbook or pamphlet should be prepared containing a complete curriculum of study for the architectural student. 2. That a certificate be granted to all who pass the Voluntary Examination. 3. That at some future period the membership of the Institute be made dependent on the passing of the Voluntary Examination in the Class of Proficiency. 4. That a preliminary Examination be held in elementary subjects open to all students who have been at least one year in an architect's office. 5. That the Institute should assist the Association to carry out the proposed Drawing School. 6. That a committee be appointed to compile the textbook referred to. As a result of the fifth recommendation Architectural Art Classes were established at the Architectural Museum under the management of a committee composed of representatives of the Institute, the Museum, and the Association. These classes were commenced in 1870, and comprised Figure Drawing and Architectural Ornament, the latter being conducted by well-known architects as visitors. For two years the Association contributed £25 annually towards the expenses of these classes, which, however, soon languished.

THE FIRST ANNUAL EXCURSION

took place in 1870, when Lincoln and district were visited, the party being conducted by the late Mr. Edmund Sharpe; and it may be remarked here that every year since then some fresh district has been visited. During the next ten years (1870-80) no important change or event took place; the membership grew from 500 to 800, two new classes were formed—viz., for the study of Colour Decoration and Architectural Science, the latter being subsequently called the Advanced Class of Construction; some courses of lectures were also delivered; special arrangements were introduced for the benefit of country members in connection with the classes and library, and the Birmingham Architectural Association was admitted as a Provincial Branch. The Institute opened its Library to members of the Association under 23 years of age. New and amplified rules were adopted in 1877, and four years later the entrance fee was raised to one guinea. Additional rooms were taken at Conduit-street in 1879: the Architectural Association Medal was founded in that year and the Architectural Association Travelling Studentship two years afterwards, when a sum of nearly £700 was subscribed by past and present members to provide the necessary funds. In 1881-82 the committee thought it desirable to vary somewhat the arrangements of the classes, with a view to making them specially useful to members preparing for the new obligatory examination of the Institute, which commenced in 1882. Courses of lectures on the History of Architecture and on Construction were given, and a new Class started for the Study of Planning and Specification Writing. In 1884 a Special Education Committee was appointed to inquire thoroughly into the general organisation of the Association, with a view to

FURTHER STIMULATE ITS WORKING

and extend its usefulness, and a scheme was adopted, in 1885, for amending and consolidating the work. The main feature consisted in forming two defined divisions of study, called the Elementary and the Advanced, the former comprising Elementary Classes of Design and Construction, preceded by Lectures on History and Construction, and the latter consisting of Classes of Design, Colour Decoration, Advanced Construction, Quantities and Surveying, but no Lectures. The work was conducted by visitors, who were formed into a Committee of Advice. An attempt was made at this time to increase the subscription of members to one guinea, with the object of affording increased educational advantages; but the proposal was defeated by a small majority. In 1885, the Saturday Vacation visits were first organised, and in the ensuing session many improvements were effected in the library—viz., a new system of registration, the addition of a reading-room, and the opening of the library twice a week instead of once. In 1886-87, a Practical Class of Masonry was carried on as an experiment at the City and Guilds Institution, and a series of lectures started on Graphic Statics. A noteworthy step was the issue in April, 1887, of the first number of *A.A. Notes* at a small subscription, though it was not until four years later, when it was issued free to all members, that its purpose was more completely fulfilled. The gradual increase in the number of members and the large attendance at the ordinary meetings forced the Committee to consider the necessity of providing better accommodation, and by the kindness of the Institute we were permitted to hold our meetings in their room during Session 1887-88—a privilege which has been courteously extended to us ever since. About this time Rules were passed to facilitate a scheme of affiliation, with the desire of creating a bond of union between the Association and provincial societies; the Birmingham and Glasgow Associations joined us, but the arrangement did not long exist. An Elementary Class of Ornament and Colour Decoration now appeared and was well taken up, and two years later the Sketching and Measuring Class was formed for the purpose of visiting buildings in the neighbourhood of London during the summer. At the same time an A.A. Cycling Club was organised with the object of making runs to places of architectural interest; but this club soon disappeared, and notwithstanding the growing popularity of cycling no attempt has been made to restart the club. Another club was founded in 1888—viz., the Lyric Club, one of the objects being to promote friendly intercourse among the members; and those who appreciate the social advantages of music, dancing, and smoking are still provided for at this club. Reference may be made here to the Camera Club, though founded at a later date (1893). Apparently, this club is not so prosperous as it was at first, and a hope may be expressed here that some effort will be made to revive its usefulness. We have now arrived at the last great movement in the Association. In 1889 a

SPECIAL COMMITTEE ON EDUCATION

was appointed, and after exhaustive inquiries its recommendations were approved by the general body in May, 1890. Following this, a special committee was oppointed to consider the revision of the rules, a new constitution and by-laws being adopted by the general body in the following January. These included the raising of the entrance fee to two guineas and the subscription to one guinea, to all members elected after 1890: and also provided for the appointment of paid officials. A reorganisation committee was next appointed to prepare the new education scheme, and resulted in the new curriculum. In order to establish the new scheme and provide for the extra cost and risk incidental thereto, as well as the outlay involved in obtaining suitable premises, an appeal was issued and generously responded to by members of the profession. The scheme provided for a complete course of study extending over four years, that being considered as the least time that should be given to the study of the subjects. It was laid down that the aim of the courses was to help members to fit themselves for their work as architects, by providing the means by which they may supplement the training acquired in offices; the principal object not being to prepare candidates for the examinations, although the courses were chiefly based upon the programme of the examinations. Premises having been secured in Great Marlborough-street, and adapted to meet our requirements,

THE NEW SCHEME

was launched in 1891-92. From the outset the first and second year's courses were well supported, the third being thinly attended, and the fourth not fully started. In 1892-93, Divisions I. and II. continued to be well supported, and Divisions III. and IV. showed improvement. In 1893-94 there was a poor attendance in Divisions III. and IV., indicating the necessity of rearranging these divisions. In 1894-95 the complete course was arranged in three divisions, but the attendance in Division III. was again disappointing, and a special committee was appointed to inquire into the working of the classes. As an outcome of this inquiry the Institute agreed to alter the dates of the examinations so as to avoid interference with the working of the classes. In 1895-96 the curriculum was arranged in two divisions, the complete course extending over four years, and a School of Design started, being attended with considerable success. Last session the work of the classes and studio showed a continued improvement, especially in Division I. The School of Design and Handicraft was most successful and encouraging; forty students joined the Elementary Class, and the whole session was devoted to one subject, which produced good results. Eight students joined the Advanced Class, the syllabus of which was amended, as it was found desirable to have more than one subject. The Technical Education Board arranged special handicraft classes for the school, and these were appreciated by the students. The Discussion Section affords opportunities for the study and discussion of those subjects and difficulties which occur in actual practice: this is a most valuable part of our work, and it is gratifying to note its continued success. A record of the Association transactions would not be complete without a reference to the Special Meeting held in December, 1893, when the question of the

ADMISSION OF LADIES

into membership of the Association provoked a lively discussion, and the proposal was defeated by a large majority. Since then no one has come forward to advocate the cause of the ladies; but we have, on several occasions, been reminded of the existence of such a class of students on the boards of the A.A. Soirée stage. We have now traced in outline the work and progress of the Association during the fifty years of its existence. The history of the Association is marked throughout its career by a fixed determination on the part of its members to maintain its independence, to uphold its traditions, to overcome all difficulties, to grapple with changing circumstances, to keep abreast of the times, to seek the counsel of its best friends, to encourage and help the young student, to provide the best training and education at its command, to keep in touch with those who have passed through the student stage, to keep alive the memories and maintain the friendship of those who have retired from active service, and, above all, to advance the noble art of architecture. May the same devotion and self-sacrifice, the same enthusiasm and loyalty, characterise the men who are entering our ranks to-day, so that the Association may accomplish in the future greater things than in the past, and heaven smile upon the works of their hands. We have been looking into the past and rejoicing in our year of Jubilee at all that has been accomplished; let us turn for a moment to the present. We have entered upon a new session with

THE LARGEST ROLL OF MEMBERS

ever recorded—viz., 1,150. Of this number, 11 have been members for 40 years and upwards; 60 for 30 years and upwards; 110 for 25 years and upwards; 180 for 20 years and upwards; 302 for 15 years and upwards; and 552 for 10 years and upwards. Seven hundred and forty-eight of our present number joined before the subscription was raised in 1891, so that 402 have come in and remained since then. The Association has succeeded in retaining many of its best and most valued friends, who are ever ready to testify to the great advantages they have derived from its membership. On the other hand, there is a solid army of young men, many as yet untried, who are destined to take up the reins of government before long, and who have opportunities which, if wisely used, may be productive of lasting good to their own and future generations in raising the status of the profession and in the advancement of Architecture as a living art. There is one point in our comprehensive Scheme of Education which demands attention, and

CONTINUES TO DISAPPOINT US.

While the students in Division I. attend in very satisfactory numbers on the whole (and, in fact, the present accommodation is somewhat strained to properly provide for them), those in Division II. are comparatively few. What becomes of those who have passed through the first stage? It is very evident that a large proportion of them do not continue their studies and complete the course we wish them to follow. This is a problem that we have not succeeded in solving yet, and it suggests the advisability of making individual inquiries of those who have passed through Division I. to ascertain the causes which apparently lead them to abandon the higher and more advanced studies provided for them.

THE COMBINATION OF PRACTICAL WITH THEORETICAL INSTRUCTION

is also a subject which is exercising the minds many. At present, the facilities we offer our students in this direction are very limited. In the Handicraft Classes last session, the students were enabled to attend a course of manual training in masonry and leadwork, thanks to arrangements made by the Technical Education Board; and this session the board has kindly arranged for a series of workshop demonstrations in stone-working, to be given at the Regent-street Polytechnic. There appears to be a difference of opinion as to how far it is necessary or desirable that an architect should be able to put his own hand to the work of any trade. If it is an advantage that an architect should have actual manual experience, would it not be better that a student should be taught or apprenticed to one trade—say mason or carpenter—before he serves his articles? Such a course would seem to be the most convenient as well as the most practicable; later on he might with advantage gain considerable knowledge in other crafts, not necessarily by handling the materials and tools, but by observation either on works, in shops, or in craft classes; while later still the superintendence of works, either as clerk of works or otherwise, would be an experience of great practical value. After all, the years of a student are limited, and even if he should make the very best use of his opportunities, he cannot expect to accomplish very much in this department of his education. By far the most useful and appropriate thing for an architectural student is modelling, and it is a question whether this is not worth all the other crafts put together. The tendency of the times is, perhaps, to make too much of the manual work undertaken at the technical institutes. It is valuable as far as it goes, especially in the more scientific subjects; but it is a fallacy to suppose that it can in any degree supersede the training which an apprentice to his trade must and should acquire in the workshop, where the every-day practical problems have to be dealt with. It has been resolved to commemorate the Jubilee of the Association by establishing a fund for

ACQUIRING NEW PREMISES,

suitable and adequate for the work carried on. For the last few years the cry has gone forth for increased and better accommodation; numerous efforts have been made to obtain premises, but hitherto without success; and seeing that our need is as great as ever, it has been determined to commemorate the Jubilee in the way mentioned. We have sought the advice and help of friends who have aided the Association generously in the past, and they have intimated their readiness to support us again, provided we are prepared with some definite scheme. We are now going forward in the matter with renewed energy and determination, and are hopeful that

THE WAY IS OPENING UP

for obtaining a site on which premises could be erected to provide studios and classrooms, library, reading-room, and offices, a common-room, and last, but not least, a meeting-room, so that under one roof we may combine all the essential accommodation for educational and social purposes. The provision of workshops might with advantage be arranged in a separate building more suitable for the purpose, if satisfactory arrangements could not be made with any of the public craft schools. This outline of a scheme may seem to indicate a large undertaking; but if carried out on the lines we have in view, there is little doubt but that it could be satisfactorily accomplished. Our desire is to formulate a definite scheme that is practicable and attainable within reasonable limits and a reasonable period. The question of establishing a

MUNICIPAL SCHOOL OF ARCHITECTURE

has been talked of, and may yet come; but such an institution could never do the work that the Association undertakes, neither could the Association open its doors to outsiders and accept grants or subsidies from county councils or other public bodies without sacrificing its freedom and ceasing to fulfil the objects for which it exists. It is an advantage that cannot be too strongly urged that the architectural student should be trained in an architectural atmosphere, that he should have every opportunity of associating with kindred spirits and forming lasting friendships with them. The true spirit of comradeship will be best promoted by such intercourse, and the higher claims of art will be more easily attained. Let us go forward, therefore, with renewed energy to the duties and studies of another year, remembering that the opportunities, the advantages, and the privileges which are now the inheritance of our students have been obtained by the cordial co-operation, the self-sacrifice, the patient toil, and the brotherly love of men who for fifty years have joined hands in promoting the advancement of architectural education and upholding the first principles and honoured traditions of the Architectural Association.

Mr. Cole A. Adams, past-president, proposed a vote of thanks to the President for his comprehensive and interesting address, remarking that he was not sure that it was well for the architectural student to devote much time to manual crafts and technical work. Few of the great masters of the immediate past had taken up these pursuits in detail; and imagination stood, after all, as the leading attribute of the architect. All felt the necessity for new premises, and with a determined effort and enthusiasm this aim would be realised.

Mr. Beresford Pite, in seconding the motion, said the President's admirable bird's-eye view of the policy and progress of the Association had shown that there would have been no examination scheme and no education movement had it not been for the initiative of their humble little body. They had not been hampered by Royal Charters, but had periodically revised their rules, and adapted themselves to new requirements. They had always had a practical aim, but had never lost sight of their high ideal. He urged on students the importance of using their eyes, and held that the time spent in searching over and examining files of architectural journals was never ill-spent; nor should they be afraid to use their indiarubber over and over again in the preparation of design. He was not sure but that the falling off in class and lecture attendance after students had reached a certain point was not a healthy sign, so far as the future of the profession was concerned.

Mr. Owen Fleming, in supporting the motion, inquired whether they were working on right lines if, after fifty years of such advantages of architectural education as the poor Greeks and 13th-century men never dreamed of, they still continued to design the hideous railway stations and street buildings to be seen rising on every side in our great cities? What was wanted was more education and less instruction, and he would urge the importance of manual training as a preparation for the architect.

The vote of thanks, having been carried by acclamation, was briefly acknowledged by the President.

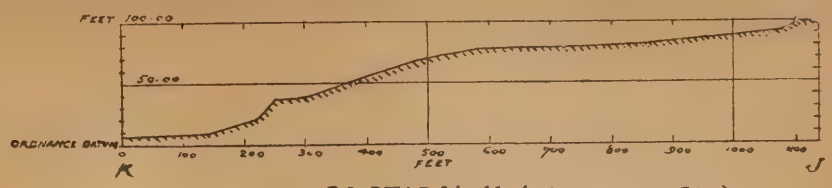
NOTES ON SURVEYING AND LEVELLING.—II.*

By Walter Tester.

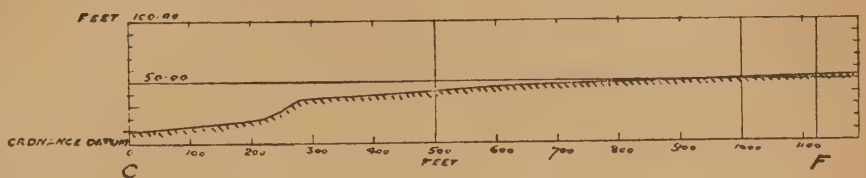
SECTIONING THE GROUND.

The accompanying sections, Figs. Nos. 4, 5, 6, 7, and 8, will give an idea of the irregular nature of the ground; they are taken along the lines shown on the plan (Fig. No. 1). The manner in which they are taken will now be described. It will be supposed that the surveyor's time is limited, and that it is impossible for him at present to take a complete set of sections all over the ground, and that he must obtain as much information as to levels as he possibly can in the time at his disposal. On the 208·33 scale Ordnance map there is a bench-mark, 19·6, on the wall near point L, and also another in Victoria-road 48·4 (see plan, Fig. No. 1). The surveyor starts by taking a reading on the bench-mark 19·6, and works with as few settings as possible to the bench-mark 48·4 in the direction Q P O N W G F, leaving a peg firmly driven into the ground, or a permanent mark on any fixed objects he meets with at each changing point. When he has reached the bench-mark 48·4 and taken a reading on it, he can fill in the level of his first bench-mark—viz., 19·6—and reduce the whole series. The second bench-mark should work out to 48·4, if his levels are correct. If there is any serious difference, he can easily run over the ground again, having retained his points. His levels will, in this way, be reduced to Ordnance Datum, which is an advantage, as he can compare any other levels given on the Ordnance map with his own.

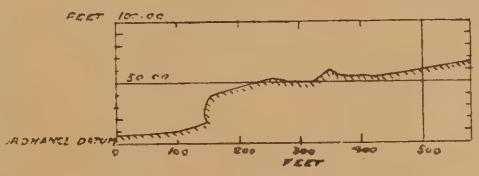
In the manner just described, he should work from the bench-mark 48·4 down Everton-street, and along the river-front back to his first starting-point, leaving permanent marks along the route, and checking his levels as before. In this way a series of bench-marks will be established for future use, and from these others can be fixed in any portion of the site. Where they are pegs driven into the ground, they should be made quite firm, and, if possible, protected; and a list should be made with a description of their position, and giving the reduced level above Ordnance Datum. If one of these backsight pegs has not been used for some time, and it is proposed to start a series of sections off it, the level should be checked from some more permanent bench-mark, such as a fixed mark on a building or a gatepost. In taking a set of levels of the description we are dealing with a good method is always to take the back sight off one of these fixed bench-marks at every change in the position of the level, using only two columns for readings in the level book, the back sight off a bench-mark being entered in the left-hand column, and all other readings from this setting in the second column. The advantage of this method is that the surveyor is sure of the reduced level of his bench-marks, and if he checks his back sight by taking a second look after he has taken all his readings from this setting, and, just previous to changing his position, he can satisfy himself as to the general accuracy of his work, as there is only the chance of an odd reading being wrong. It will be as well at this place to say a few words about the method of reducing levels: Some surveyors reduce each level in succession from the previous one by finding the difference between the two readings, and adding or deducting this difference to or from the reduced level of the preceding point, according as the ground rises or falls. A much simpler way is to add together the reduced level and the reading of the back-sight point for a constant for all readings taken from this setting; then, all that is necessary is to deduct each of the readings from this constant for the corresponding reduced level. This simply means



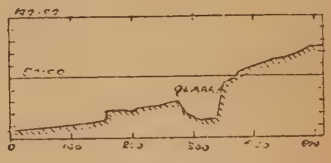
SECTION K.J. (SEE PLAN OF SITE)
FIG. N°4



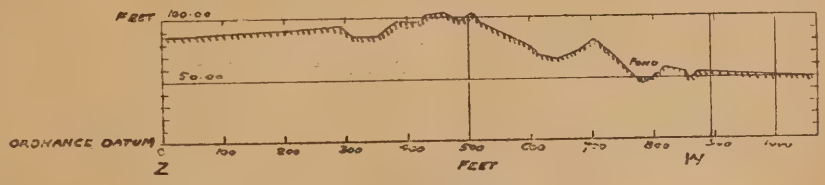
SECTION C.F.
FIG. N°5



SECTION Nº 10
FIG. N°6



SECTION Nº 18.
FIG. N°7



SECTION Z. W.
FIG. Nº8

that the distance between the datum and the line of collimation is constant for one setting, and, as the reading or distance from the line of collimation to the ground varies at different points, so the reduced level or distance from the ground to the datum varies to a corresponding extent, but inversely.

Let us take an example:—

B.S.		Reduced Levels.
2·30	..	34 50
...	3·40	33·40
...	4·50	32·30
...	1·20	35 60
...	5·60	31·20
...	6·30	30·50
...	7 40	29·40
...	12·00	24·80
...	13·50	23 30
	53·90	240·50

Constant.
34·50 + 2·30 = 36·80
Deduct 3·40 = 33·40
" 4·50 = 32·30
" 1·20 = 35·60, &c.

The results may be checked by adding up all the readings and reduced levels (excepting those for the bench mark), and this should total up to the same as the result of multiplying the constant by the number of readings:—

240·50
53·90 Constant.
——— 36·80 × 8 = 294·40.
294·40

So far as the present sections are concerned, it has already been explained how the series of parallel lines at the river front can be set out; also the survey lines K J and C F can be used for sections. For the purpose of checking the chaining of the series of parallel sections, a point, Y, should be fixed at the top of the cliff near the house on the central section of the series (Fig. No. 1), and a line set out square off the section line and parallel to L M and K B. All these sections should measure the same length between this line and K B. It will be best to take several of these sections together, with one setting of the level as far as the bottom of the cliff, and then moving the level to a higher position to take the central portion of each, and, finally, moving the level to the top of the cliff, to take the remaining lengths. One or two of these sections should be produced, as shown on the plan, Fig. No. 1, and one should be taken on the line W Z, as this is the roughest part of the estate. The theodolite will be found very useful for producing these lines, as, for instance suppose a high ridge crosses one of the lines, with a sudden drop in the ground behind the ridge. The surveyor can place the theodolite on the ridge at a point in the line and produce it by turning over the telescope, as previously explained.

In addition to the sections, the surveyor should take as many odd levels as he can at any fixed points on the plan, such as the junctions of roads, corners of buildings, &c., and for this purpose the bench marks he has fixed will be very useful. Sufficient has now been said to explain the preliminary surveying and levelling operations; but there must necessarily be a considerable amount of work of this description yet to be done, as, for instance, on the athletic grounds which is to be placed on the rough ground in the neighbourhood of the line W Z (Fig. 1), and these matters will be dealt with in subsequent articles.

PLOTTING THE SURVEY.

It will be as well to make a few remarks as to the method of plotting the main lines of the survey. Let us suppose that it is to be put down to the scale 40ft. to the inch. It will be found that the angles cannot be set out sufficiently accurately with a protractor, unless it is a very large one indeed, the lines requiring to be produced after the angles are marked out. The most accurate and the proper way is to calculate

diagonal dimensions for the angles. Let us take the main figure of the survey C F J K, see sketch Fig. No. 9, neglecting for the time the triangle F G H. The surveyor wishes to plot the line K J in its true position in relation to the line K C. The angle J K C being 88° 50′, and length

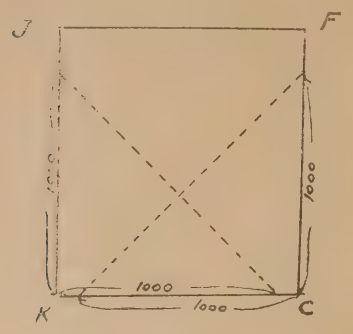


Fig. 9.

of K J = 1,139ft. 6in., length of C K = 1,018ft. He has now the two sides and contained angle of a triangle, and he wishes to calculate the third side in the direction J C. The formula is, from Molesworth's "Pocket-book":—

$$JC = \sqrt{CK^2 + KJ^2 - 2\,CK \times KJ \times \cos.\ \text{angle K}},$$

which means a lot of calculation, and can be simplified by taking 1,000ft. along each of the lines C K and K J, giving points near the ends.

Cos. 88° 50′ from the Tables = ·0203608, and substituting the figures in the formula—

$$JC = \sqrt{1{,}000{,}000 + 1{,}000{,}000 - 2 \times 1{,}000 \times 1{,}000 \times {\cdot}0203608}$$
$$= \sqrt{2{,}000{,}000 - 2{,}000{,}000 \times {\cdot}0203608}$$
$$= \sqrt{200{,}000 - 40721{\cdot}6}$$
$$= \sqrt{1959278{\cdot}4} = 1399{\cdot}74 = 1{,}399\text{ft. } 9\text{in.}$$

The same method can be used for the line C F, the angle K C F being 90° 4′, and taking 1,000ft. along each line, as before, we have—

$$\sqrt{2{,}000{,}000 - 2{,}000{,}000 \times \cos.\ 90°\,4'}$$

Now, 90° 4′ being more than a right angle, we take the cos. of 180° − 90° 4′ = 89° 56′ = ·0011636, and change the sign—

$$\sqrt{2{,}000{,}000 - 2{,}000{,}000 \times -{\cdot}0011636}$$
$$= \sqrt{2{,}000{,}000 + 2327{\cdot}2}$$
$$= \sqrt{2{,}002{,}327{\cdot}2} = 1415{\cdot}03 = 1{,}415\text{ft. } \tfrac{1}{2}\text{in.}$$

For calculations of this nature the table of decimal equivalents of the division of a foot in Molesworth's "Pocket-book" will be found exceedingly useful, and for the natural sines, cosines, &c., "Chambers's Mathematical Tables" may be used. If the surveyor understands the use of logs., he can use the tables for same in the latter book, and it will reduce the length of his calculations. In the two examples given above the figures are so simple that it will scarcely be worth while using logs., except perhaps for taking the square roots at the end. For example:—

Number.		Log.	
195 9 2 7 8 4	=	2920 7 8 8 1 5 5 1 7 7 8 8	
195 9 2 7 8 ·4	=	6·2920 9 6 1 5 8	

Dividing by 2 to extract the square root = 3·146048079.

Log.		Number.
·146048079		
1460350	=	13997
....130		
124	=	4
67		2
62		
59	=	2
		13997 4 2 2
3·146048079	=	1399·7422

The above results may be checked by the method given in Molesworth's Pocket Book for plotting angles without a protractor, which is also simpler. This rule is—"Strike out a portion of a circle with radius 100, and lay off a chord equal 2 sin. of half the angle required."

Applying this to the examples, and using 1000 radius instead of 100, we have—

Angle, 88° 50′
½ ,, 44 25
sine, 44 25 = ·6998711
1000 × ·6998711 × 2 = 1399·7422

And for the angle, 90° 4′
½ ,, 45 2
sine, 45 2 = ·7075180
1000 × ·7075180 × 2 = 1415·0360

The lines K J and C F can now be plotted down in their correct position in relation to K C, using a length of 1,000ft. along each line by means of the calculated dimensions; they can then be produced to the proper lengths, and J F should now work in exactly.

The line in the direction H F not being run through to meet C F, will have to be calculated, also the distance from G along G F, where it would cut.

Taking this triangle and calling it G H F (see sketch, Fig. No. 10), the angles at G and H are measured outside the triangle, and if we deduct

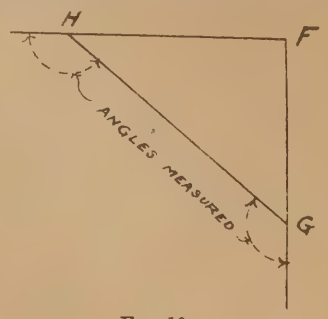


Fig. 10.

each of these from 180°, we shall have the angles inside. The angle at F will be the balance to make up 180° inside the triangle the length G H was measured. Therefore we have the three angles and one side of a triangle. And from the formulæ—

$$HF = \frac{GH \times \sin.\ \text{angle G}}{\sin.\ \text{angle F}}$$

and—

$$GF = \frac{GH \times \sin.\ \text{angle H}}{\sin.\ \text{angle F}}$$

These two lines being calculated, the main figure of the survey, C F J K, can be plotted, and there should be no difficulty in filling in the lines of the subsidiary figure A B C D E (Fig. No. 1), or any of the internal lines used for filling up the walks, drives, &c. The latter may be put in with the help of a protractor. The following method may be useful for plotting a series of lines similar to the ones used for the drives and walks.

Suppose there are several lines running one from another at various angles which are

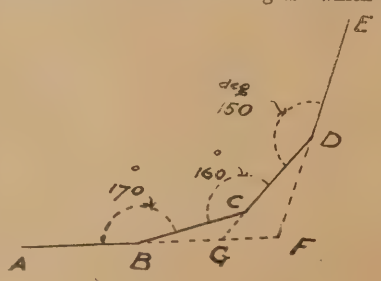


Fig. 11.

measured. See sketch, Fig. No. 11. (These are not the lines of the survey.) The line D E can be checked in its relation to the line A B by calculating the angle which they would make with each other if produced to meet. Suppose the lines E D and D C are produced to meet A B produced at F and G, then, taking the triangle B C G—

Angle C B G = 180 − 170 = 10°
,, B C G = 180 − 160 = 20
Therefore angle B G C = 150

The balance of 180

In the same way, in the triangle D G F—

Angle D G F = 180 − 150 = 30°
,, G D F = 180 − 150 = 30
Therefore G F D = 120

The balance of 180

If the lines have all been tied together with angles and measurements in the manner described, there should be no difficulty in filling up the details of the survey.

"BUILDING NEWS" DESIGNING CLUB: AWARD OF PRIZES, 1896-7.

THE successes of the past twenty years augur well for the continued prosperity of our Designing Club, which has been conducted with so much advantage to those who have availed themselves of its competitions. The contests are open to all, without fee of any kind. We now present the prizes offered for the best work of the past session, and reopen the competitions for the forthcoming season. In these days of the survival of the fittest, as the saying goes, there can be no doubt that the architectural student must let no opportunity pass without endeavouring to make the most of it to further his knowledge and gain experience. By testing his own capabilities in planning and design with the attempts of others, in the manner supplied by our Designing Club, must undoubtedly tend to strengthen his position, besides affording him an opportunity of securing publicity for his work, provided it reaches a given standard of merit. The designs are all brought under review, the principal ones obtain mention, and the best are illustrated. The awards are arrived at by the points secured by the students' successes throughout the year. For the last session they rank in the following order: — "Nap," "Pickles," and "St. Leonard." Hon. mention is accorded to "Nut" and to "The Dingo." We therefore award the prizes as follows:—

"Nap" (first prize), £10 10s., Mr. Fred. W. C. Gregory, 19, Forman's Buildings, Goldsmith-place, Nottingham.

"Pickles" (second prize), £5 5s., Mr. C. J. F. Palmer, 48, Northwood-road, Archway, Highgate, N.

"St. Leonard" (third prize), £3 3s., Mr. W. B. Y. Draper, De Grey House, St. Leonard's-place, York.

LIST OF SUBJECTS AND RECORD OF SCORES.

A.—Country Cottages.—"Pickles," 1; "St. Leonard," 2; "Moss," 3; "Potluck," 4; "The Dingo," 5.

B.—Village Church.—"St. Leonard," 1; "Pickles," 2; "Nut," 3; "The Dingo," 4; "Cheese," 5.

C.—Small Village School.—"Nap," 1; "Pickles," 2; "St. Leonard," 3; "The Dingo," 4; "Tyke," 5.

D. — Technical Institute. — "Nap," 1; "Pickles," 2; "The Dingo," 3; "Nut," 4; "Manxman," 5.

E.—Small Country House.—"Alfio," 1; "Nap," 2; "Idristwyn," 3; "Pickles," 4; "The Dingo," 5.

F.—County District Council Hall.—"The Dingo," 1; "Nap," 2; "Nut," 3; "Pickles," 4; "Pantile," 5.

G.—Stable Buildings.—"Nut," 1; "Pickles," 2; "Nap," 3; "Dache," 4; "Pantile," 5.

H.—Tea and Coffee Restaurant for Suburbs.—"Nap," 1; "Pantile," 2; "Pickles," 3; "Tyke," 4; "Orb," 5.

RULES OF COMPETITION FOR SESSION 1897-8.

1. Drawings to be sent within 28 days after the publication of the particulars of each subject.

2. One or more subjects will be given every month, from which a competitor may choose.

3. The drawings to be executed in firm black lines on white drawing-paper, in sheets of the absolute size of 22in. by 14in., with no washes or tinting in colour whatever; outline to be the first consideration; but drawings may be slightly shaded with shadows executed wholly in line. Sectional parts to be shown in ruled "hatching," or blocked in. The scaled to be used will be given with each subject.

4. Drawings to be forwarded, unmounted, by post, care being taken to roll the short way of the drawing, as packages over 18in. long are not transmissible through the book post.

5. On entering the Class (which may be done at any time) each competitor is required to furnish his name and address, which must be written legibly on the back of each drawing as a guarantee of good faith, the *nom de plume* the author intends to adopt being boldly marked on the front of each separate drawing. The motto,

once adopted, to be adhered to throughout the session.

6. Prizes of £10 10s., £5 5s., and £3 3s. will be awarded to the best series of designs. Our decision to be final.

7. Before awarding the prizes any contributor will be expected to furnish proof, if necessary, as to his age, and the time during which he has been engaged in professional pursuits, though no candidate need be strictly an architectural student.

8. We reserve the right of arranging the drawings for publication in any manner we deem necessary.

9. A critical notice of the designs sent in of each series will be given in an early issue following the receipt of the drawings.

FIRST LIST OF SUBJECTS, 1897-8.

A.—A Suburban Dwelling-house, for a City gentleman, to cost £2,000. Economy of plan on a limited site are points of leading importance. The frontages are at the corner of two roads, facing south and west. The main road side of the plot measures 50ft., and has a return of 150ft. The elevation must set back 18ft. from the boundary fence on the main road side. A large dining-room or living-room is to take the preference over the drawing-room or parlour. A third sitting-room, not less than 12ft. square, is to be provided for a study or breakfast-room. That need not necessarily be on the ground-floor. A mezzanine arrangement is suggested. There must be six bedrooms in all: two of these may be attics. Bath-room essential, and two w.c.'s, besides kitchen and offices. There may be a small cellar. The entrance must be roomy but not wasteful, and the stairs not less than 3ft. 3in. wide. Materials brick, with stone dressings sparingly used. Roofs covered with tiles, style optional. Size of rooms to be governed by the money expenditure. Drawings required: Three plans, two elevations, and a section scale 8ft. to the inch. Plans may be 16ft. to inch; sketch view necessary.

BUILDING TRADES' CONFERENCE ON TECHNICAL EDUCATION.

A MEETING of representatives of the building trades, to consider the best way in which the Craft School could supply the needs of the London building trades with regard to technical education, was held on Wednesday evening in the workroom of the school in Globe-road, E. The chair was occupied by Mr. Llewellyn Smith (chairman of the school and Deputy-Comptroller of the Board of Trade), and among those present were Sir Philip Magnus, Mr. Holloway, Dr. Garnett (secretary of the Technical Education Board, L.C.C.), Mr. Selby-Bigge, Mr. W. A. Lethaby (Art Inspector to the Technical Board), Mr. Oldman (secretary National Association for Promotion of Technical and Secondary Education), Mr. Dent (Labour Commissioner), besides representatives of building trade societies. The chairman observed that, whatever might be the feeling with regard to the changes that had come over the country with regard to apprentices, there would be no contention as to the need of centres where workmen could have an opportunity of perfecting themselves in the various branches of their trades. The object of the classes for the building trades was for the training of workmen, and not for the amateur, for they were of opinion the two could not be successfully mixed up together. A very considerable number of workmen in the district already took advantage of them, and the object of the conference that evening was to obtain suggestions as to the best means of making the classes useful and more widely known. All the suggestions made would be carefully considered by the committee, with the desire, so far as practicable, of carrying them out, so as to make the school more useful to the centre of the great building trade. Mr. George Dew said the time had come when, as trade unionists, it was their duty to get lads to go into the classes. It was only by these the younger ones could obtain knowledge. The building trade had unavoidably changed, and the title of "master craftsmen" no longer belonged to their employers. Mr. Holloway, as an employer of the building trades, said he had considerable sympathy with institutions of that character. He fully realised there was great room for improvement in the skill of their mechanics. He deplored the fact that the system of apprenticeship had fallen out of practice; but his firm kept it up, for the apprentices turned out the best mechanics. As an encouragement to lads in his firm, on the completion of their apprenticeship, if they had behaved themselves during that term, they received £5 to set themselves up with a set of tools. Such an encouragement was an inducement to lads to take up an apprenticeship; and institutions like that school ought never to take the place of apprenticeship, but simply to augment it. He concluded by suggesting that the foremen should be invited to visit the classes. A discussion followed.

CHIPS.

Messrs. Hans Price and Wooler, of Weston-super-Mare, have been instructed by a committee of the urban district council for that town to prepare plans for dwellings, shops, and alterations to the Market House at a cost not to exceed £3,500.

The conversazione of the Architectural Association is being held later in the session this year than usual—namely, on Nov. 26—the reason being to allow time for the preparation of a topical play which it is intended to produce on the occasion.

Mr. Ernest Veall, of Norwich, in the office of the Norfolk County Council, has been appointed district road surveyor of the East Elloe (Lincolnshire) Rural District Council, at a salary of £62 10s.

The committee of the Harrogate School of Art have purchased a site in the centre of the town whereon to erect the new Technical Institute and School of Art. The total cost of the building is estimated at £6,000.

The Metropolitan Asylums Board made an important appointment at their meeting held on Saturday last—that of architect for their new chief offices which are to be erected on the Thames Embankment, upon a site recently purchased from the City Corporation. Acting on the recommendation of a committee, the board appointed Mr. Edwin T. Hall, F.R.I.B.A., of Moorgate-street, who designed the Park Fever Hospital at Hither Green, Lewisham, opened a month since.

The new church of St. Gabriel's, Willesden Green, was consecrated on Thursday in last week by the Bishop of London. It is built in Walm-lane, and consists of a chancel, Lady-chapel, and chantry, three bays of the nave and aisle. It is in style Early Decorated. The church seats 600 in the present condition, but it will accommodate 1,000 when completed. The building was designed by Mr. P. Philip Day, and built by Mr. J. Bentley. The contract for building the portion of the church now erected amounts to £7,000.

The Burlington Hotel, which is about to be built at Swanage, on the site overlooking Swanage Bay, on the road to Studland, at a cost at present of some £6,000, to be increased when the hotel is fully completed to some £16,000 or £20,000, has been granted a full license by the Dorset county magistrates.

A new drill-hall for the members of the Shirley Company of the 1st Hants Artillery Volunteers has been erected in Shirley-road, and was opened on Thursday in last week. The drill-hall has been built from plans prepared by Lieut. J. H. Blizard, architect, of Southampton, and is of corrugated iron, the interior being lined with matchboarding. In front of the hall is a parade-ground extending to 105ft., with a width of 40ft., there being a depth of 7in. of gravel, the inside of the hall having a floor of the same material to a like depth. There is a skylight, with louvres for ventilation. The brick foundations of the building were laid by Mr. T. J. Jukes, of Freemantle, who also carried out the internal and external fittings; while the hall itself was erected by Messrs. Powell and Co., of Westminster.

The fund for the provision of a public park and recreation-ground for Widnes and the extension of the West Bank Promenade, in commemoration of the Queen's Diamond Jubilee, is making satisfactory progress. The amount required is £14,000, and towards that sum about £11,500 has already been subscribed.

The Earl of Jersey and Colonel Boughey, Commissioners under the Light Railway Acts, held an inquiry at Derby on Monday into a proposed electric railway between Derby and Ashbourne. The length of the line would be about thirteen miles, and would run alongside the highway. The commissioners expressed their approval of the proposals, which, it was stated, would involve an outlay of £70,000.

Mr. Francis Cranmer Penrose, F.R.S., Fellow and late President of the Royal Institute of British Architects, having resigned his position as architect and surveyor to St. Paul's Cathedral, after holding the office for a period of thirty-four years, the Dean and Chapter of the Cathedral have appointed Mr. Somers Clarke, F.S.A., of Dean's-yard, Westminster, to succeed him.

Building Intelligence.

BIRMINGHAM.—The city council received on Tuesday a report from the lunatic asylums committee stating that the formal approval of the Home Secretary has been obtained to the conveyance of the Holly Moor Farm land, and the purchase will be shortly completed. The committee had had under consideration the next step towards the erection of the asylum, namely, the question of the appointment of architects. The Commissioners in Lunacy, who have to examine and approve the plans before a building contract can be made, strongly recommended the appointment of architects who had had previous experience in the erection of lunatic asylums of a similar class, and they did not speak favourably of the usual results of competitive plans; besides which, experienced architects now declined to prepare plans for such a competition unless they each received payment for their labour, and the referee also required a handsome fee for his services; the cost of a competition might, therefore, approach £1,000. The committee also believed that there was a general feeling in the council against going outside Birmingham for professional assistance, which could be equally well obtained within the city. The building will be an extensive one, of a very special kind, not situated in the city, and the purpose will not be so much to provide an ornament to the neighbourhood as to erect a well-proportioned comparatively plain building, with every convenience and advantage which experience can suggest for the care and comfort of the patients. After giving the matter careful consideration, the committee were satisfied that the expense and labour of a competition would far outweigh its advantage; and they proposed, with the approval of the council, to offer the appointment to Messrs. Martin and Chamberlain, if fair terms could be arranged. This firm were the architects of the Rubery Hill Asylum, which had proved to be a satisfactory building of its class, and Mr. William Martin was engaged upon the plans of the Winson Green Asylum, and had carried out all the subsequent enlargements and alterations. He was also called in to reconstruct and enlarge the Glamorganshire Asylum at Bridgend, and to improve and extend the new asylum at Carmarthen. This recommendation and report led to a long discussion; but eventually an amendment referring the matter back to the committee with instructions to obtain plans in a limited competition was carried by the narrow majority of 32 votes to 30.

DOUGLAS, ISLE OF MAN.—It will be remembered in the recent open competition for a new town hall, the design of Mr. Arthur Ardron, F.R.I.B.A., of Westminster, London, was selected, and tenders obtained. The tender of Messrs. Gradwell, contractors, of Barrow-in-Furness, at £10,368, has now been accepted. Three distinct groups are provided: municipal buildings, free library, and fire-station. The first-named is placed at the corner of Ridgeway-street and John-street, and the free library occupies the remainder of the Ridgeway-street frontage, and has also a frontage to Church-street. The fire-station is placed at the corner of John-street and Church-street. The principal entrance to the public offices is from John-street, through a vestibule. The town clerk's department is placed next Ridgeway-street, and the borough surveyor's next John-street; the principal staircase of Portland stone with wrought-iron balustrading, together with lavatories for the staff, are arranged centrally for each department. On the first floor is the council chamber, approached from the main corridor, with three committee rooms and waiting rooms, as well as lavatory and cloak-room accommodation. The council chamber, which is divided into three bays by pilasters, has a panelled wood dado, and has an elliptical arched ceiling, ribbed and treated in ornamental plasterwork. At one end is a small gallery for the use of the public, approached by a separate entrance and staircase. On the second floor, over the committee rooms, are the caretaker's quarters, also with its own entrance. In the basement are provided heating chambers, strong rooms, coal stores, &c. The free library will be entered from Ridgeway-street, and has the news-room and lending department on the ground floor. The reference room is on the first floor, over the lending library, with librarian's private room, &c. Galleries are provided in the lending and reference rooms for the storage of books, while further storage room is

provided in the basement, with lift communication. The fire-station contains engine-room, opening into Church-street, with folding doors, with assembly room above. A hose-room, with tower for drying purposes, is also provided. The style of the building, which was illustrated in our issue of Feb. 12, 1897, is Italian Renaissance, freely treated. The walls facing Ridgeway-street and John-street will be built in local stone, with Monk's Park Bath stone dressings; while the elevation next Church-street will be carried out in brick. The roof will be covered with Broseley tiles. The building throughout will be heated on the low-pressure system by means of ventilating radiators and heating pipes. The buildings will be commenced at once, and it is intended to have them completed in 18 months from the present time.

Leicester.—The Bishop of London opened last week the new art and technical schools which have been erected by the Leicester Corporation at a cost, for site and buildings, of nearly £40,000. Hitherto the art and technical schools in the town have been distinct institutions, but it was decided to incorporate them in one building. The corporation secured for £8,000 a new central site in the Newarks, near Leicester Castle. The site extends to nearly three-quarters of an acre, and the main frontage is nearly 220ft. in length, with an elevation of four stories. The structure is of red brick, with Portland stone dressings, and has been designed by Messrs. Everard and Pick, architects, Leicester. Two of the floors are devoted to technical instruction in hosiery and boot and shoe manufacture, with a variety of all kinds of old and new machinery, showing the development of the processes of manufacture, engineering, plumbing, dyeing, painting, &c. The two upper floors, which comprise the school of arts, have been fitted up at a heavy outlay, and the local efforts have been seconded by the authorities of South Kensington, who have given classes and lent a wide variety of objects of art for the benefit of the students. The art school has also been enriched by the Art Departments of France, who have provided casts and other art objects from the Musée du Trocadero, Paris. The large casts of screens, figures, stalls, &c., were brought to Leicester in sections, and rebuilt in the school by Italian artists. A portion of the roof of the building is flat, and on this a conservatory has been erected for plant-life studies. We illustrated the buildings by a double-page perspective and full page of plans in our issue of May 29, 1896. Messrs. T. and H. Herbert were the contractors. The late Mr. John Loveday was the first clerk of works, and since his death Mr. C. S. George has held that post.

Liskeard.—The vicar and churchwarden of Liskeard have received the written judgment of the Chancellor of Truro (Mr. R. M. Paul) on their application for a faculty to take down the existing tower of the parish church and erect a new tower in harmony with the church. The petition was heard by the Chancellor and his assessor (Mr. C. E. Ponting, F.S.A.) in open Court at Liskeard Guildhall on the 23rd ult. In his judgment, the Chancellor mentions that Mr. Ponting "made a thorough examination of the tower and the foundations, the petitioners having most courteously permitted pits to be sunk on two sides of the tower. It was found that, although the rock formation exists at a depth of 10ft. from the surface, the foundations are only carried down 4½ft., without any proper projection beyond the face of the wall, and are composed of small rubble stones laid dry, as is so often the case with Norman foundations. The result is a serious settlement of these foundations and cracks in the superstructure, and this movement has now undoubtedly reached a critical stage." The Chancellor adds that he is advised by Mr. Ponting that, notwithstanding the defects enumerated, the tower can be restored, that it "can be underpinned and repaired without the addition of buttresses" (as recommended by Mr. Fellowes Prynne), and put in sounder condition than when first built. Churches in an equally dangerous condition are enumerated which have been secured under the supervision of Mr. Ponting, who has expressed his willingness to gratuitously give to the petitioners written directions as to the methods to be adopted, and, if required, to send them a builder to carry out the work. In giving his decision, the Chancellor says the Court is bound to consider future as well as present parishioners, and "in a diocese where Norman work is comparatively rare, no effort should be spared to preserve every link that connects the present age with the far-distant past." Mr. Paul, therefore, rejects the prayer of the petition so far as it involves the demolition of the existing tower and the erection of the proposed new tower; but, if the tower be restored, a vestry-room may be erected on the south side, in accordance with Mr. Sansom's plan. If it will meet the wishes of the petitioners, the Chancellor adds that he would be prepared to sanction the necessary work recommended by Mr. Ponting for the preservation of the existing tower, and the erection of the proposed new tower (with such modifications as the altered circumstances render necessary) at the N.E. or S.E. corner of the church. A local journal, which makes a violent attack on "the solicitor from Truro" for his judgment, mentions that the fee charged by Mr. Ponting for his services is 27 guineas, which, with the expenses of the Court, amounting to £8 2s. 4d., has to be paid by the parishioners of Liskeard, in addition to the petitioners' own legal expenses.

Minories.—A new City police-station at the corner of the Minories and Goodman's-yard was occupied for the first time last week. It is a plain building of red brickwork four stories in height, with a domical turret carried one floor higher at the angle of the two streets. On the ground floor are the charge-room, the inspector's room, and the muster-room, and opening out of this latter is an apartment for the use of the detectives. Seven cells are provided, cased with white glazed brick, and lighted directly from the inner courtyard, instead of, as is usually the case, deriving their light from a passage. In the basement are the mess-room and a large kitchen, together with the necessary offices and the coat and helmet room. The ground floor contains, in addition to the official rooms mentioned above, a reading-room and a large recreation-room. It is in the men's sleeping-rooms that the greatest change has been made. Instead of the usual dormitories, every man at the Minories will have his own cubicle, a little apartment 9ft. by 6ft., each of which has its own window, and a cupboard in which clothes can be kept. There are three floors of these cubicles, and on each landing there is lavatory accommodation, with a bath-room. In all some sixty-five constables and sergeants can be accommodated at this station, in addition to a housekeeper. The building has been constructed from plans prepared by Mr. A. Murray, the City surveyor, and the work has been carried out under the personal superintendence of Mr. T. R. W. Mossman, of the City surveyor's office.

Newcastle-on-Tyne.—At a meeting of the Stewards of the Freemen of Newcastle on Tuesday, it was decided by an overwhelming majority to grant a site for the new infirmary on the Leazes, to which attention was drawn by the deputation of the governors of the infirmary who waited upon the Freemen the previous Wednesday. It was also resolved that the site should be an absolute gift. The opinion was general that such a noble offer as that of Mr. Hall's to build a hospital at an estimated cost of £100,000 should be met in a magnanimous spirit.

Thornhill, Dumfries.—A new church is in course of erection for the United Presbyterian congregation in Thornhill, the memorial stone of which was laid on Saturday by Mr. Hugh Stevens, Glasgow. It is being erected on the site of the former church, in West Morton-street. The style is Gothic, of the Decorated period, and the principal feature of the main gable is a four-light window, with tracery head. The gallery staircase is placed in a square tower which rises at the side of the church behind the porch, and is carried to a height of 60ft, being finished with a low tiled spire. Internally the church will be roofed in a single span, with moulded timber main couples carrying a semi-octagonal ceiling. The principal timbers will be dressed and exposed; the ceiling between these is finished in plaster. There will be a gallery at the end only, facing the pulpit. The church is being built of red stone from Gatelawbridge quarries. The woodwork finishings and seating throughout will be of pitch-pine; glazing in lightly-tinted antique glass; gasfittings in wrought iron. The total number of sittings provided for is 360. There are also a hall for 90 persons, vestry, lavatory, heating-chamber, &c. The total cost will be about £1,900. The architect is Mr. John B. Wilson, A.R.I.B.A. and I.A., Glasgow. The following are the contractors for the various works:—Mason, Mr. James Cook; joiner, Mr. W. M'Clane; plumber and heating, Messrs. P. Drummond and Son; plasterers, Messrs. Waugh and Nish; slater, Mr. J. Corson—all of Thornhill; painters and glaziers, Messrs. A. and H. Gilchrist, Kilmarnock.

Truro.—The High School for Girls in Falmouth-road was formally opened last week by the Bishop of Truro. In general appearance the school is of Elizabethan character, having at the N.E. corner a battlemented tower. The windows have mullions and transoms, which, like all the dressings, are of Cornish Mabe grey granite. The walling is of squared Plymouth limestone. The endeavour has been to produce a building which should be of good proportions, outline, and massive, and funds being very limited, there is little ornament except some panels sculptured in granite, from full-sized models by Mr. Martyn, of Cheltenham, under the architect's supervision. The main entrance leads into a square hall, from which the central hall of the school on the principal floor is reached by a staircase of teak and pitch-pine. This hall measures 48ft. by 26ft., and, as adjoining classrooms can be added to it at pleasure, it affords floor space for seating about 400 people at time of examination. It is lighted wholly from the two ends by mullioned and transomed windows. It has an open-timbered roof of simple design (adapted for the application of swings and gymnastic fittings. A battlemented tower masks the lavatories and dressing-rooms, and forms the access to the playing field. The tower contains on the main floor a waiting-room and a room for the head mistress; at a higher level an assistant-mistresses' room, and in its upper part accommodation for a caretaker. On the lower floor are reached from the entrance-hall a dining-room and kitchen, teachers' room, and complete lavatories and dressing-rooms for the girls. Under the central hall the slope of the site has afforded space for the storage of chairs when not in use. The warming commences by the provision of a warm-air stove of the Heim-Gundry kind; there is also a system of hot-water warming, and fires in the rooms. The total cost, including the excellent site, is about £4,100. The work has been carried out by Mr. John Colliver, builder, of Truro. The architect is Mr. E. R. Robson, F.S.A., of Westminster. Under Mr. Robson's direction, the progress of the building operation has been supervised by Mr. Silvanus Trevail, F.R.I.B.A., architect, of Truro.

CHIPS.

A United Methodist Free chapel at Dunham Hill, on the main road from Chester to Warrington, was opened on Wednesday in last week. Mr. G. C. Taylor was the architect.

The town council of Halifax have instructed the borough engineer to prepare detailed plans for a hospital for smallpox, at Harewood Well Moor, at an estimated cost of £16,000, including land.

The new electric-lighting station at Bradford was formally opened on Friday by the mayor. The building is situated in Valley-road, and the plant and premises have cost close on £40,000, whilst the capacity of production is 12,000 8c.p. lamps. The new machinery consists of two six hundred imperial horse-power engines, two six hundred electrical horse-power dynamos, feed pumps, two boilers, condensing plant, switchboard, &c. Mr. J. L. Morley, Bradford, has supplied the condensing plant, which includes air and circulating pumps. The new machinery has cost £10,325.

The Earl of Jersey and Colonel Boughey, the Light Railway Commissioners, attended at Goole, on Saturday, to hold an inquiry into the application of the promoters of the Goole and Marshland Light Railway, for an order granting them permission to construct such a light railway. The total proposed mileage is 13½ miles, the district to be served extending from the Trent to the Ouse.

The scheme of water supply promoted by the local authority of Portland has received the approval of the Local Government Board. It will supply the Government departments, Admiralty, prison, and the inhabitants. The source of the supply is situated in the chalk hills at Upwey, between Weymouth and Dorchester, and the water will be conveyed by pipes to Portland. The work will be commenced immediately.

The new publishing premises of Messrs. Macmillan and Co. were opened on Tuesday. The new building, which extends from St. Martin's-street to Whitcomb-street, is of Portland stone, of Classical design, has a frontage of 106ft. in Whitcomb-street, 99ft. in St. Martin's-street, and 24ft. in Blue Cross-street. Mr. John Cash, of Newman-street, W., is the architect, and Messrs. Patman and Fotheringham were the contractors.

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ILLUSTRATIONS.

"Rowton House," Newington Butts.—"Red House," Milliken Park.—Holy Trinity Church, Southport.—Mansion House, Dumfriesshire.—Business Premises, Camborne.—Agricultural Schools, Newport.

Our Illustrations.

"Rowton House," Newington Butts.

This double-page illustration is taken from Mr. Harry B. Measures' Royal Academy drawing, and illustrates the last built "Rowton House," which marks a distinct development in the homes of our Metropolitan working classes. The plans have, unfortunately, not reached us in time for illustration to-day; but we shall give them next week, with a detailed account of this great undertaking which has just been completed.

House for Mr. A. B. McKechnie.

"Red House" is erected on the lands of Johnstone, in Renfrewshire, on the western slope of the Gleniffer range of hills, not far from Milliken Park, and near to the site of the original and present Cochran Tower. The house is built of best Scotch terracotta red brick, and tiled with Ruabon tiles; the upper story being treated in half-timber work. The ground-floor contains three public rooms, besides kitchen and other accommodation, and the upper floor contains four bedrooms, bathroom, and studio. The drawings of the house, and also specimens of the proprietor's paintings, were hung at the recent Fine Art Exhibition in Glasgow. The architect is Mr. C. Davidson, of Terrace-buildings, Paisley.

Church of Holy Trinity, Southport.

Mr. Huon A. Matear, F.R.I.B.A., is the architect of this large church, of which we give a view from the original perspective shown at this year's Royal Academy. The plan presents several distinguishing features in church planning, while the external treatment is marked by boldness and breadth of handling worked out in brick and stone. The porch giving access to the morning chapel is well contrived, and serves as an additional exit to the church itself. We have not received any particulars of the undertaking, and so are unable to supply the information.

Mansion House, Dumfriesshire.

In the Building News for August 27 we published a double-page view of this large house, which was designed for Mr. W. A. Coats by Mr. John A. Campbell, of Glasgow; we likewise printed a copy of the plan. To-day we give another view, showing the entrance front.

Business Premises, Camborne.

These buildings are in course of erection at Camborne, Cornwall, for Messrs. Vivian Bros., of Camborne, and Dunedin House, Basinghall-street, London, E.C., merchants, who, in addition to their Cornish and London trades, do a large business with Johannesburg and South Africa generally, chiefly in drapery, outfitting, and fancy goods. The buildings face Market-place and Church-street, Camborne, and are divided on the ground floor into drapery, carpet, outfitting, trunk, and tailoring departments, whilst the first floor is almost solely occupied by dresses, mantles, millinery, and fancy goods, the chief showroom measuring 104ft. by 30ft. The second floor will be occupied exclusively by workrooms for the employés of the firm, comprising separate departments for dressmakers, tailoresses, and milliners, with their separate refreshment-rooms. The walling will be in brick and stone, and the roofing of slate, whilst steel will enter largely into the construction of the floors and supports. When completed it promises to be the most important building of its kind in West Cornwall. Mr. Silvanus Trevail, F.R.I.B.A., of Truro, is the architect, and the builder is Mr. John Colliver, of the same place.

The Harpur-Adams Agricultural School, Newport, Salop.

This design was placed first in open competition by the professional assessor appointed by the governors, and the author has been engaged to carry out the work. The buildings, which provide accommodation for 50 day boys and 50 boarders, comprise a large dining-hall, small dining-hall, schoolroom, two classrooms, and library, with large entrance-hall and suitable lavatories, cloak and boot rooms. A covered-way leads to a detached building, in which is placed a laboratory, lecture-room, preparation and balance rooms. Large and airy dormitories are placed on the first floor, with suitable lavatory accommodation and work for the assistant-masters. The head-master's house adjoins the school buildings. The kitchen, which is required to be used for both the master's house and the school, is centrally placed, and the servery is arranged between the master's dining-room and the dining-hall of the school. Accommodation is provided for the matron, and also an isolated sickroom for the students. A large laundry and ironing-room is provided, and also boiler, engine, dynamo, and accumulator rooms. The buildings will be of brick, the walls faced with Ruabon red pressed bricks, relieved with Grinshill stone dressings, and the roofs covered with brown Broseley tiles. The ground floors will be laid with wood blocks, and the first floor will be fire-proof. Most of the ground-floor rooms will have glazed brick dadoes. An electrical plant will be put down capable of lighting the whole of the buildings, and also pumping water from a well to the top of the building. The exhaust steam from the engine will be utilised to heat the water for warming the building. Each room is also provided with a fireplace. The ventilation will be by means of ventilating inlet radiators and extracts on roofs. The cost, including electric plant and laundry and cooking fittings, will be about £12,000. The architect is Mr. H. Teather, Andrew's-buildings, Cardiff.

CHIPS.

Mr. J. Douglass Mathews, C.C., F.R.I.B.A., was installed the Master of the Innholders' Company on Tuesday.

The Painters' Company will hold their annual Feast of St. Luke at the hall, Little Trinity-lane, on Monday next.

A bas-relief portrait tablet, the work of Mr. A. Bruce Joy, is about to be placed in the chapel of Rugby School in memory of the late Archbishop of of Canterbury.

The Whitechapel Board of Guardians have severed their connection with the Forest Gate School District. They have dissolved the partnership in the schools which formerly existed between them and Poplar, and have handed over the schools entirely to Poplar. The Whitechapel Guardians are to erect instead cottage schools at Grays, Essex, and they are to receive as their share of the Forest Gate Schools £15,586.

A clothing factory capable of employing 500 people is about to be built at Pitsea, South-East Coast, for Mr. J. W. Humm. The architect is Mr. Arthur T. A. Bowyer, F.I.S.A., of Leadenhall-street, E.C.

The will of Mr. Alfred Sacré, C.E., of the Westinghouse Brake and Yorkshire Engine Companies, who died in London in August, has been proved, the personalty having been sworn at £249,441.

At a full-dress soirée to be held in the Walker Art Gallery, Liverpool, on Wednesday, November 3, Sir Wyke Bayliss, P.R.B.A., will deliver an address on "Art—in the House of her Friends."

COMPETITIONS.

Bexhill Pier.—This competition appears to be a "limited" one—at any rate, by the number of particulars printed by those managing it. We have a post-card before us sent to one applicant, without name, address, or signature, which reads:—"Bexhill Pier.—The printed particulars had all been exhausted before your letter arrived. It is not proposed to print any more.—October 10, 1897." Curt, but hardly courteous!

Bury, Lancs.—The Art Gallery Committee of the Bury Corporation had 33 applicants for the conditions of the gallery competition, and have received a total of 23 designs; these have been hung for exhibition in the Town Hall. Mr. R. Knill Freeman, of Bolton, F.R.I.B.A., has been appointed as assessor.

Darlaston.—In a limited competition for a new brewery, the plans submitted by Messrs. Hickton and Farmer, of Walsall, have been placed first by the assessor, Mr. Wells, of Birmingham, and they have received instructions to proceed with the work.

Harrisburg Capitol.—The Harrisburg competition has taken a new turn. At the suit of Mr. James H. Warner, an architect, of Lancaster, Pa., the Capitol Commission has been restrained by a preliminary injunction from adopting any design for the proposed Legislative building except one of the eight designs selected and presented by the Board of Experts, as provided in the programme of competition. Mr. Warner's design is said to have been classed highest in merit by the Board of Experts, and he is, therefore, a very proper person.

New York.—The competition among New York architects for the commission for the new home of the National Academy of Design on Morningside Heights, New York City, will close on October 31, when all designs must be submitted. In this limited paid competition the following architects were invited to compete:—George B. Post, Henry J. Hardenburgh, Babb, Cook, and Willard, Carrere and Hastings, Edward Pearce Casey, and Ernest Flagg. Each competitor will receive 500dol., and the author of the design chosen will receive the commission. The jury will be composed of four Academicians, and three architects appointed by the competing architects—Charles F. McKim, of McKim, Mead, and White; John G. Howard; and Mr. Peabody, of Peabody and Stearns, of Boston.

Playing Cards.—The Court of Assistants of the Worshipful Company of Makers of Playing Cards have adjudicated upon the 174 designs sent in for the recent competition for prizes for the best designs for the backs of playing cards. The "H. D. Phillips Prize," of £5 5s., was awarded to Mr. Alfred Carpenter, 64, Charlotte-street, Fitzroy-square, W.; the second prize, of £3 3s., to Mr. S. B. Canton, 6, Beaumont-street, W.; and the third prize, of £2 2s., to Mr. Arthur G. Kinnear, of Trinity-road, Tulse-hill, S.W. One of these designs will be reproduced on the packs of cards to be presented to the members of the company and the guests present at the Master's and Wardens' inauguration banquet next month.

The Adderly Edge District Council has decided to apply to the Local Government Board for sanction to borrow £3,000 for the purpose of securing land and erecting sewage works.

The new workhouse infirmary, Newton Abbot, is being warmed and ventilated throughout by means of Shorland's patent Manchester stoves, with descending smoke-flues, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

In connection with the scheme of dock improvement at Liverpool, which has for some time engaged the attention of the Mersey Dock Board, it is stated that an outlay of something like four million sterling will be incurred. Amongst the works in contemplation is the modernising of the whole central docks, so as to enable them to be utilised at all states of the tide by vessels of the largest draught, and the provision of extended quay space. A new deep-water dock will probably be constructed on the Birkenhead side.

At a meeting of the Board of Directors of the Jersey New Waterworks Co., Ltd., on the 8th ult., it was unanimously decided to extend the present filter-beds, and to add a new pumping engine to the works. Instructions were given to the company's engineer, Mr. H. G. Foster Barham, to prepare the necessary plans and specifications for the carrying out of the same.

Proposed Agricultural School
Newport Shropshire.

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Engineering Notes.

Tidal Lock at Wandsworth.—A conference of the representatives of the various parishes on the Thames between Richmond and Wandsworth took place at the Hammersmith Town Hall on Friday to consider the report recently presented by Mr. Pritchard, C.E., recommending the construction of a new half-tidal lock at Wandsworth at a cost of £250,000. Mr. Chamberlin presided, and representatives were present from Hammersmith, Barnes, Mortlake, Fulham, Chiswick, Heston, and Isleworth. General approval was given to the proposal to put the lock below Putney; but the Fulham representatives thought that a full tidal instead of a half-tidal lock might be desirable, and those from Isleworth desired that the height of water retained by the half-tidal sluices should be increased, believing that otherwise they would not derive much benefit from the scheme. The matter was referred to a sub-committee to go fully into the question of details, and also as to how the financial side of the question should be dealt with. The London, Middlesex, and Surrey County Councils will probably be asked to contribute. The Wandsworth Board of Works, which has a scheme of its own, prepared by Messrs. Stevenson and Burstal, of Westminster, was not represented at the meeting. Messrs. Stevenson and Burstal's proposal is to maintain 3ft. greater depth of water than in the scheme proposed by Mr. Pritchard, thus keeping the water below the Richmond weir at practically the same level as that above the weir. The low-water level at Wandsworth would be raised 9ft. instead of 6ft. Mr. Pritchard, C.E., accompanied by the Fulham and Isleworth committee, made a visit of inspection to the alternative sites proposed for the lock, and promised to prepare a report as to the second site, that below the Wandle outfall, and also as to the relative cost of holding up another 3ft. of water.

On Wednesday night in last week, the members of the Hull branch of the National Association of Operative Plasterers held their annual dinner at the Queen's Hotel, Charlotte-street, Hull, when a large number of the members were present, including Mr. C. H. Clarke, president, and Mr. T. W. Walker, secretary. There were also present Councillor T. G. Hall, representing the Amalgamated Joiners' Society, and Mr. Tom Tighe, from the Hull Builders' Labourers' Society.

The contracts committee of Glasgow Corporation Gas Department have under consideration tenders for the supply of gas-piping for the city. For the pipes of a larger size a Philadelphia firm of good standing sent an offer, which was equal to £1 per ton less than of any British firm, the price including delivery in Glasgow. The committee are inclined to accept the offer, but have meantime delayed coming to a definite decision. By accepting the lowest British offer in preference to the American tender, the city would lose between £800 and £900.

The foundation-stone of the new workhouse hospital, which is being erected at Skircoats, Halifax, will be laid to-morrow (Saturday). The scheme will involve an expenditure of £120,000; but the guardians will carry out only a portion of the undertaking at present, making provision for some 420 beds, and this can be done at a cost of £95,000. On the completion of the whole plan, accommodation will be furnished for 600 beds. The plans of the new premises have been prepared by Mr. W. Clement Williams, architect, Halifax.

During the past two months the work of extending the Ripon and Wakefield Diocesan Training College, in the former city, has been actively in progress. The Education Department sanctioned the enlargement so as to accommodate 35 additional students; and the plans of the architect, Mr. J. Oldrid Scott, F.S.A., having been approved, the contract of Messrs. Ives and Co., of Shipley, was accepted, they having also the contract for the chapel and recreation-room. Messrs. Ives and Co. have undertaken to finish their part of the work by the 1st of July, 1898.

The foundation-stone of a new Wesleyan Chapel in Albany-road, Cardiff, was laid on Wednesday week. Designed to seat 950, and estimated when finally completed with tower to cost about £7,000, the structure will be in blue Forest stone, relieved with Bath stone dressings. The nave will be free from galleries, which will be placed over the transept. The pulpit will be on a level with the choir. In addition to the organ chamber, the adjuncts comprise vestries, parlour, and a classroom. The present contract is for £6,000. The architects are Messrs. J. P. Jones, Richards, and Budgen, and the contractors Messrs. Turner and Sons.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Bristol Society of Architects.—The session of this society was opened on Monday night by an inaugural address from the President, Mr. W. L. Bernard, F.R.I.B.A. The following is the programme for the session:—Nov. 8th, "Mediæval Bristol," by Col. Bramble; Dec. 13th, "A Visit to a Cistercian Monastery," by G. H. Oatley; Jan. 10th, "Decoration," by H. Dare Bryan; Feb. 14th, "Some Ancient Roman Buildings," by M. Aston Green; March 14th, "Architectural Photography," by G. C. Lawrence; April 11th, Annual Meeting; and May 9th, "Plumbing," by Geo. Tuckey.

Edinburgh Architectural Society.—The opening meeting of the second half of the session of the Edinburgh Architectural Society was held in Dowell's Rooms on Wednesday night in last week. Mr. J. A. Williamson, A.R.I.B.A., the president, gave his opening address, entitled, "Architecture of the Victorian Era," in which he sketched in outline the various phases through which architecture had passed during the Queen's reign, bringing the history down to the latest date. The net result, the lecturer pointed out, of the architectural activity of the last sixty years was that, compared with any former time, there was a greater wealth and variety of models to select from. But at present a stage of architectural license had been reached, in which Gothic and Classic forms and features were blended with surprising ingenuity, which the lecturer considered might defeat its own object, ending in reaction towards more archaic forms.

Sheffield Society of Architects and Surveyors.—The opening meeting of the winter session of this society was held at the School of Art, Arundel-street, on Tuesday night, the President (Mr. R. W. Fowler, F.S.I.) in the chair. The President, in his address, remarked that they were desirous of securing a habitation of their own; but, so far, owing to want of funds, that had been impossible to obtain; and following that the collecting together of a library of professional and scientific works, a commencement with which had already been made. The conditions of competition for school-board work were not at all satisfactory in Sheffield, and the Council appointed a deputation consisting of Messrs. Hadfield, Gibbs, and Innocent to discuss the matter with the Board. The result of their interview had been to obain an increase in the architects' fee from 6s. to 7s. 6d. per head of school accommodation, and some alteration in the conditions. The Corporation made formal recognition of the society by throwing open to the members of it practising in Sheffield a competition for a fire-brigade station, and also appointed its officers as assessors. The conditions of the competition, which were prepared by Mr. Innocent, and settled by him and Messrs. Gibbs and Hadfield, had been highly approved of by other kindred societies. On this subject he pointed out the advantage accruing to the Corporation from throwing open such competition to their body, instead of employing an architectural staff of their own, whose services could not always be in requisition, and who yet must necessarily be a permanent expense. They thus obtained the talents of practically the whole architectural profession in the neighbourhood, with very beneficial results, not only to themselves, but to the ratepayers at large. No large employer of labour would dream of carrying on his work on the principles that are urged as so necessary for some corporations. A railway company when making new lines invariably employed contractors, and on the high efficiency of that work depended the safety of thousands of lives in the future, and why a municipality should be unable to supervise piecework with the same satisfactory result as private individuals and other corporate bodies was a matter difficult of comprehension. He congratulated the society on the decision of the Wofinden trustees to throw open to competition amongst the whole of the members of that society the designs for the erection of a convalescent home and almshouses. After alluding to the lectures arranged for the forthcoming session he paid a tribute to the work of the honorary secretary, Mr. C. J. Innocent. The new goods station which the London and North-Western Railway Company were about to construct at the back of the Corn Exchange, the construction of the Sheffield District Railway, and the completion in the near future of the Great Central Railway's new line to London, could but have a favourable effect on its commerce. A vote of thanks was accorded to the president for his address, on the motion of Mr. E. Winder, jun., seconded by Mr. J. B. Mitchell-Withers, and supported by Mr. E. M. Gibbs.

CHIPS.

The Wesleyan Book Room authorities have just come into possession, owing to the death of a well-known Methodist lady, of the original portrait of Mrs. Susannah Wesley, the mother of John and Charles Wesley. The oil-painting is by a famous painter of the last century. It is deposited at the Conference Office in London.

The heritors of Coldingham, N.B., appointed a committee last week to inquire into the present seat accommodation of Coldingham church, and to consider the question of the preservation of the old Priory, with power to consult an architect, and with instructions to report to a subsequent meeting of heritors.

The laying of Newmarket-street, Ayr, with tar macadam has proved so successful that the town council have begun to lay Alloway-street with the same material—a combination of stone and tar with granite powdered over all.

With an increased supply of properties last week at the Mart, the returns showed a substantial improvement, the aggregate realisation being £51,705.

At Friday's meeting of Dean of Guild Court at Edinburgh, Mr. C. W. Murison received warrant to erect a lodging-house at King's Stables-road. The building, which will be six stories high, will fill up the whole corner of the Grassmarket and King's Stables-road. It will cost between £12,000 and £15,000, and there will be accommodation for about 500 beds in the establishment.

The Birmingham Guardians have consented to the making of alterations and additions at the block for male epileptics at the infirmary, at an expenditure of £1,600. They have also agreed to the outlay of £1,500 upon a new laundry and the laying of new water-mains in connection with the Marston Green Cottage Homes, and to the expenditure of £2,300 for the provision of a new dining-hall and storage accommodation at the workhouse.

At a meeting of the Erpingham Rural District Council held on Monday, the 11th inst., Mr. Charles D. Watts, of the firm of Watts and Carter, architects and surveyors, of Sheringham and Cromer, was appointed, out of a large number of applicants, surveyor to the above council for the popular seaside resort. It was at first proposed to include Mundesley and Overstrand; but it was ultimately decided to consider the addition to the surveyorship later.

The town council of Bury, Lancs, had a lively discussion last week anent the amended plans prepared by Mr. R. Neill, and submitted by a committee, for the market proposed to be erected in Moss-lane. Eventually, by a small majority, the plans were adopted, and Mr. Neill was instructed to prepare a specification and quantities.

An inquiry was held at the County Hall, Beverley, on Friday, by the Light Railway Commissioners, the Earl of Jersey and Colonel Boughey, concerning the application for an order authorising the erection of the Beverley and Beeford Light Railway. The line would be 12½ miles, and is estimated to cost £30,000.

An accident took place recently in the lofty building of the American Tract Society in New York, by which an elevator fell through 19 stories, killing the elevator attendant and the engineer of the building. This is the fourth elevator accident that has taken place in the building since it was finished.

At Portsmouth, under the shadow of the parish church, which was erected a few years since from Sir Arthur Blomfield's designs, mainly through the munificence of the late Mr. W. H. Smith, the foundation-stone of a parish institute was laid on Tuesday by Lady Esther Smith. The institute will cost £6,500.

The new Lyceum Theatre at Newport, Mon., was opened on the 8th inst. The building provides accommodation for 1,250 people, and the cost has been £20,000. Mr. W. R. Sprague, of London, designed the new interior, and Mr. Linton, of Newport, was the contractor.

The London County Council adopted, on Thursday, the recommendation by the General Purposes Committee of the appointment of Dr. F. Clowes to the office of chemist to the council, in the place of Mr. W. J. Dibdin, who lately resigned the post. The salary is £700 per annum. There were 42 applications for the appointment.

Mr. William Arnot, who has been engineer to Glasgow Corporation Electric Lighting Department since its inception six years ago, has intimated his resignation. It is understood that this step has been prompted by the recent discussions on the electrical affairs of the city.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

BUSINESS PREMISES · CAMBORNE · SILVANUS · TREVAIL · ARCHT

MANSION-HOUSE · DUMFRIESSHIRE · JOHN A. CAMPBELL · ARCHT.

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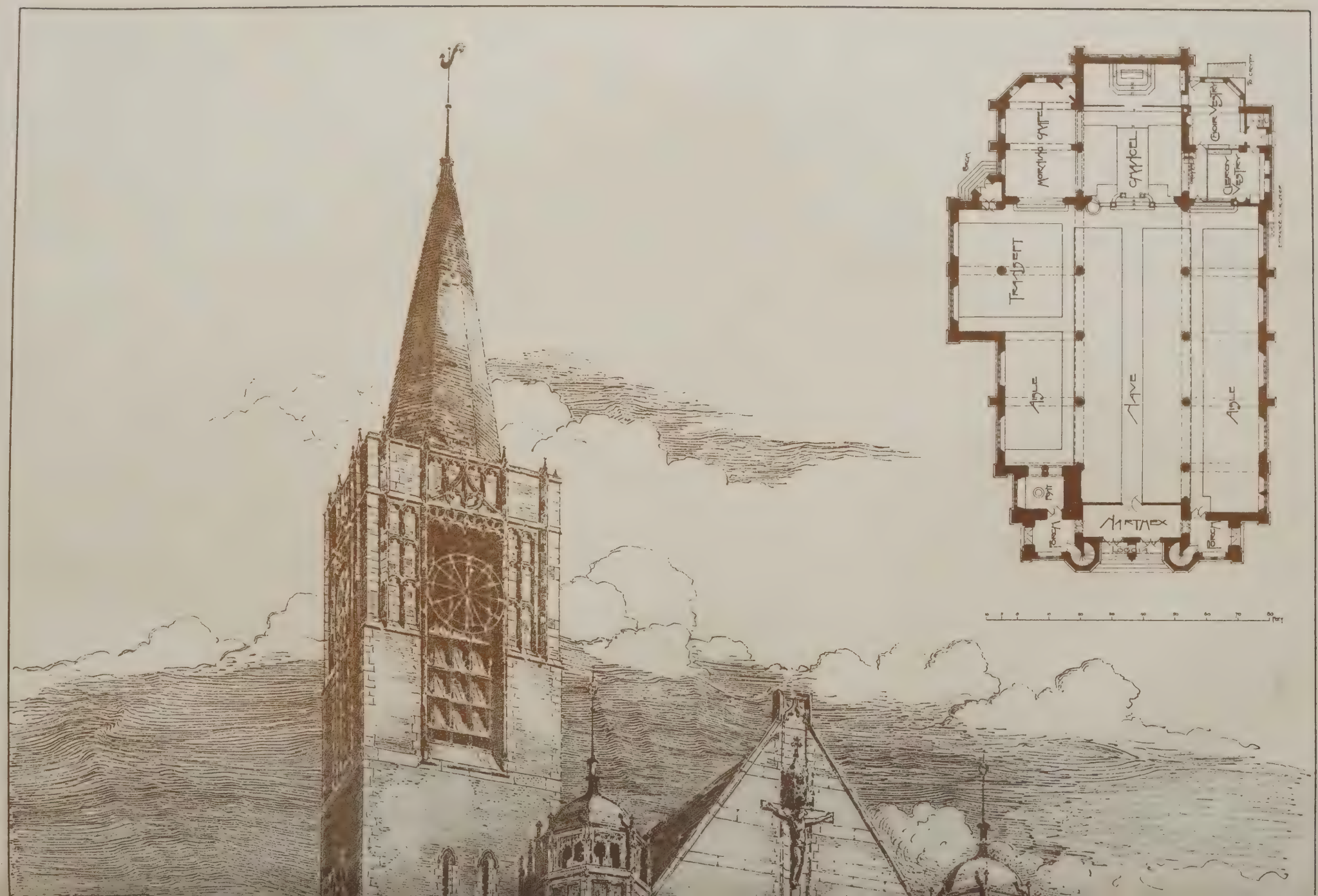
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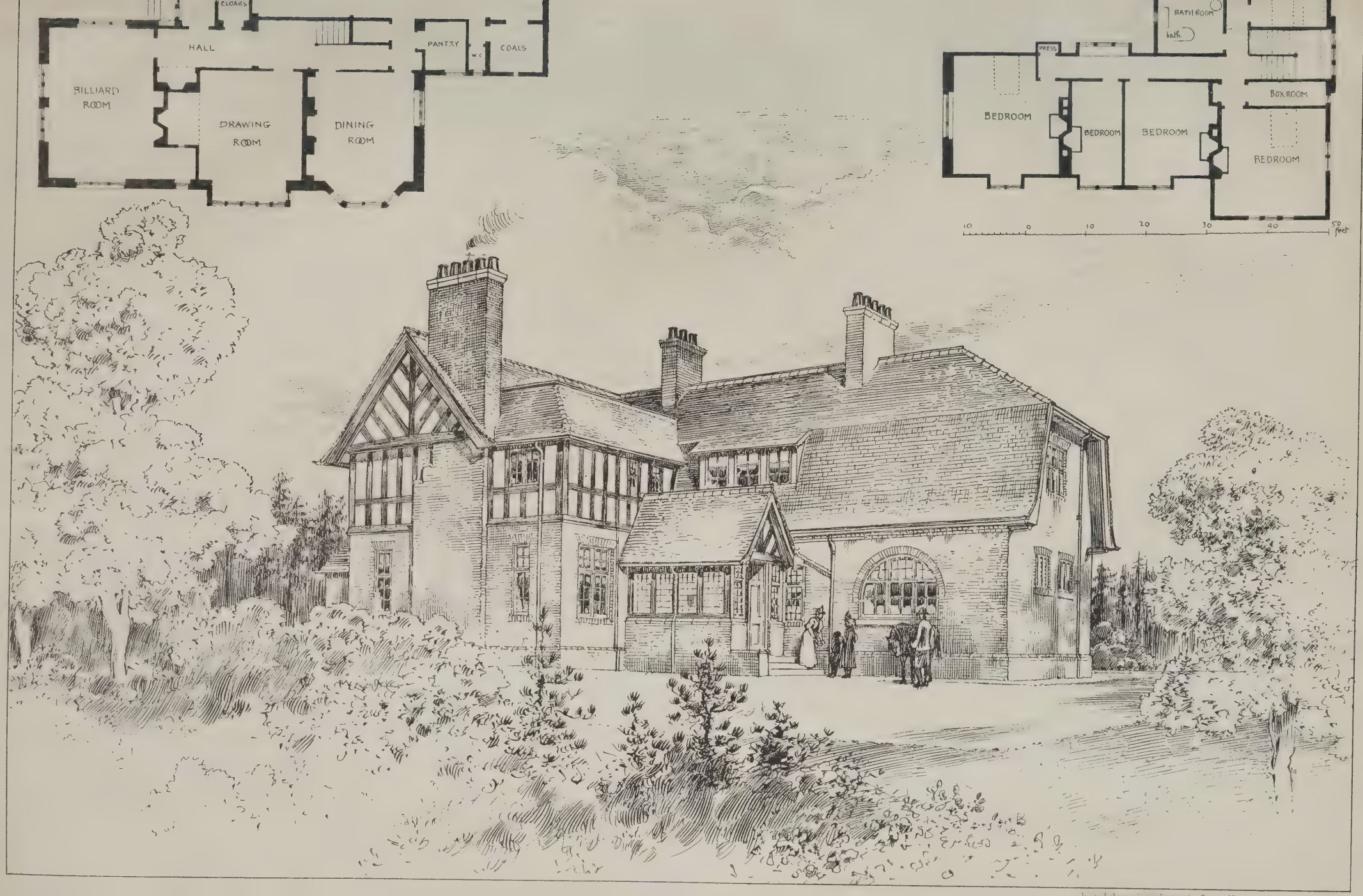

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RED HOUSE · MILLIKEN-PARK · C DAVIDSON · ARCHT

ROWTON HOUSE, NEWINGTON B

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S, S.E., Harry B. Measures, Archt.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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NOTICE.

Bound copies of Vol. LXXII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

RECEIVED.—B. G. O.—A. H.—W. S. S.—C. S. M. Co.—M. M. (Bradford).—G. F. A.

Correspondence.

RHOS-ON-SEA BUILDING ESTATE COMPETITION.

To the Editor of the BUILDING NEWS.

SIR,—Some weeks ago you published a letter for me in the BUILDING NEWS, asking for information as to the above, but no reply was forthcoming. Surely some of your readers can tell me what has been done in the matter!

The plans were sent in on the 10th of January, and I am told that the competition has been settled months. I have written to the agent of the proprietor, but can get no reply. Neither my plans nor the deposit paid for the particulars have been returned. There must, I think, have been other competitors. I shall be much obliged for any particulars.—I am, &c., J. L. S.

POOR MORTAR.

SIR,—In reply to "W. E. M.'s" query in your issue for 8th inst., as to why "air is in a pulverulent state when freely exposed to lime," kindly allow me to say that the printer made me say something entirely different to what I did say. This is not the fault of the compositor who set up my letter, but the illegibility of my caligraphy. To put the matter clearly before my readers, I had better state what I did say, and then quote what your compositor made me say. Thus, in my letter in your issue of Oct. 1, the compositor sets up my matter thus (*vide* middle of the 18th line): "The CO_2 is imbibed by the lime, for the air, when freely exposed thereto, is in a pulverulent state." This is utter nonsense, as they will see when they compare it with what I wrote in my letter, which is the following: "The CO_2 is imbibed by the lime from the air when freely exposed thereto in a pulverulent state."

Now as regards the "applying so many different names to the same substances may lead to confusion," I beg to differ, for this reason: Many chemical substances have a variety of names, and such substances are more commonly known to the public by the name given to them in drysaltery than by those given to them by the chemist. To give a few examples, green copperas, green vitriol, ferrous sulphate, sulphate of iron, and protosulphate of the oxide of iron are the various names by which the sulphate of the lower oxides of iron is known; but for every hundred persons who know what green copperas is not one person (I am only limiting the number for the sake of argument) would know what substance was meant if it were referred to under the last-mentioned name. So likewise with spirits of salts, killing salts, muriatic acid. These names are more familiar than the chemical name (hydrochloric acid, or chlorhydric acid, or chloride of hydrogen) by which this substance is known to the chemist. So again with bluestone, blue vitriol, blue copperas, the chemical name for which is sulphate of copper; white vitriol and white copperas are the names given to sulphate of zinc. Glauber's salt is the drysalter's name for sulphate of soda; salammoniac is chloride of ammonium, saleratus is carbonate of potash, oil of vitriol is sulphuric acid, and so on. Now, in my opinion, I find it is less confusing to state all the names by which a substance is known than to limit its designation to one or two names when it possesses half a dozen. My sole desire, when writing, is to make myself clearly understood by my readers, and if I succeed in doing this I am satisfied.—I am, &c., H. C. STANDAGE.

SIR,—In the interesting correspondence on this subject the kind of lime appear to have been ignored, as though chalk lime, stone lime, and lias lime should all be treated alike, which I take to be a mistake. The Romans slaked their lime, and kept it, or the mortar, a year at the least *covered* in pits. My reading is not comprehensive enough to enable me to know exactly the kind of lime they used; but I apprehend it was not hydraulic lias lime, but what we call a rich lime, such as chalk lime or stone lime, which latter is very slightly hydraulic. If so, the method they adopted is analogous to that of good builders of the present time, who, for particular small works, keep a stock of old mortar made of stone lime (take Dorking or Merstham as a standard), a rather rich lime, but very slightly hydraulic. This they slake on a sand bed, and afterwards cover with the sand for a day or two, then roughly incorporate the mixture and bank it into a heap, as compact and dense as possible, for use many months after. Mortar thus made and used, when re-tempered and beaten up before use, makes excellent work, and is much better than if used "hot." But it is not to be supposed that this is the equivalent of "laying it out exposed to the air," as one of your theoretical chemical writers infers. It is kept in a high-banked mass, often covered with sand. This appears to me to approach the Roman method of keeping in covered pits.

As to the supposed chemical action and reaction between the lime, the sand, and the carbonic acid of the air, none of the chemical theories lately advanced in your correspondents' letters appear to correspond with the actual experiments of the late Professor Lewis. He joined pieces of flint (in some cases with their clean natural fracture joints, and in others with polished surfaces) with slaked lime (chalk lime, stone lime, and lias lime), and freely exposed the pieces to the air, rain, and intermittent sunshine for years, and then examined the flint pieces both by naked eye and microscope, but could not find any change in the surfaces, nor could he detect any silication of the lime. And yet, if the theories above referred to are correct, he should have been able to do so.

Burnell on "Limes, Cements, and Mortars," 13th edition, p. 69, says: "The rich limes, inasmuch as they absorb the carbonic acid gas with difficulty, gain by being exposed for a longer period to the contact of the atmosphere. As far as such a proceeding is consistent with economy, it is advisable, then, to protract the operation of their manipulation as much as possible; *it is even advisable to work up large quantities of such mortar beforehand*, rendering it fit for use by a second manipulation."—I am, &c.,

F. J. N.

Intercommunication.

QUESTIONS.

[11809.]—**Fire Insurance.**—Is it *infra dig* for an architect to be an agent for a fire insurance co.? Is it unprofessional for one to specify that their new buildings are to be insured during erection in the office he represents? Do better class architects act as insurance agents or not?—FALCONER.

[11810.]—**Joists in Concrete.**—If, instead of plastering to a concrete ceiling, wood ceiling joists are used partly buried in the concrete and then lathed and plastered, will the ceiling joists become rotten?—F. KING.

[11811.]—**Cost of Draughtsmanship.**—Architects have the reputation of not being business men; but can any general practitioner say what is a fair percentage on the average annual outlay on works executed to put down for the cost of draughtsmen's salaries? How much of the architect's 5 per cent. goes in assistants' time occupied in drawing plans, details, &c.?—LONKY.

[11812.]—**Professional Charges.**—In laying out an irregularly shaped and uneven property of 3½ acres for building purposes, what should be the professional charges for (*a*) preparing estate plan and laying out? (*b*) Taking levels for and preparing plans, sections, and specifications for new roads, together with duplicate copies of same for contractor's use and for borough surveyor, and general superintendence of work? (*c*) Negotiating sales of building lots, with tracings in duplicate from estate plan for agreements to purchase, &c.?—S. H.

[11813.]—**Gauged Brick Arches.**—Would some kind reader inform me, with illustrations—if the Editor will permit—how to draw, set-out, and make the moulds for a camber gauged-brick arch—*i.e.*, one with a straight top, and only slightly curved or cambered intrados? The crux of the whole matter is to utilise the whole thickness of the brick at the top, so far as is consistent with equal thickness of bricks measured at right angle with a mean line along the middle of their length. I have read over and over again "Brickwork," by Walker, and "Brick-Cutting," by Hammond, both of Weales' series, published by Lockwoods; but they somewhat contradict each other. They both assume a knowledge in certain details and operations by the learner which they possess but do not impart, and the literal following of one of them would make the bricks next the skewbacks not only thinner in some cases and thicker in other cases than the others, but in one alternative would lead to making the mould for working the brick wider than the thickness of the brick to be manipulated.—A. HAMSON.

REPLIES.

[11794.]—**Parpoint Facing with Brick Lining.**—Thanks to Mr. Freeman for his reply; but to call the outside facing of stone "parpoint" is, I think, a corruption of the true term. I should be glad if Mr. F. would state his definition of the term "parpoint," as I believe it to be a term specially applicable to stones finished and intended to be seen on both faces—such as parapets above roofs, &c., and therefore without brick or even rubble lining. Through-stones in hollow walls are a means of conducting the damp from the outside facing to the inside lining.—GALLATOWN.

[11800.]—**Ink.**—The "glossiness" or wet appearance that is exhibited by some brands of ink is due to one or other of the following causes: either an excess of gum, dextrine, or glucose, with or without the addition of glycerine. The presence of the latter body in ink renders the ink a "copying ink"—that is, a facsimile copy can be obtained from the writing done with such an ink.—H. C. S.

[11804.]—**Building Construction.**—The architectural questions in the Honours exam. can generally be answered from a knowledge of Rickman's "English Gothic Architecture," or Parker's "Introduction to Gothic," and of Leed's "Orders" (Weale's Series). Instead of these, however, one might take Smith and Slater's "Classic Architecture," and T. Roger Smith's "Gothic and Renaissance" (5s. each, Sampson Low and Co.) The best work to study for the sanitary questions is undoubtedly the "R.E. Professional Papers for 1891" (Vol. XVII.), published by W. and J. Mackay and Co., 176, High-street, Chatham.—H. BUSBRIDGE.

[11807.]—**Bath and Sink Waste.**—The Cregeen gully and channel, as per list herewith, will do what is required in a cheap and efficient manner. Write us for particulars.—J. STIFF AND SONS, High-street, Lambeth.

Joseph Pitts, a painter, was being hoisted up outside the tower of St. Paul's Church, Blackburn, on Tuesday in a swing seat, in order to paint the woodwork at the top, when the rope broke, and he was precipitated to the flagged pavement. He sustained terrible injuries, from which he died a few hours afterwards at the infirmary.

Operations are in progress in the Station-square, Cambuslang, in connection with the erection of the Diamond Jubilee Fountain, presented to the village by Mr. Hugh Glen, builder, and the unveiling will take place to-day, Friday. The fountain is of polished granite, and the site is a conspicuous one, opposite the new Free Church.

An arcade is being constructed from Lord-street to West-street, Southport, at an estimated cost of £40,000. In the centre will be an octagon 48ft. across, and having a balcony. The arcade will be entirely covered in with glass, heated with hot water, provided with seats and ornamental foliage, and lighted by electricity. The work is being carried out by local contractors, from designs and under the supervision of Mr. Geo. E. Bolshaw, architect, Manchester Chambers, Lord-street, Southport, and at Crewe.

LEGAL INTELLIGENCE.

Failure of a Wrexham Architect. — John Ebenezer Lash, who resides at Mile End-terrace, Trefynant, Ruabon, and carried on business as an architect and surveyor at Temple-row, Wrexham, came up for his public examination, on Tuesday, at the local Bankruptcy Court. The gross liabilities were scheduled at £276 16s. 4d., expected to rank £266 15s. 8d., assets £34 16s. 10d., leaving a deficiency of £231 18s. 10d. He started business in 1876 without any capital, and in 1885 made an arrangement with his creditors. He then started again without capital. He did not think that any part of his insolvency was due to his personal extravagance. He had had a few betting transactions, but he did not think he had lost any money by them; he thought he was about quits.—The Official Receiver: You are very fortunate.—The examination was closed.

CHIPS.

The festival dinner of the Royal Institute of British Architects will be held at the Whitehall Rooms on the evening of Thursday, Dec. 2.

The first wing of the new Roman Catholic College at Blairs, near Aberdeen, was opened on Wednesday by Archbishop Macdonald, of Edinburgh.

St. James's Church, Piccadily, will be reopened, after repair, cleaning, and decoration, under the direction of Sir A. W. Blomfield, A.R.A., on Sunday next, the 17th, with the annual harvest festival.

The finance committee of the Islington Vestry have recommended that Islington shall subscribe £2,000 towards the £23,000 required for the preservation of Churchyard Bottom Wood, at Highgate, from the encroachments of the builder, the stipulation being that the remaining £21,000 is assured, and that the £2,000 be raised by loan, and not paid from the current rate.

The memorial statue to the late Mr. R. W. Dale, which has been placed in the Birmingham Corporation Art Gallery, was unveiled on Wednesday. The statue, which is of marble, and is life size, is the work of Mr. Onslow Ford, R.A.

Major Cardew, R.E., from the Board of Trade, held an inquiry at the Town Hall, Halifax, on Tuesday, in reference to an application by the corporation for sanction to borrow a sum of £9,300 for purposes connected with the electric tramway scheme. There was no opposition.

A thorough renovation of the large organ of St. Paul's Cathedral is in progress. Among other additions is that of a celestial organ in one of the alcoves of the dome, the connection with the large instrument being made by electricity.

A new vestry for the choir boys has been erected in the north cloister of Ely Cathedral. On the west wall is a tablet with the name of the mother of the donor, Canon Dickson, for very many years Precentor. The work has been carried out under the direction of Mr. J. Oldrid Scott, F.S.A., the architect to the Dean and Chapter.

A chancel screen has been added to All Saints Church, Finchley-road. The material is alabaster, highly polished. It is intended to be a memorial of the Queen's Diamond Jubilee, and a tablet to that effect is placed at the base of the screen. It was designed by Mr. E. White, F.R.I.B.A., and executed by Mr. Forsyth, of Finchley-road, Hampstead.

Mr. J. A. Campbell, M.P., has offered to subscribe £1,000 towards the restoration of Brechin Cathedral. Another gentleman has offered to subscribe a similar sum, and it is therefore considered likely that the restoration will be effected. It would only cost about £10,000, as the cathedral is but small and is well-preserved.

The foundation-stone of the new R. C. Cathedral at Loughrea was laid on Sunday. £20,000 will eventually be expended on the building, which has been designed by Mr. Byrne, of Suffolk-street, Dublin.

The partnership hitherto subsisting between Messrs. C. D. Swale and F. Mitchell, architects and surveyors, Leeds, under the style of Swale and Mitchell, has been dissolved.

The sub-committee of the sanitary committee appointed to inquire into the nuisance arising from the pollution of the River Avon and the New Cut by the discharge of the Bristol sewage have unanimously resolved to ask their committee to report to the Bristol Town Council that the best way of dealing with the evil is to carry the sewage into the Bristol Channel by the plan of extending their main sewers.

The memorial stone of a new high school for girls and boys at Keswick was laid on Wednesday week by Lord Muncaster. The cost of the school and hostel, to accommodate 80 scholars and 24 boarders, will be rather over £7,000.

WATER SUPPLY AND SANITARY MATTERS.

Rotherham.—Mr. G. W. Wilcocks, M.Inst.C.E., an inspector of the Local Government Board, held an inquiry recently into an application made by the Rotherham Town Council for sanction to borrow £55,269 for the purposes of sewerage and sewage disposal. The town clerk (Mr. H. H. Hickmott) mentioned that the population of the Rotherham borough was slightly over 50,000. The corporation decided to have constructed sewage disposal works, and they visited a large number of works in the country, ultimately coming to the conclusion that the one in operation at Wolverhampton was the best adapted for the district. They therefore engaged Mr. R. E. W. Berrington, the Wolverhampton engineer, whose plans and scheme they had adopted. A contract had been entered into for the purchase of 90a. 1r. 2p. of freehold land for £18,052 10s., as a site for the proposed works. Mr. Berrington produced plans and gave detailed particulars of the scheme. The sewage, after being collected and carried to the outfall works, would pass into tanks, the effluent going through two series of coal filters, and afterwards passing on to land, finally finding its way in a satisfactory condition as to purity into the river. The sludge would be treated and pressed, being available for farmers' use. Mr. Jennings, borough surveyor, was also examined.

Late on Saturday night, by a fire on the premises of Messrs. Warner and Sons, wood turners and timber merchants, of Canal-side, Worksop, damage estimated at £3,000 was done.

The reopening of the Free Methodist Church at Eighton Banks took place on Saturday, after partial rebuilding. The alterations have involved an expenditure of £600, and Mr. R. Stephenson, builder, Low Fell, and Mr. R. Bruce, joiner, Washington, were the contractors.

General Sir Redvers Buller laid, on Tuesday, the foundation-stone of the new church of Emmanuel, St. Thomas, near Exeter. Sir Redvers Buller has given the site for the new church. The building is to cost £9,000, is to be erected from designs by Mr. H. Brakspear, A.R.I.B.A., which were selected some time since in a competition in which an unusually large number of architects took part, will be in the style of the 16th-century Gothic, and will provide accommodation for 600 persons.

Professor Begas's design for a statue to be erected to Prince Bismarck in Berlin has been unanimously adopted by the committee concerned, and the order has been given to him. The Prince is in undress uniform and cloak, with his sword in his left hand. In front the pedestal is adorned with the figures of Atlas bearing the world, and of a smith forging a sword. Professor Begas wishes the statue to be erected near the fountain in front of the Reichstag, and as far from the building as possible.

At a private meeting of the Warrington Town Council, held on Monday night, Alderman J. E. Wright, J.P., architect, accepted an invitation to fill the office of mayor of the borough for the ensuing twelve months. This is, of course, subject to the approval of the new town council. Alderman Wright has been 15 years in the town council, and is a Conservative in politics. He is a chairman of the paving and sewerage committee, and also vice-chairman of the street improvement and lighting committee. He is the oldest in point of service of the members of the corporation who have not held the mayoralty.

Two ladies have offered to present to the Missions to Seamen a church for the use of seagoing men of the Port of London. The church, which is to be built in accordance with plans prepared by Sir Arthur W. Blomfield, A.R.A., and Sons, alongside the Missions to Seamen Institute in Poplar, with a covered way between, will be chiefly used for week-day services by sailors frequenting the Seamen's Institute.

An opera-house is about to be erected at Tunbridge Wells, from plans by Mr. John P. Briggs, of Arundel-street, Strand, W.C. The frontage is to Mount Pleasant-road; but the site is isolated on all sides, and the façades will be occupied by shops. The style is described as of the 12th century, with some Indian and Spanish features. The total seating accommodation will be for 1,500, and the stage will have an area of 40ft. by 60ft., with a proscenium opening 28ft. by 30ft.

The Wrexham rural district council opened at their last meeting ten tenders sent in for carrying out the Ruabon drainage works, there being a discrepancy of nearly £2,000 between the highest (which had no name attached) and the lowest, which was that of Mr. George Law, of Kidderminster. This, however, was so much higher than the estimate of the engineer (Mr. E. R. Martin, of Stourbridge), that the council, under the circumstances, declined to adopt any of the tenders at present. They appointed, however, Mr. T. E. W. Saint, of Tai Clawdd, as clerk of works for the scheme.

Our Office Table.

An exhibition of ancient and modern Mediæval art-metal work is to be held at the Royal Aquarium, Westminster, early next year, which promises to be of an interesting character. The Directors of the Royal Aquarium have placed the arrangements in the hands of a representative Council of Advice, consisting of leading art-metal designers and workers and architects, the chairman being Professor Banister Fletcher, F.R.I.B.A., J.P., D.C.L., and amongst the rest Mr. George Frampton, A.R.A.; Mr. J. Starkie Gardner; Mr. Ellis Marsland, hon. sec. of the Society of Architects; Mr. E. J. Kibblewhite, the Editor of the Building News; Mr. Maurice B. Adams, F.R.I.B.A.; Mr. Lewis F. Day, Mr. W. A. S. Benson, Mr. F. W. Ruck, Mr. Gilbert Wood, and others. The exhibition will be divided into a Loan and Exhibit and Trade sections. Competitions for workmen are being arranged, and prizes will be given. All particulars as to terms for floor-space, &c., can be had of Mr. Edgar S. Shrubsole, organiser of the exhibition, Royal Aquarium, Westminster, S.W.

"The Paris Charity Bazaar Fire and its Lessons" is the subject of the paper to be read by Mr. Edwin O. Sachs before the Architectural Association on Friday evening in next week, October 22. The paper will deal, not only with technical facts regarding the construction of the fatal building, and include particulars of the fire, but will be fully illustrated by views of the structure taken before and after the conflagration, copies of the contractor's drawings, and other details which Mr. Sachs has brought over from France. The policy of the architect in generally trying to oppose or avoid regulations governing buildings will be dealt with, and the policy of the architect in saving his clients a few pounds, and thereby incurring a moral responsibility of much of the annual loss of life will also be treated of. Among those who have been invited by the association to attend the meeting with a view of participating in the discussion of the subject are: Mr. Thomas Blashill, the architect to the L.C.C.; Mr. Roberts, of the L.C.C. Theatres Committee; Mr. William Archer, the critic, as representing the public; and several of the leading fire-brigade officers.

On Saturday night, before a crowded audience at the Passmore Edwards Settlement, Tavistock-place, St. Pancras, Mrs. Humphry Ward delivered the opening lecture of the session in connection with that institution. The settlement, towards the cost of which Mr. Passmore Edwards gave £15,000 and the Duke of Bedford £1,500, in addition to the grant by his Grace of the use of two large gardens at a nominal yearly rent of £10, embraces a large lecture and concert-hall, accommodating 450 persons, class-rooms, gymnasia, library, and entertaining-rooms, and rooms for a warden and 18 residents. The buildings have been erected by Messrs Higgs and Hill, of Crown Works, South Lambeth, from plans by Messrs. Smith and Brewer, of Theobald's-road, W., and were illustrated in the Building News for July 3, 1896. It was in the large lecture-hall that Mrs. Ward gave her address. Mr. R. G. Tatton, warden of the settlement, presided. The settlement is intended to continue and develop on extended lines the work that has hitherto been conducted at University Hall and Marchmont Hall during the last six years. Its aim is to be a centre of education, recreation, and social life for the district, such as Toynbee Hall and other settlements are supplying in different quarters of London.

In connection with the Cambridge University extension movement, a course of ten lectures on "The History of Italian Painting," by Mr. G. Percival Gaskell, R.B.A., with magic-lantern illustrations, was commenced on Tuesday afternoon at the All Saints' Parish Room, Alma Vale-road, Bristol. The lecturer dealt with the beginning of Italian painting and the decay of Roman art with the decline of the Roman Empire. The rigidity and lifelessness of the Byzantine style was emphasised, several illustrations of Byzantine mosaic decorations and some of the National Gallery pictures, including "Margaritone of Arezzo," being given. Giovanni Cimabue was spoken of as the first of the great Florentine painters, as he introduced greater life and feeling, and made the first great break from Byzantine tradition. Mr. Gaskell next referred to Duccio

Buoninsigna) of Siena, who was contemporaneous with Giotto (di Bondone). Whilst speaking of the latter, he gave a number of illustrations of his work, also of his frescoes at Florence, Padua, and Assisi. Under Giotto, art made a greater advance than under any single painter. The subjects of the remaining nine lectures are as under:—(2) Italian painters of the 14th century; (3) Florentine painters of the 15th century; (4) same, continued; (5) the Schools of Umbria and Ferrara-Bologna; (6) the Paduan and Early Venetian Schools; (7) Leonardo and Michael Angelo; (8) Raphael, Andrea del Santo, and Correggio; (9) the Venetian School of the 16th century; and (10) the Decline.

The Bristol Town Council discussed for some three hours on Thursday the report of the Lunatic Asylum Committee, who proposed important extensions at the institution at Stapleton at a cost of about £45,000. Exception was taken to the report by some members of the council on the ground that, before embarking on so large an expenditure, considerably in excess of a former estimate, the committee should have called in a professional architect instead of intrusting such work as that to a clerk of works. It was replied that Mr. Withycombe, who was in the permanent employ of the corporation, was fully competent to fill both offices of architect and clerk of works, and that to employ an architect, as urged by the Bristol Society of Architects, would involve an additional £2,000. The members were not at all satisfied, and a proposal was made to refer the matter back to the committee. On a division, this was rejected by 24 to 20 votes, and the report was afterwards adopted, though a member intimated his intention to move the rescision of the resolution at a future meeting of the council.

Judging from the discussion that took place at the last meeting of the Mold Urban District Council relative to the appointment of a surveyor, the rule "Wales for the Welsh" is strictly applied in the northern border counties of the Principality, and the antipathy to Englishmen as office-holders is only exceeded by the rivalry between North and South Wales. At the meeting referred to, the clerk stated there had been received 29 applications from men living in all parts of England and Wales. Among the local names applying were those of Messrs. J. Meirion Williams, Broncoed; Richard Edwards, Cunliffe-street; and J. E. Davies, High-street. There was a statement of qualifications with each, together with two or three testimonials, the latter of which were not read. Mr. Marston proposed that all the applications should be accepted—that was, that the application should be in lieu of proposer or seconder, and that they should be in a position to vote direct on the application. After some conversation as to whether all the applicants had complied with the terms of the advertisement, this was agreed to. In the course of a discussion on the advisability of reading the testimonials in committee, Mr. Marston said they might as well acknowledge the truth. Probably most of them would vote for a local man. No one from South Wales, Stoke-on-Trent, Leeds, or London had the slightest chance, so let them decide there and then, even if it took them two or three hours to read the applications. This was seconded, but lost on a division, and eventually it was agreed to meet on a later date to make the selection. If these admissions are to be accepted, it seems waste of time for any but a Flintshire man to send in letters, and the advertisement inviting applications ought frankly to state: "None but natives need apply."

The Improvement Committee of the London County Council, in a report submitted on Tuesday, called attention to the powers conferred on the council by an Act obtained in the present year. Three improvements are thus mentioned, the estimated gross cost being £841,990, and the net cost £839,490. One improvement consists of the northern approach to the Tower Bridge, another the widening of the Strand at Holywell-street, and the third that which is connected with Bozier's-court. The Holywell-street undertaking shows no reduction on the gross cost, which is £569,130. The same is the case with regard to Bozier's-court, which is estimated to cost £53,860. The gross cost of the Tower Bridge approach is estimated at £219,000, and there is a slight recoupment, but no "betterment." Under the Council's General Powers Act of this year, there is provision for four other improvements, the gross cost being £430,280, to be reduced to £383,880 by the sale of surplus land. The council will be asked at their meeting next week to take steps to put their powers in operation for the carrying out of these projects.

The Salford Town Council at their last meeting rescinded the resolution passed by them on the 1st October, 1896, adopting plans for the erection of artisans' dwellings on Block 7 of the Housing of the Working Classes Scheme. They further authorised the preparation of new plans by a professional architect for the erection of artisans' dwellings. Mr. Huddart explained that the borough engineer had estimated that the dwellings would cost £10,527. The committee had just before completed a block on the opposite side of the street at a cost of £10,221. After the council had approved the scheme the committee advertised for tenders, and the estimates received were £15,985, £15,290, £16,400, £15,600, and £15,965. The committee then thought they could do no less than ask the council to rescind its former resolution and apply for more money. The borough engineer had given the reasons why the mistake had arisen; he said an erroneous calculation had been made; he had, in fact, estimated the cost on the same basis as that of the other property they had built in Queen-street, but since the latter were built builders' prices had gone up 20 per cent. The cost of these dwellings, it appeared, would be at the exorbitant rate of £280 for a two-room tenement. The lowest estimate was £15,200, and they had to add amounts for contingencies, the clerk of works' fee, the cost of preparing the estimate, and the paving, and the amount would come to about £17,000. He suggested that they should let the engineer in future do engineering work, and architects should be employed to do building work.

A Board of Trade Report was issued as a Parliamentary paper on Monday, showing the proceeding of the department in respect to tramway, gas, and water orders during the past session. The applications for provisional orders under the Tramways Act of 1870 were nineteen. In two instances the applications had reference to the use of electrical or mechanical power on existing tramways. With these exceptions, powers were sought for the construction of new lines. The aggregate length of such tramways was nearly 29 miles of double line, and above 43 miles of single line, the estimated cost of construction for the whole being £434,000. Four of the schemes related to new systems, and thirteen were extensions of existing lines. Four applications were not proceeded with by the promoters, for want of the consent of the local and road authorities. In a fifth case the application was withdrawn by the promoters, and a sixth could not be proceeded with owing to a non-compliance with the Act. In the remaining cases, thirteen in number, provisional orders were made by the Board of Trade, and were afterwards confirmed by Parliament.

The tower of St. Michael's Church, St. Alban's, which Lord Grimthorpe has just rebuilt, was reopened on Sunday.

St. John's Parish Church, Constitution-street, Leith, is about to be reopened, after the substitution of chair seats with sloping backs for the high-backed pews, the opening of fresh windows, improvement of ventilation, and internal decoration. Three windows have been filled with stained glass, the artists being Messrs. Dickson and Walker, of Edinburgh.

The annual exhibition of the Hull Society of Artists is now open, and is strong in the work in oils of ladies. Among the water-colours, the landscapes of Mr. John Somerscales, Mr. F. W. Booty, and Mr. T. B. Hardy may be named. Designs for wall-papers are shown by Mr. C. G. Lowther and Mr. M. S. Barnard, and Messrs. Harry Hems and Sons, of Exeter, lend a large collection of 15th-Century carvings in English oak, taken from various churches in Devonshire.

The Conway and Kelwyn Water Board, at their last meeting, received a letter from Mr. Bugbird, the contractor for the works, declining to accept the offer of the board in final settlement of his claim, and expressing his willingness to refer the matter to arbitration. The board had offered £1,280 on a claim of £1,764. The engineer (Mr. T. B. Farrington, C.E.) said there were about a dozen items in dispute between himself and the contractor, only three or four of which were of any magnitude. He suggested that a deed of reference should be drawn up, embodying the disputed items, and submitted to some professional gentleman to be mutually agreed upon. It was eventually agreed to refer the disputed items, representing £638 14s. 7d., to Mr. Thomas Jones, C.E.

MEETINGS FOR THE ENSUING WEEK.

Monday.—Liverpool Architectural Society. "Compensations," by J. H. McGovern. 6 p.m.

Wednesday.—Edinburgh Architectural Society. Lecture by W. H. Mellon. 8 p.m.

Friday.—Architectural Association. "Practical Lessons from the Great Paris Fire," by Edwin O. Sachs. 7.30 p.m.

THE ARCHITECTURAL ASSOCIATION.

OCTOBER 22nd, ORDINARY GENERAL MEETING, 9, Conduit-street, W., 7.30 p.m. Paper by Mr. E. O. SACHS, "PRACTICAL LESSONS FROM THE PARIS BAZAAR FIRE."

E. HOWLEY SIM, G. B. CARVILL, } Hon. Secs.

CHIPS.

The inaugural meeting of the session 1897-98 of the Surveyors' Institution will be held at the Medical Examination Hall, Savoy-street, Victoria Embankment, on Monday, November 8, when the president, Mr. Christopher Oakley, will deliver an opening address. The chair will be taken at 8 p.m.

The Streets Committee of the Darlington Town Council having considered the plans sent in for carrying out the High-row improvement, came to the decision that the plan marked "Labour Omnia Vincia" was the best scheme submitted. The report and recommendation were adopted by the town council at their last meeting, and on opening the accompanying envelope the author proved to be Mr. A. W. Roberts, 9, St. John's-crescent, Darlington.

The urban district council of Menai Bridge have decided to provide a pier, and to offer a premium for the most suitable design.

Reporting to the Scarborough Corporation, Mr. J. E. Everett, the resident engineer for the construction of the road round the Scarborough Castle Hill, states that the scarping of the cliff at the north-east corner has been practically finished. The sea wall is being pushed forward at the eastern end. A plan for the construction of an apron to the sea wall in the North Bay, at an estimated cost of £765 has been approved.

The Darlington Rural District Council have appointed Mr. John Robinson as highway surveyor in succession to his father, lately deceased, Mr. William Robinson, who had held office over 30 years, and who was in turn the son of John Robinson, appointed over 70 years ago to superintend the main roads between Stockton and Barnard Castle, and also contractor for keeping in repair the county bridges and bridge roads.

The first public distribution of medals, prizes, and certificates to students at the Wandsworth Technical Institute took place on Monday night in the Town Hall. There are in daily attendance at the classes 378 students, 94 being young women, and the governing body are proud of the fact that the silver medal for brickwork, offered to the whole country by the City and Guilds of London Institute, was carried off by Mr. A. W. Stokes, one of the Wandsworth students; while the bronze medal for carpentry, offered to national competition, fell to the lot of Mr. H. Smith, also one of the students. After the distribution by Dr. Garnett, Mr. W. T. A. Emtage, the principal of the institute, read his report, which reviewed the plan pursued in the several classes.

Owing to the extensive tourist traffic, the line between Skegness and Firsby (where the Skegness branch joins the East Lincolnshire line) is to be doubled by the Great Northern Railway Company, the estimated cost being £30,000.

The stone bridge which has been erected over the river Conway at Talycafn, and which will supersede the ancient ferry, was on Saturday opened by the Mayor of Conway. The contractor was Mr. Thorne, London, Mr. Dawson supplying the designs.

The opening of the new Workmen's Institute at Westbury-on-Trym took place on Friday. The architect was Mr. W. L. Bernard, and the contractor Mr. E. Walters.

The Todmorden Town Council are applying to the Local Government Board for sanction to borrow £4,150 for purposes of public walks and pleasure grounds on the Stile Estate, and £6,500 for the purchase of premises opposite Waterside Mill for purposes of a depot, fire-engine station, wharf, stables, &c.

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LIST OF COMPETITIONS OPEN.

Pickering & Kirbymoorside—Gravitation Water-Supply Scheme	No Premium	Robert Kitching, Clerk to Pickering R.D.C., Pickering	Oct. 16
Colne—Technical School, Free Library, and Public Hall (£5,500 limit)	£50, £35	Alfred Varley, Town Clerk, Town Hall, Colne, Lancs	„ 20
Wolverhampton—Free Library (selected Architects)		The Town Clerk, Wolverhampton	„ 28
Eastcote and Northwood, near Ruislip—Sewerage Scheme	£40 for Combined Scheme, £15 for Eastcote, and £25 for Northwood.	C. Woodbridge, Clerk, R.D.C., 33, High-street, Uxbridge	„ 30
Byfleet—Village Hall and Workmen's Club (£1,500 limit)	25 Guineas	F. C. Stoop, Hon. Sec., Albany House, Byfleet, Surrey	Nov. 13
Southend—St. Alban's District Church	No premium offered; no Assessor named	Rev. E. C. Kimber, Avenue-terrace, Southend-on-Sea	„ 20
Wells City—Public Hall	£25, £15, £10	Reginald L. Foster, City Clerk, 1, Cathedral-green, Wells, Somerset	„ 30
Mexico—Legislature Palace (1,500,000dol. limit)	15,000dol. Mex.	Secretary Public Works, Mexico City	„ 30
Cardiff—Town Hall and Law Courts (A. Waterhouse, R.A., Assessor—£200,000 limit)	£500 (merged), £300, £200	J. L. Wheatley, Town Clerk, Town Hall, Cardiff	Dec. 4
Nottingham—Laying-out and Planting Basford New Cemetery.	£100, £50	Samuel G. Johnson, Town Clerk, Nottingham	„ 15
Nottingham—Designs for Basford Cemetery Buildings: Chapels, Crematorium, Lodges, &c.	£100, £50	Samuel G. Johnson, Town Clerk, Nottingham	„ 15
Carlton, Victoria—Children's Hospital	£100, £50, £25	J. Nicholson, Hon. Sec., Pelham-street, Carlton, Australia	(1898) Jan. 30
New York—Sun Dial (Plaster Model)	500dol., 250dol.	Sec. National Sculpture Soc., 215, West 57th-street, New York	(1898) Feb. 28
Newcastle-on-Tyne—New Infirmary (local Architects)	(No first) £150, £100, £50	Secretary Building Committee, Newcastle	(1898) Mar. 1
Brighton—Artisans' Dwellings (local Architects only)	£75, £25	F. J. Tillstone, Town Clerk, Brighton	—
Boscombe—Hospital Enlargement, Shelley-road		J. Pratt, Assistant Sec., 126, Christchurch-road, Boscombe	—
Carlisle—Board School (530 places)	£20, £10	S. Cartmell, Clerk, 27, Lowther-street, Carlisle	—
Tottenham—School Board Offices		J. F. Adams, Clerk, School Board Offices, Tottenham, N.	—
Bexhill-on-Sea—Promenade Pier and Garden		Secretary, Pier Co., 7, Sackvill-road, Bexhill	—
Blackburn—R.C. Infant School, Dean-street	(No first) £5	The Rector, 48, Islington, Blackburn	—
Lichfield—Nursery Home and Invalids' Kitchen	£10, £5	R. R. Redmayne, Secretary, 22, Dam-street, Lichfield	—
Dukinfield—Town Hall (£7,000 limit)	£40, £20	Samuel Hague, Surveyor U.D.C., King-street, Dukinfield	—

LIST OF TENDERS OPEN.

BUILDINGS.

Buckfastleigh—Additions to Farm Buildings at Torr Dean, and Additions to Stables at Bigadon House		J. Fleming, 9, Biliter-square, London, E.C.	Oct. 16
Silsden—Twelve Houses	Co-operative Society	R. P. Holdsworth, Secretary, 1, St. John-street, Silsden	„ 16
Londonderry—House, Upper Violet-street		Wm. Barker, Architect, Richmond-street, Londonderry	„ 16
Callan—Fifty-Eight Labourers' Cottages	Guardians	John F. Shelly, Clerk, Board Room, Callan	„ 16
Gorleston—Mission Buildings, High-street		S. Rivett, M.S.A., 5, South Quay, Great Yarmouth	„ 16
Knottingley—Additions to The Croft		Willie Wrigley, Architect, 6, Westgate, Wakefield	„ 16
Warrenpoint, Maguiresbridge, Crumlim, and Ballinderry—Station-Masters' Houses	G.N. Railway of Ireland	T. Morrison, Secretary, Amiens-street Terminus, Dublin	„ 18
Bradford—Reinstating Hill Crest Oil Works, Laisterdyke	Wm. Laing and Co.	Empsall and Clarkson, Architects, 7, Exchange, Bradford	„ 18
Elgin—Additions to South View House		C. C. Doig, Architect, Elgin	„ 18
Morecambe—Three Cottages	Misses Clayton	J. Marshall, Architect, Back-crescent, Morecambe	„ 18
Old Trafford—Refuse Destructor	Stretford Urban District Council	John Bowden, Architect, 14, Ridgefield, Manchester	„ 18
Leeds—Wards for Imbeciles, the Workhouse	Guardians	J. Mitchell Bottomley, 46, Albion-street, Leeds	„ 18
Bradford—Nineteen Houses, Cornwall-road		Milnes and France, Architects, Bradford	„ 18
Morecambe—Nine Houses and Four Shops, Moss Park Estate	Mr. T. Baxter	J. Marshall, Architect, Back-crescent, Morecambe	„ 18
Hull—Dormitories and Mortuary, Workhouse	Board of Guardians	R. H. Winter, Clerk, St. Mary's Chambers, Lowgate, Hull	„ 18
Bradford—Baths, &c., at Wapping-road School	School Board	C. H. Hargreaves, Architect, Exchange-buildings, Bradford	„ 18
Craigellachie—Additions to Hotel		Reid and Wittet, Architects, Elgin	„ 18
Raunds—Factory	St. Crispin's Productive Society	Chas. Groom, Secretary, Raunds	„ 18
Notting Hill—Nurses' Home	St. Marylebone Board of Guardians	Hy. T. Dudman, Clerk, Guardians' Offices, Northumberland-st., W.	„ 18
Morecambe—Shops, Warehouses, &c., Regent-road	W. C. Farrar	J. Marshall, Architect, Back-crescent, Morecambe	„ 18
St. George—Girls' School (for 420), also Enlargement to present School at Summerhill	School Board	F. Bligh Bond, F.R.I.B.A., 51, Corn-street, Bristol	„ 19
Sketty—New Gallery and Reseating at Eng. Cong. Chapel		D. Davies, 2, Greenfield-terrace, Sketty	„ 19
Barrow—Additions to Caretaker's House, Barrow Island School	School Board	W. Hutchinson, Clerk, Barrow-in-Furness	„ 19
Kingston-on-Thames—Alterations to Baths	Town Council	H. A. Winser, Town Clerk, Kingston-on-Thames	„ 19
Alnwick—Additions to Training School		R. R. Templeley, Clerk of Works, Alnwick Castle	„ 19
Barking—Public Baths	Urban District Council	E. H. Lister, Clerk, Public Offices, Barking	„ 19
Goole—Alterations to Market Hall	Urban District Council	Geo. England, Clerk, Goole	„ 19
Morecambe—Additions at 9, The Crescent		J. Parkinson, Architect, 67, Church-street, Lancaster	„ 19
Thornton Heath—Boundary Wall at Cottage Homes, Mayday-rd.	Guardians of Croydon Union	Frederick West, Surveyor, 23, Coombe-road, Croydon	„ 19
Coventry—Additions to Red-lane Board Schools	School Board	G. and I. Steane, Architects, 22, Little Park-street, Coventry	„ 20
Londonderry—Presbyterian Lecture Hall		Wm. Barker, Architect, Richmond-street, Londonderry	„ 20
Knutsford—Piggeries at Workhouse	Guardians of Bucklow Union	George Leigh, Clerk, Union Offices, Knutsford	„ 20
Morecambe—Concert Pavilion on Pier Extension	Pier Co.	E. Hill, Secretary, Morecambe	„ 20
Ballyclare—House and Stables		T. H. Jordan, 31, Garfield-street, Belfast	„ 20
Aberdeen—Public School at Kittybrewster	School Board	Thomas Hector, Clerk, 31, King-street, Aberdeen	„ 20
Purston—Two Houses and Shops	H. Palfryman, Featherstone	Garside and Keyworth, Architects, Pontefract	„ 20
Morley—Public Baths, Fountain-street	Corporation	Holtom and Fox, Architects, Westgate, Dewsbury	„ 20
Coventry—Additions to Red-lane Board Schools	School Board	G. and I. Steane, Architects, 22, Little Park-street, Coventry	„ 20
Pontnewydd—Renovating Richmond-road Baptist Chapel		James Russell, Commercial-street, Pontnewydd	„ 20
Mumbles—Pier Refreshment Rooms and House	Mumbles Railway and Pier Co.	E. A. Watkins, Secretary, 2, Rutland-street, Swansea	„ 21
Winchcombe—Alterations to Three Cottages, Gloucester-street	Loyal Sudeley Lodge of Oddfellows	Conrad Hall, Winchcombe	„ 21
Kingston-on-Thames—Victoria Hospital Buildings		Town Clerk Office, Clattern House, Kingston-upon-Thames	„ 21
Belfast—City Hall	Corporation	Sir Samuel Black, Town Clerk, Belfast	„ 21
Preston—Sanatorium, Royal Cross School		Sames and Green, Architects, 65, Northgate, Blackburn	„ 21
Eastbourne—Model Common Lodging-House	Sanitary Committee	W. Chapman Field, Borough Architect, Town Hall, Eastbourne	„ 22
Winchfield—Cottage Home	Hartley Wintney Board of Guardians	F. S. Chandler, Clerk, Odiham, Hants	„ 22
Great Yarmouth—House, Gordon-road, Southtown	J. L. Hunt	C. G. Baker, Architect, Town Hall Chambers, Yarmouth	„ 22
Kennettmouth—Distillery, Houses, and Cottages		C. C. Doig, Architect, Elgin	„ 22
Lowestoft—Batteries and Drill-Shed	Royal Navy Reserve	Director of Works, Admiralty, Northumberland-avenue, W.C.	„ 22
West Mersea—Schools for 365 Children	School Board	J. W. Start, F.S.I., Architect, Colchester	„ 22
Manchester—Offices, Workshops, &c., Hydraulic Pumping Station	Waterworks Committee	The Secretary, Waterworks Offices, Town Hall, Manchester	„ 25
Purton and Suckley—Cottages at Collin's-lane Crossing, near Purton, Gloucestershire, and Suckley, Worcestershire	Great Western Railway Co.	G. K. Mills, Secretary, Paddington Station, W.	„ 26
Featherstone—Villa	Dr. Stevens	Garside and Kegworth, Architects, Roper-gate, Pontefract	„ 26
New Bilton—Stores at New Bilton	Rugby Co-operative Society	Geo Adams, Manager, 45, Chapel-street, Rugby	„ 26
Westbury—Cottage near Grange Court	Great Western Railway Co.	G. K. Mills, Secretary, Paddington Station, London	„ 26
Kendal—R.C. Schools, Gillingate		J. Stalker, M.S.A., Kendal	„ 26
Douglas, I.M.—Murray's-road School (1,000 places)	School Committee	T. R. Lewin, Clerk, Douglas, Isle of Man	„ 26
Windsor—New Passenger Station	Great Western Railway Co.	G. K. Mills, Secretary Paddington Station, W.	„ 26
Dagenham—Ward at Smallpox Hospital	West Ham Corporation	F. E. Hilleary, Town Clerk, Stratford, E.	„ 26
Hampstead—Enlargement and Alterations, Fire Brigade Station	London County Council	C. J. Stewart, Clerk, Spring-gardens, S.W.	„ 26
Leeds—Public Baths, Meanwood-road	Baths Committee	Walter Hanstock, Architect, Branch-road, Batley	„ 26
Presteign—County Intermediate School		H. Teather, Architect, Andrew's Buildings, Queen-street, Cardiff	„ 28
Birmingham—Dining-hall and Stores at Workhouse	Guardians	W. H. Ward, Architect, Paradise-street, Birmingham	„ 28
Windermere—Residence	Dr. Mason	Robert Walker, F.R.I.B.A., Windermere	„ 28
Surbiton—Branch Post and Sorting Office	H.M. Office of Works	Hon. Reginald B. Brett, C.B., Secretary, 12, Whitehall-place, S.W.	„ 28
Shrewsbury—Engine and Boiler Houses and Chimney Shaft at Coleham	Corporation	Henry C. Clarke, Town Clerk, Guildhall, Shrewsbury	„ 29
Horrabridge—Alterations to Board School		Wm. Squire, M.S.A., Tavistock	„ 30
Christchurch—Addition to Workhouse, Fairmile	Guardians	A. Druitt, Clerk, Christchurch	„ 30
Falmouth Workhouse Infirmary	Board of Guardians	J. H. Genn, Clerk, Falmouth	„ 30
Manorhamilton—Repairs to Courthouse		E. O'N. Clarke, County Surveyor, Carrick-on-Shannon	Nov. 1
Barry Dock—Offices	Barry Railway Company	W. Mein, Secretary, Barry Railway Company, Barry Dock	„ 1
Barnes, S.W.—Six Shops and Houses, Rocks-lane		F. and W. Stockers, Surveyors, 90, Queen-street, Cheapside, E.C.	„ 2
Chelsea—Meat Store and Larder at Cale-street Infirmary	Board of Guardians	Wm. Muller, Clerk, 250, King-street, Chelsea	„ 2
Farnham—Isolation Hospital		E. Crundwell, Clerk, South-street, Farnham	„ 3
Bedford—Post Office	H.M. Office of Works	Hon. Reginald B. Brett, C.B., Secretary, 12, Whitehall-place, S.W.	„ 5

THE BUILDING NEWS
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AGENCY *VERSUS* ART.

If it is agreed that a work of architecture is the product of a number of trades, the work of the architect should be to see that these trades were properly carried out in the building, and he ought to be sufficient master of each to know when they were performed with skill and completeness. Such a knowledge no doubt implies a formidable task of preparation and study, often beyond the capacities of young and inexperienced men, and yet nothing less than this is the opinion of the leading members of the profession. The ideal of those who maintain that the architect ought to be a master craftsman is very much higher than that entertained by the ordinary professional man. The latter looks upon the various craftsmen as so many passive workers to be employed and kept in line with each other, whose work individually has no influence on the design. They are regarded as so many tools to carry out certain parts of the design according to instructions—never to deviate from it without order. The architect assumes more the agent than an artist. These opposite views of the function he is called upon to perform make a wide difference as to qualification. To the first, each trade is not only engaged in carrying out a definite portion of the design, but the tradesman is a joint artist in the production of it, as if the architect had distributed his design and specification among so many working masons, carpenters, joiners, smiths, and plasterers, and they each worked out their part to the best of his ability, independently of, though concurrently with, the architect. But, according to the generally-accepted view of the building trades, the workman has no individuality, and has simply to follow instructions issued through the contractor from the architect. Which view accords best with existing conditions we leave the reader to see. The latter view is easier for both architect and workman. The one has simply to order and give instructions, the other to obey. If we look at our modern buildings in the light of these different systems, we shall find a great deal to illustrate the results of each of these views. Our streets are full of buildings made up of trades directed by agents. Every trade is a question of quantity, of cubic feet of stone, feet run of mouldings, superficial of floors and glazed partitions, of lineal feet of machine-made mouldings, of plaster, glass, iron, and painting—all at so much the yard or foot superficial or weight; but in none of these things do we find any evidence of that imaginative faculty which makes our older buildings so interesting and so instructive. The evidences of contract meet us when we look into any public building, great hotel, or shop. We see every trade and detail has been cut down to a price; that the tradesman has been regulated by the "quantities," not by what he considered to be the best. The consequence is that machine-labour is everywhere apparent. If it is a piece of ornamental woodwork, turned and circular-cut mouldings are combined to dispense with hand-wrought work. The finished workmanship and manual skill of the last century is conspicuously absent. There is no imagination, for this is crushed out by organisation of one sort and another, the masters' greed and the men's unionism. The organiser is now the man who is the head of affairs. The organising architect has the charge of many agencies; he simply has to set the machine in motion. The contractor is nothing if not a good organiser of labour, with the power of keeping his men all going. So with the great manufacturer or City merchant: the men count as mere units, and all sympathy is crushed out. The commercial and competitive environment has never made the architect anything beyond his office or his drawing-board, or the craftsman to take any interest beyond his wages or his tools. Trade has now become a commercial business; it is no longer a craft as it was before builders lost their old traditions, when the guilds fostered the genius of the workers in their several branches. The modern system has tended to obliterate the lines which distinguish one craft from another, and has discouraged personal ability. The technical schools and classes are based on the idea that a youth may learn one craft as well as another, that there is no special faculty required, and that a man may be equipped in all trades. This is up-to-date teaching, and has given us the all-round builder and tradesman. The same idea has prevailed amongst the profession; the architect must be taught all the branches, learn every style or period, and be turned out able to design any building. It is no longer a matter of ability or taste: his pencil and box of instruments are thought to make him competent to undertake any kind of building. And the academical teaching of the present day is all that is necessary;—he can apply Greek or Gothic or Byzantine to any building, no matter how diverse. We can trace this superficial view of trade and art to the 16th century, when, as Mr. Blomfield in his "History of Renaissance Architecture in England" says, the builders, losing their traditions, were tempted to bold experiments for which they were unprepared. He writes: "The specialisation of building had already begun; the builder, instead of being an artist, who built and designed in one and the same process, was becoming a person who built buildings, and then thought it necessary to adorn them with ornamentation borrowed at random." The identification of designing with the builder and workshop was lost sight of by the new *régime*. Something very different has taken its place—easier for the designer, who may be quite ignorant of his material, and confine himself to his drawing-desk, and easier also for the tradesman, who can take advantage of the designer's incompetence or indifference. The design may cover all the possibilities of incompetence and blundering and bad copyism; but what matters? The contractor takes all the risks and responsibilities of the execution, and the result may be as near an approach to the architect's intention as the profit of the contractor will permit. He can introduce stock mouldings, old castings and patterns, and other cheapening processes without in the least arousing the suspicions of the architect, who may be only too glad to see his details executed with the least trouble to himself.

In his inaugural address at the Association, Mr. Hampden W. Pratt quoted a passage of Mr. Ruskin delivered many years ago, which expresses very clearly the existing condition of building art. He was referring to the qualities which distinguished great from mean artists—namely, imagination and industry. Of these imagination is the greatest. "It was not manipulation, or calculation, or attention; it was something more, something higher than all or any of these. If an architect lays his bricks and stones well, we praise him for his manipulation; if he keeps well within the contract, we praise him for his calculation; and if he arranges his beams so that nobody drops through his floors, we praise him for his caution. But, if he is to be a great architect, he must do something more than possess and exercise these qualities." These words convey our meaning. We have much manipulation and calculation in our building work: everything is measured and analysed—the stresses of our girders and roofs, the chemical composition of our stone and brick earths, even the quantities of our iron and stone and timber. Our illustrious predecessors never dreamt of these niceties, and yet they produced work full of thoughtfulness and imagination. It is true that critical research and analysis has almost robbed us of our faith, and the specialisation of our crafts appears to have crushed out individual effort, till the working mason, the joiner, or smith thinks his only duty is to manipulate his material to the most profitable advantage. Our architects must do something more than measure building materials and calculate stresses—they must enter into the personal equation of the workman, consider his difficulties, and aid him in his work. It is not in the sense of specialisation nor analysis only that the architect must study workmanship; nor in being able to order and organise the trades of buildings after the manner of an agent; but he ought to be able to see the realisation of his design through, and not independent of, the trade. No doubt it is very hard to attain to this standard of the architect's work: it means harder work for him than mere official routine and commissions.

Why is it that competition weighs so heavily upon the building trades? Is it not because the work of the craftsman has not been assessed at its true value; that our architects are not fully competent to judge of quality of workmanship, and therefore they accept tenders at a loss? We hear on all sides that estimates or tenders are made from sheer ignorance or from guesswork. The builder tenders from unknown facts or imperfect quantities or specifications. He puts in a mere guess for what he does not know exactly: he wishes to secure the contract at any price; and corporations and public bodies abet this kind of chance competition. The inadequate specifications and incompetent details are at the root of all this uncertainty. If these were full and precise, there could be no guessing, and contractors would not venture to affix prices to items which they knew were to be insisted on. As they now appear, the under-bidding builder trusts to the vague and indefinite clause, and to the incompetence of the architect in particular trades. This incompetence and vagueness are at once revealed by the flimsy and superficial description, devoid of actual facts. Only a full and perfect specification will justify a fair and reasonable competition. On no other basis can it be insured. Manufacturers justly complain that inferior articles and workmanship are placed in competition with those of superior merits by the "juggling" of speculative builders who can, out of a vague specification, ask for quotations for two very different things—one an inferior and one a very superior article, and, of course, accept the price of the former. For example, an article of ironmongery is specified in general terms; the contracting party asks for a reduced price, and represents to the manufacturer that for the same article another competing firm has made a lower offer. Unguardedly, the unwary tradesman yields, but soon discovers his mistake. The specification has been taken in two ways, or the competing tradesman does not exist. Examples of this sort of dealing are common, and can only be resisted by making good workmanship synonymous with art.

INSTITUTE OF PAINTERS IN OIL.

On the walls of the Institute of Painters in Piccadilly are to be seen a few works of more than the ordinary show sort. Of course, we find a great many of the popular engraving variety, and no gallery is free from this element. Like all other branches of art, the demand for the popular

and pleasing picture will always create a supply amongst artists of a certain kind. In the West Gallery we notice Hugh Carter's "Old Highland Woman" in white cap, plying her scissors. Like other of Mr. Carter's works, it is Dutch like, full of quiet sentiment; the light from the cottage window is cleverly thrown over the white cap. Near it E. Davies' view in "Charnwood Forest, Lincolnshire," is pleasing in the gleaming field of ferns; and Lawrence Koe's "Roses," a study of a girl holding a bunch of pink roses, is a nice harmony of yellows and green. H. Fantin-Latour has a vigorous piece of flower-painting "Fleurs Variées" (8), and No. 16, admirable in colour. The vice-president, Frank Walton, sends a small sunny landscape, "Ockham Farm" (10), in which the hayfield is tenderly painted; but his principal work is in the central gallery, a view of "Cover Wood, Holmbury Hill," a thickly-wooded upland with leafless trees; a golden flood of autumnal light suffusing the landscape. The handling is extremely skilful and delicate. We pass a work entitled "Mutual Curiosity," by Robert Fowler—a partially-draped maiden standing behind a piece of rock at the side of a lake, while an inquisitive tortoise on the other side looks up inquiringly. The subject is curious and the meaning not very clear; but there are good qualities in the colour and handling. Fred. Weekes' "On Outpost Duty" (19), a horseman and his steed examining an object in a wild snow-clad tract, and the late T. Hope McLachlan's "Evening Quiet," are works of some interest. Harold Speed (28) has a broad piece of meadow, starred with daisies and buttercups, "Early Spring"; T. Austen Brown has a clever subject, "Winter" (30); but his "Homewards," in the next gallery, is a strong and vigorous handling after the Glasgow School. We must note, also, among the few subjects of mark, John J. Richardson's "Welcome Shade," in a crisp style; Miss Harriet Ford's "Santa Maria" (34) the head of a maiden decoratively handled, head reverential in treatment; Miss Henriette Ronner's group of kittens, "Indolence"; Dudley Hardy's "A Nomad" (36); Edward Brewtnall's large picture of a wrecked vessel near rocks, lighted up by a crimson sunset with storm clouds gathering (38); the landscape by Edward W. Waite (45), a village of tiled cottages embowered in foliage; Fred Morgan's pleasing piece of *genre*, "Shuttlecock" (48), are works of some merit. St. George Hare's subject, "Butterflies" (61), is conceived happily; but the little girl in white satin, who is trying to catch a butterfly, lacks expression. In breadth, atmosphere, and vigour of handling, E. M. Wimperis has seldom done anything so good as "A Dartmoor Storm" (65), a rushing torrent from the mountains, cleaving its way through a rocky bed; the stormy clouds and the overflowing bubbling stream are painted with power. "Tavy Cleave" (342) is another Dartmoor landscape, skilfully painted in its atmospheric effects. Reginald Vicat Cole paints a broad expanse of meadow, covered with scarlet poppies, in his own way. We cannot award the highest praise to T. B. Kennington's classical legend, "Cephalus and Procris," an adaptation of another subject. The charming recumbent nymph, with her wealth of golden tresses, lies wounded, while her admirer is prostrate at her side. Miss Flora Reid has done nothing stronger or more brilliant than "Cock-a-Doodle-do!" (70); the deep blues and spring greens are, as usual, refreshing and vivid. A pleasing study of "Canterbury," by Vincent P. Yglesias (69), is hung. Solomon J. Solomon sends an idealised study entitled "Gabrielle" (77), a fair girl with large, light-blue eyes and long tresses. The purple drapery makes a somewhat trying contrast to the pallid face. Leopold Rivers has one of his quiet evening effects, with its stillness and silhouetted profile of cottages against a light sky (78). In composition and colour there is merit in W. H. Bartlett's "Difference of Opinion" (81): a party of billiard players in an inn, who are having an altercation, while at the side are seated a few who are freely criticising and drinking. James Orrock has a finely-painted example of his work, "The Estuary of the Nith" (84), broadly and solidly painted. "The Sirens' Pool" (105) is a favourite theme for certain impressionists. Julius Olsson paints a bay of delightful blue sea inclosed by rocks, lit up by a summer's sun. The sirens are disporting themselves under a steep rock of rosy light, and alluring the unwary navigator to a spot in which submerged reefs abound. The large subject-picture, by S. E. Waller, "Keep my Secret" (111), must be taken with the reserve that they are portraits of lady and horse. A young lady in riding costume stands at the head of her favourite horse, and is showing him a letter in confidence, which the equine instinct seems to understand. The expression in the horse's eyes is skilfully painted; but the landscape is somewhat tame, and there is a want of vigour in the foreground.

The president, Sir James Linton, contributes only one subject in the Central Gallery—"Rest." The disconsolate maiden, seated against the trunk of a tree on the wooded bank of a river, with a large copper vessel at her side, is rather meaningless, if not an idealistic study. The red-cloaked maiden may be a scholarly study of the draped figure; but what connection there is between the refined-featured lady and the environment does not appear. There is little relation of the figure to the picture. The landscape is in dull green, the bright-red cloak being the only enlivening note. Near are a few meritorious studies. James S. Hill has a very broad and able sketch of "High-street, Glaisdale" (247), a hilly street, drawn with skill; Walter Osborne, R.H.A., "A Connemara Village" (242). The gleam of sunlight over hills gives life and beauty to the broad, quiet tones of the shaded village. The strong work by Robert W. Allan (244), and the study by Ernest Parton (248), Frank Spenlove-Spenlove's sombre landscape "A Winter's Tale"; and Arthur G. Bell's market study (249), a delightful piece of colour are worth attention. "La Cigale," by Arthur Hacker, is full of tenderness and feeling—a wan-faced girl leaning against a tree, a red rose in her hair, unpretentious, but pathetic in its simplicity. R. Thorne Waite's "Cart-Horses" (259) are well grouped, and the colour rich. John Lomax knows how to hit off an incident. His "Fortune's Favourite" is a clever and spirited group of dice-players.

We can only notice a few in the East Gallery. "Night Thoughts" is a successful ideal by a master of poetic subjects, Henry J. Stock. The figure gazing into a dark, starlit sky is graceful. One of the chief attractions is "A Study," by George F. Watts, R.A., probably an early work by that eminent living master. Considerable beauty of line and colour is manifested in this three-quarter study of a lady's face, ruddy and plump, but full of grace and rich in the harmony of reds. Another master of composition and colour whose works lend a charm to the collection is H. Fantin-Latour. We have spoken of his flower study. Here we have "Diana," a graceful, recumbent figure of the goddess of hunting reposing on a bank and beneath luxuriant trees. A large centre subject by Henry J. Stock, "The Humiliation" of our Lord, is one of the finest works in the room. The hideous monsters whose faces peer from the dark background at the Saviour bear the Psalmist's interpretation: "Fat bulls of Basan close me in on every side; they gape upon me."

Edwin Hayes's large centre seascape (351) and Robert W. Allan's "Starting for the Herring Fishery," a large picture full of fishing-boats, are both noteworthy; the latter is brilliant in the sea sparkle of the flickering sunlight. We cannot admire T. B. Kennington's "Circe"; there is nothing very bewitching or weirdly fascinating in the fair maiden holding a large glass bowl of red wine, and the treatment is too realistic. Miss McCrossan's "Blue and White, St. Ives," a small study of blue sea and glistening white boats, is a clever piece of colour and drawing. A poetical study, "The Sea People," by St. George Hare, is better in idea than in treatment. Yeend King's "Meadow Sweet" is pretty, and suggestive of spring; the girls on the bank picking the flowers are gracefully drawn, but there is a conventionality which the painter cannot overcome. A bold figure-composition occupies one end of the gallery, representing a group of figures in semi-Classical-dress in a landscape. There is vigour of handling and some dignity and grace in the figures on the banks of the pool. John R. Reid's "A Daughter of the Soil" (398) is his best work, a healthy-looking lass who has a hoe in her hand in a field, breezy and brilliant, and strong in colour. The subject is a pleasing departure from the sea toilers and Cornish coast subjects. Alfred Wither's "The White Mill" (377), and No. 395, are strong and vigorous in tone, and we must note works by Lance Calkin (356), Rupert C. W. Bunny (168) "An Allegory," J. Haynes-Williams (364), Fred. G. Cotman's large sunset landscape with Wells Cathedral (323), Adolph Meyer's fine landscape (313), Frank Dillon's Portico of the Temple of Iris at Philæ (298), and John Fulleylove's view of the Parthenon.

THE LONDON COUNTY COUNCIL WORKS DEPARTMENT.

THE Finance Committee of the London County Council, to whom, since the abolition of the Works Committee, the duty has been delegated of controlling the finances of the Works Department, have just issued a report, which contains a statement showing (1) the estimated and actual cost of works executed during the half-year ended March 31, 1897, and (2) the totals of the actual cost and of the final estimates, or the amount of the schedule value, of all works executed by the Works Department since its creation. In all, 13 estimated works have been completed and reported during the half-year. The total of the original estimate for these works was £23,525, the final estimate being £24,099, and the actual cost £25,563, showing a balance of cost above estimate of £1,463. The loss on the half-year has been solely occasioned by the work on the extension of the Wandle branch sewer, for which the final estimate was £9,665, and the actual cost has been £12,011, or a balance of cost above estimate of £2,006. There is a slight excess in cost over estimate in two or three of the other items, but there has been considerable saving on some of the works. This has been the case particularly in the work done for the Housing of the Working Classes Committee. The central laundry in the Boundary-street area, which was estimated to cost £6,532, has been constructed for £6,103, showing a saving of £429, whilst on the construction of a sewer on the same estate, estimated to cost £1,454, a saving of over £300 has been effected. Small works executed for the Fire Brigade Committee have also been carried below the estimated cost.

The table detailing the cost of jobbing works carried out during the half-year by the department for the different committees of the council gives the schedule value of the works as £16,758 and the actual cost as £15,869, showing a balance of cost below schedule value of £889. The value of the jobbing work done for the bridges committee was put at £2,443 and the actual cost was £2,185, for the fire brigade committee £2,877 and the actual cost £2,772, for the main drainage committee £6,670 and the actual cost £6,300, and for the highways committee £1,354 and the actual cost £1,284.

Another table exhibits the totals of the actual cost and of the final estimates, or the amount of the schedule value, of all works executed by the

A PRESENT FOR THE TSAR.

Works Department since its creation. This shows that up to March 31 of this year the final estimate for all the estimated works carried out by the department was £459,772 and the actual cost £462,897, making a balance of cost above estimate of £3,125. The schedule value of jobbing works executed from April, 1895, when the system of a schedule of prices was first tried, to March 31, 1897, was £56,176, and the actual cost £52,260, showing a balance of cost below schedule value of £3,915.

A PRESENT FOR THE TSAR.

NOT "MADE IN GERMANY."

THIS work is the joint gift of the generals of the German Army to the Tsar, through the Kaiser, on the natal anniversary of the late Emperor Frederick III., Oct. 18. It is in the form of a mural tablet to be affixed to the high altar in the Imperial Chapel, in the fortress of SS. Peter and Paul, at St. Petersburg. The full-face portrait of the Tsar is sculptured on the facsimile of the great bell of Moscow, in Carrara marble, the likeness having been modelled at Breslau during the German army manœuvres in the autumn of 1896. The piece of sculpture, which measures 3ft. by 2ft., is attached to a Byzantine bronze shield, engraved with the words "Freundschaft, Immer, unt für Ewig" (friendship, always, and for ever). The clapper of the bell is a copy of the Crown of Germany, and the Muscovite regalia forms the top, with the initials "N." and "W." The rim exhibits the orders of St. Andrew and also the Black Eagle, and bears the inscription "Berlin—Moscow, 1813-1897, in lasting memory of the Napoleonic devastation."

Mr. Oscar Alex. Young, of Elgin-terrace, W., was the sculptor intrusted with the work, and it is worth noting that, though a present from Germans, it was *not* "made in Germany."

A HISTORY OF RENAISSANCE ARCHITECTURE IN ENGLAND.*

[WITH LITHOGRAPHIC ILLUSTRATIONS.]

THE two handsome and copiously illustrated volumes which Messrs. Bell and Sons have just published, from the capable pen and facile pencil of Mr. Reginald T. Blomfield, M.A., may at once be described as a distinctly valuable addition to any architect's library, and, at the same time, the work is not in any way so exclusively technical as to insure only a qualified welcome by a large number of readers among that immense class of artistic people who love old English houses, and are more or less acquainted with the history of our national architecture. The author has realised his aim by giving, without controversy, a concise consecutive account of the rise, development, and ultimate decay of what he calls the Humanist revival of the 15th and 16th centuries, as illustrated by the architecture of the Renaissance, in which England happens to be exceedingly rich, not forgetting, of course, the work of the 18th-century architects—such as Archer, James Campbell, Ripley, Lord Burlington, Leoni, Kent, Gibbs, the Woods (of Bath), the Dances, and the Brothers Adam. Three hundred years, 1500 to 1800, forms the period which Mr. Blomfield includes in his history, and to make his treatment the more thorough, after analysing the house-planning of the Tudors, the Stuarts, and the Commonwealth, as well as that of Queen Anne and the Georges, he supplies a capital account of the literature of architecture of the 17th and 18th centuries. Added to this follows a treatise on the handicrafts and trades associated with building, thus furnishing much interesting information about carpentry, masonry, brickwork, plaster-work, lead, and iron. A list of authorities consulted is prefixed to the first volume in a useful way for the reader's information, and shows that the author has realised and readily acknowledges what other workers in the same direction have done, thereby, too, making it more evident that Mr. Blomfield's undertaking has not been lightly entered upon. He has given his treatment of the subject a distinct individuality; his drawings are correct, spirited, and detailed, always bright and appreciative, while his writing is entertaining, comprehensive, and seldom over-dogmatic. These are words of no faint praise. It is always so easy to find fault; but then the author tells us that he has not attempted a catalogue raisonné of English architecture during 300 years, and if, may be, some first-rate and typical examples are omitted, he has confined his selection, he says, to buildings of historical importance, or, at any rate, to those which best illustrate, in his judgment, the lines of development of English architecture of the time. There is no need to compare the books before us with the monumental folios produced a few years ago by Mr. Batsford, under the direction of Messrs. J. Alfred Gotch, F.S.A., and Talbot Brown, because, instead of contrasting or competing, each of the two works serves to augment the value of the other, and the same remark equally applies to Messrs. Belcher and Macartney's work the "Later Renaissance" now in progress of publication.

Mr. Blomfield very interestingly discourses on the works of the Italians in England employed by Wolsey and Henry VIII., and he accompanies his essay with sketches, such as the terracotta plaque from Hampton Court, which we have reproduced herewith. The influence on the vernacular work of the period exercised by these Italians was very limited, for, of all the Northern peoples, the English were the most tenacious of the past, the slowest to accept these foreign ways. The population of the Metropolis and the principal seaport towns were, no doubt, made more familiar with Continental modes and manners, owing to our commercial relations with the Italian States, which had existed since the 13th century; but the middle and lower classes were separated in a very marked degree by their general poverty and inaccessibility of ideas from the nobility, and so it was that the endeavours of the rich to import in a ready-made fashion a taste for the Renaissance of Europe proved abortive in England, and isolated instances only of their productions exist, such as those at Hampton Court, Layer Marney, the Fitz-Alan Chapel at Arundel, East Barsham Hall, the Abbots Hospital, Guildford, and perhaps the front at Cranborne, in Dorsetshire. Other examples, not named by the author, are the tomb at Wymondham, and Oxburgh Hall and monument in the Church hard by, which certainly deserve a reference. These Italians, Torrigiano and Antonio di Piergiovanni di Lorenzo, Toto del Nunziata and Jacopo da Verona, his associates. Baccio Bandinelli, Benedette da Rovezzano, Giovanni da Majano, and the rest flourished during the prosperous days of their wealthy patrons; but, subsequently, they suffered many hardships, and did not always, by any means, obtain their dues. These foreigners were familiar with the work of the Della Robbias, and introduced terracotta invetriata—that is, terracotta covered with a stanniferous glaze and susceptible of receiving colour at will. Half the charm of this 16th-century detail in clayware is, however, largely due to its disintegration, and where the old terracotta remains perfect and unsoftened by the action of the weather, it is quite as unpleasantly hard as modern work, though, of course, being more limited in its use, the cast-iron appearance, so isolated from good taste, which we deplore in the contemporary use of terracotta, is for the most part absent in old work. The continued employment of the material was abandoned, with good reason, as being harsh and discordant with the beautiful texture of old English brickwork. The history of the Cardinal's tomb, which Henry VIII. appropriated character-

* A History of Renaissance Architecture in England, 1500-1800. By REGINALD BLOMFIELD, M.A., Architect. London: George Bell and Sons, Covent Garden. Two vols. Net price £2 10s.

istically for himself, is highly interesting, and Mr. Blomfield furnishes many items of information about these Italian artists who were employed upon it and their work. The gateway at Montacute House, the choir-screen at Winchester, and the Salisbury Chantry at Christ Church, Hants, are also illustrated.

"The death of Henry VIII. marks a turning point in English history. The end of his despotism was an end of a long nightmare." The Italians retired from this country, the people recovered liberty, and the buildings became marked by a more substantial form of architecture. The numerous foreigners who came to England during the reigns of Elizabeth and James I. were nearly all natives of Germany and the Low Countries. Little work was done architecturally during the days of Edward VI., who was poor, and of Mary, whose reign was marked by other undertakings. The revival of building when it came was associated with German and Flemish artificers. The architect, as we now know him, had not yet detached himself in England as an independent designer from the general body of craftsmen, and usually the building owner or "client," to use the modern term, gave personal and general directions as to what was to be done. The trades with whom rough contracts were made supplied the details, sometimes under a foreman designer, who worked for the most part without drawings and specifications beyond the merest outlines. A long, entertaining chapter is devoted to the history of this exceedingly rich and important period of which we are speaking, and during which the best of our old English mansions were built. The English builders, such as John Thorpe, are not overlooked, and much of the ground covered by Mr. Gotch in his account of "The Buildings of Sir Thomas Tresham in Northamptonshire" necessarily is retraversed; and associated with this connection come the buildings of Robert Smithson, the designer, perhaps, of Wollaton in Nottinghamshire. Bolsover Castle, Derbyshire; Cobham College, Kent; St. John's College, Cambridge, and Corsham Almshouses likewise furnish some good illustrations, and, added to them, are a variety of plans, reproduced from the Soane collection in Lincoln's Inn-fields. The staircases in Whitecross-street, Christ College, Cambridge, and that from Hawkhurst, Kent, which we illustrate in a reduced form with this notice, will give the reader an idea of the thoroughness with which the author has dealt with his subject.

A whole chapter is devoted to Inigo Jones, and not a few of his drawings are reproduced, including the plans for Whitehall, and other "uprights" figure of St. Paul's, Covent-garden, and Somerset House. The central bay to the south front of Wilton House, herewith photographed from Mr. Blomfield's sketch, is spiritedly drawn, and Wilton is a particularly valuable example, inasmuch as parts of it, at any rate, are undoubtedly by Inigo Jones. John Webb, Marsh, and Gebbier follow with contemporary works at Burford Priory, Oxfordshire; St. John's Church, Leeds, and Groombridge Church, Kent; the Ashmolean Museum, Oxford, and Trinity College Chapel there, Emmanuel College, Cambridge, and other examples. Sir Christopher Wren and his works are done justice to with copious plates and plans of his scheme for the rebuilding of London. We reprint one of the plates in this section, giving it to a smaller scale. The subject is the font of St. Stephen's, Walbrook. Grinling Gibbons's design for the enrichment of a monument by Wren shows the style of our great national architect's drawings. Wren's contemporaries and successors are treated of in the second volume, from which book we take our remaining illustrations. Our space is exhausted, but our interest is only quickened as we close our review of these two excellent volumes, which thus obtain our warmest praise. By no means the least valuable parts of Mr. Blomfield's work are his practical pages on brickwork, plaster-work, lead, and iron. No architect can read them without advantage.

THE DWELLING-HOUSE.*

THE little volume before us is a useful protest against the curse of overcrowding. Its author, Dr. Poore, is a zealous advocate in the cause of sanitary progress, and his "Essay on Rural Hygiene," and lectures on the baneful effect of overcrowded areas, have shown how much can be done to improve our habitable conditions. In this volume the author points out the defects in our dwelling-houses, the danger of persons being located under the same roof with a "case of whooping-cough, measles, scarlatina, diphtheria, typhus, or small-pox." Even tuberculosis and pneumonia are now placed in the same category of communicable diseases that are liable to infect through the air. The requirements of independent ventilation and light to all channels of internal communication, such as halls, passages, and staircases, are pointed out. These should be blown out by through-draughts and be well lighted. The author says, "The dark passage ending in a close *cul de sac* of bedroom doors is one of the commonest features of the modern house, and is absolutely to be condemned." Again, "The smell of fried bacon which oozes through the keyhole of your bedroom may be accompanied by all the infective potentialities of all the inmates of the house." In fact, the internal staircase serves rather for the conveyance of foul air instead of the supply of fresh air. Large hotels and towers of flats are liable to be most unwholesome residences. Lift-shafts, as well as staircases, should be ventilated. A typical London house is shown which illustrates the defects common to it, and the alterations necessary to make it healthful. The plans of every floor (four stories above basement) are given. Its height entails labour on the servants, and the tendency to build them higher is shown to be most disastrous to health in our great cities. The author criticises each of the floors of these typical London houses, and especially the basement, where the butler sleeps, and where the traps and closets abound, the one staircase which acts as a ventilating shaft, into which all the basement fumes and smells enter, and which has no outlet but the bedrooms. Useful suggestions are made on the ventilation of corridors, which the Medical Committee has drawn up for the guidance of the architect in the plans for the rebuilding of University College Hospital. One is to place the secondary staircase between the ward and the sanitary offices, so that the staircase forms a cut-off, with cross ventilation. The author would make the staircase useful in this way by cutting off connection with the offices from the living rooms of a house, a plan that is often followed where there is area enough as in a country house. We have no space to follow the author into other points, such as aspect, warming, hotel bedrooms, sanitation of isolated dwellings, dry methods of treating urine, wells, &c. The remarks on town dwellings, building estates, model by-laws, overcrowding statistics, contain many suggestions of value. If some of these suggestions had been carried out at Maidstone a number of cases would have escaped the terrible epidemic now running its course.

* By George Vivian Poore, M.D., F.R.C.P., Physician to University College Hospital, &c. Illustrated. London: Longmans, Green, and Co.

NOTES ON SURVEYING AND LEVELLING.—III.*

By Walter Tester.

SETTING OUT THE TOWER BUILDINGS.

THE survey of the site having been plotted as described in the last article, and a block-plan showing the position of the various buildings, made with the assistance of the levels and sections taken as explained, the surveyor is required to set out on the ground a building of the shape shown on Fig. 1—viz., an octagon with four wings off alternate sides. The building is to be used as a place of public amusement, and contains in the lower portion inside the octagon a combined circus and water show, with the necessary dressing rooms and accessories in the basement.

Two of the wings are devoted to entrances and staircases; another is to be used for dining and refreshment rooms, and the fourth is to contain all the machinery. There is to be a steel tower, about 550ft. high, octagonal on plan, the main pillars of which come down just inside the octagon. The position in which this building is to be placed is on the site of the old kitchen garden, and the surveyor is supplied with a plan showing the situation provisionally adopted, also with the general dimensions of the buildings. The diameter of the octagon being:—

	154ft.	0in.	inside
Add	2	8½	thickness of wall
Add	2	8½	thickness of wall
	159	5	outside diameter

Then, by calculation—

Length of the side $= \frac{1}{8}$ diam. $\times$ ·8284
$= 79' \; 8\tfrac{1}{2}'' \times \cdot 8284 = 66' \; 0\tfrac{1}{4}''$

Length of line from centre point to corner of the octagon $= \sqrt{79' \; 8\tfrac{1}{2}'^2 + 33' \; 0\tfrac{1}{8}'^2} = 86 \cdot 3\tfrac{1}{4}$

Wings 65ft. $\times$ 40ft. 8in. external dimensions.

Diagonal of wings $= \sqrt{65' \; 0''^2 + 40' \; 8''^2} = 76' \; 8''$

Supplied with these particulars, the surveyor can proceed to set out the building approximately on the ground, which may be done near enough for present purposes by scaling measurements from any fixed points on the site plan to the main corners of the proposed building, and setting out these dimensions on the ground. The surveyor will then get an idea how the building is going to work in, and whether it will necessitate any further cutting down of trees, and he should take trial levels of the ground at each of the main corners of the building to see how the excavations for the basement will come out. He may, perhaps, have to move the building down the hill to prevent cutting through a very high bank on the top side of the site, and, if so, he must set the buildings out again, and take a new set of trial levels. In fact, it may be necessary to alter the position several times before it is satisfactory in every respect. Before it can be definitely fixed, trial-holes should be made to see at what depth there is a good foundation for the walls and tower pillars, and levels, both on the original ground and on the rock, should be taken at the corners of the building.

The plan (Fig. 1) shows the position finally adopted, and the following are the levels, above Ordnance datum, at the main corners.

Points.	Original Ground Level.	Surface of Rock.
A	51·60	45·21
J	53·26	—
K	53·55	—
B	54·00	48·55
C	61·92	52·75
L	60·89	—
M	73·79	—
D	67·18	58·18
E	69·04	59·13
N	74·79	—
O	69·93	—
F	62·88	55·74
G	54·64	49·55
P	60·56	—
Q	50·72	—
H	51·78	44·23

The level for the basement floor of the building being 50·00 finished, and the whole of the ground inside the octagon and for the two wings G H P Q and A B J K is to be excavated down to the 49·62 level (allowing 4½in. for concrete); in addition, the arena in the centre of the octagon and the tower pillar foundations are to be sunk to a lower level still. The ground floor of the building is to be at 60·00, and in order to reduce the excavation for the road around the buildings, the level opposite the entrance wing E F N O is raised to 70·00 (necessitating a flight of steps in the building down to the 60·00 level).

The position of the building and the level of the main floor being settled, it is desirable to fix permanently the centre point of the octagon and the axis of the building. The best way to deal with the centre point is to dig out a hole down on to the rock and then put in a wooden post, say, 4in. by 4in., which should be carefully fixed, plumb, and then built around with brickwork to keep it in position, a nail being driven into the post at the exact position of the centre point. As the excavation is got out this centre post can be sawn off, the brickwork being removed and the point transferred down to a lower level. An easy way to do the latter is to fix four pegs with their tops about level, and drive a nail in each so that two string lines fixed to the nails will cross each other at the centre point, the lines being arranged so as to cut each other about at right angles and not obliquely. The four pegs are fixed so as to be clear of the centre pier, it being understood that the original ground around the centre point is not disturbed until the latter is transferred to a lower level. The brickwork around the centre post can now be removed, and the centre point plumbed down.

We will suppose the surveyor has fixed his centre point as described; he must also permanently mark the axis of the building. Of course, he has already done so approximately, and he should now set his theodolite over the centre point and straighten this line up by turning over the telescope of the instrument, checking the adjustment by setting round an angle of 180°. The axis of the building should be retained by driving two posts into the ground

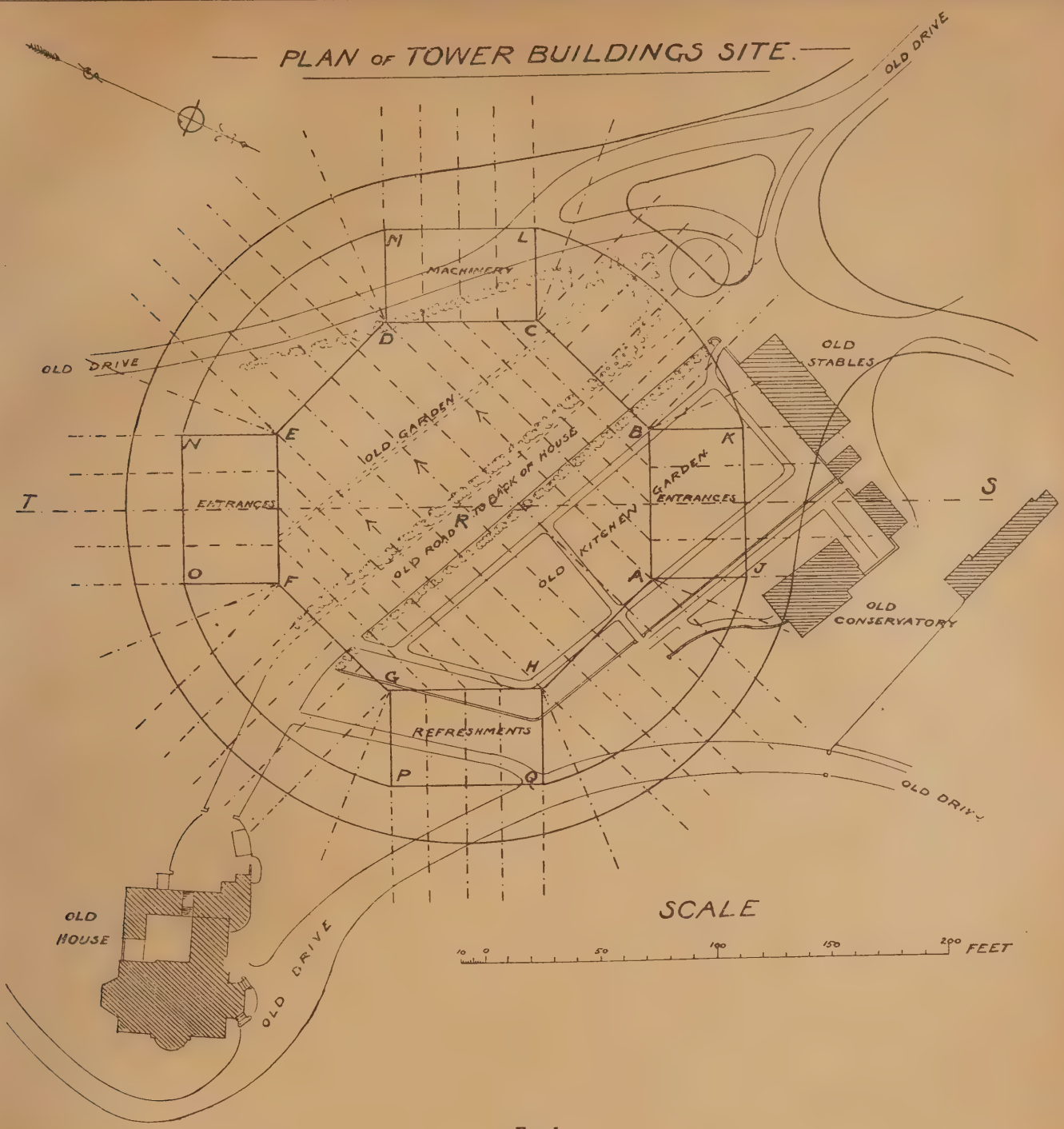


Fig. 1.

entirely clear of the excavations, one on each side of the centre point, and marking the exact points where the line cuts with a nail accurately set with the theodolite. The surveyor should now reset out the outline of the building as accurately as he can with his chain and tape, and must proceed at once to take the sections for the measurement of the excavations before the ground is disturbed.

In addition to the building, there is a circular road to be made around the latter, and he must make his sections serve for same; and the question now arises, Which are the best lines to use? They must be characteristic sections of the ground, and for this purpose the direction of the arrows (Fig. 1) is the best; also they must take the shape of the building and road into consideration. So far as the octagon is concerned, a series of lines parallel to the sides, as shown on Fig. 1, will do very well, as they are typical sections of the ground. These lines would not be suitable for taking the wing excavations, as they cross them obliquely. It therefore seems desirable to turn the lines at right angles to the sides of the octagon where the wings are. (Fig. 1).

For the circular road and spaces between the wings outside the octagon, the lines already arranged will serve if produced, and similar ones square off the two remaining sides of the octagon will be required. This arrangement leaves triangular pieces of ground unsectioned, and it will be as well to run a radial line from the centre point through each corner of the octagon.

These sections should be taken as close together as the nature of the ground requires, or, as is often the case, as time will permit. The method of setting out the lines is exceedingly simple, the outline of the building being already marked out; all that is necessary is to measure out the positions where the sections cut, and sight the lines through from opposite sides of the octagon (see Fig. 1). So far as the radial sections are concerned, the lines can be marked out by setting the theodolite at the centre point, and turning on to the octagon corners, and marking another point farther from the centre on the same lines. The road sections require to be run well out, so as to take in the natural slope of the bank, and they should have a peg left in at the end, as this will be useful for measuring the top edge of the slope when the road is cut through. The order of taking these sections would, if necessary, be arranged so that the excavator could make a start immediately one or two are obtained, and by the time they are all taken he will have got well to work excavating the sand on top of the rock on the high side of the ground and running it out to the low side, leaving it at a convenient level for filling up around the building. It will not be necessary to take the sections outside the outline of the building on the low side of the site, as there is no cutting, and the price for excavation includes tipping up this portion of the ground. A good long stake should be driven in at each main corner of the building, as any short peg would soon be lost in loose sand excavations. As the excavator gets the sand removed and the rock bared, the surveyor must reset out the outline of the building and take rock sections on the same lines as used for the ground surface. The excavator can then proceed to get out the rock down to the formation level for the basement floor. On the lower side of the site there is only the top soil to remove, but as the walls have to go down on to the rock, trenches must be cut for them, and these require to be set out. The trenches are made a few inches wider than the wall, for play, and the walls are to be built without footings, as they start off the rock. The object of the footings being to distribute the weight over the foundation, they are unnecessary in this case. Where the walls start off the rock at the formation level, they should have a trench about two courses deep or for them to prevent any tendency to slide.

WROUGHT-IRON AND STEEL IN CONSTRUCTIONAL WORK.—XXX.

SOME of the principal joints employed in the building up of the elementary members of structures having been illustrated, we have now to consider the methods of effecting joints

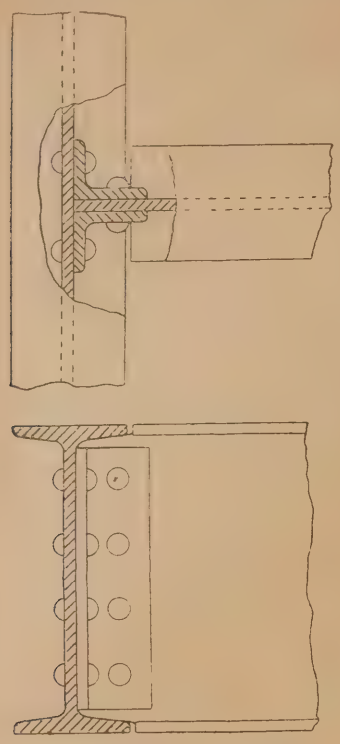


Fig. 186.

between the members themselves. This is not always an easy matter, because strength, stiffness, and the economical employment of material and labour have to be taken due account of; frequently, too, convenience of transit has to to be provided for, more especially in work sent to foreign countries, the resources of which are but partially developed, and in hilly districts.

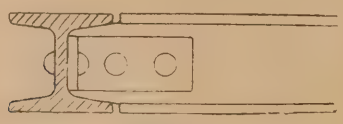


Fig. 187.

Rivets and bolts are both used in joint-connections for permanent fastenings, but bolts are often inserted in rivet holes for temporary service, to be subsequently replaced by rivets. Plates, bars, and rolled sections are used for connecting pieces, and built-up gussets and brackets and forged knees also for many purposes.

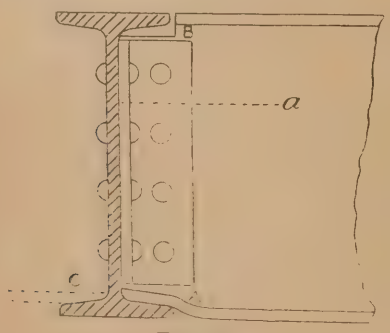


Fig. 188.

The whole question of the fitting of parts together is of great importance as affecting the stability of a structure, and one in respect of which specifications and inspection are far more stringent than formerly; it is here that much of the difference in the cost of contract work lies, and that the necessity for the strictest inspection comes in. The reason is clear. If joints do not abut closely because of bad, unequal fitting, or of no fitting at all, the strains are thrown mostly upon the rivets or bolts; they become not only subject to severe shearing stress, but also to alternating stresses, the most trying to which they can be put, due to the rickety character of the fitting. The only element in the work which can serve to prevent this from happening is the frictional contact set up between surfaces by reason of the clinching of the rivets or bolts, and little or no dependence is placed upon this coming into play when required. The tendency

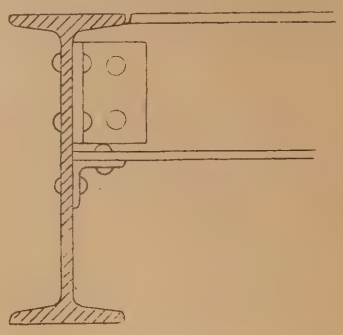


Fig. 189.

to slip with bad joints and ill-fitting rivets must always be taken account of, and frictional contact must not enter into calculations of strength. A few remarks on the general modern practice in this respect may suitably precede the illustration of joints to follow.

Since bridge, girder, and roof-work have generally to be erected in a works, and sent away in sections for erection in other places—sections can never be very large. For some foreign countries, in which the difficulties of transport by men or animals alone is great, it is often stipulated that the weight of any one section shall not exceed a given amount. Several results follow.

The joints of the section must not be riveted up

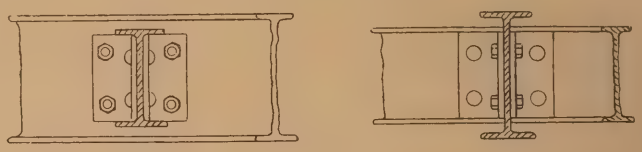


Fig. 190.

in the contractor's yard, but only bolted temporarily; the joints must be made with reference to the design and strength of the members. In the construction of the main elements themselves they can only be made at portions where the plates or angles break joint in the design, so that limitations other than those of manufactured lengths available will occur in such cases. When testing a piece of work in the contractor's yard the deflection will usually be greater when temporary bolts alone are used than when the rivets are put in, and allowance must be made for

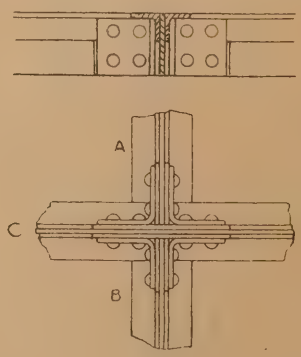


Fig. 191.

this by the inspector. The writer remembers an angle-iron in a very vital portion of a structure once breaking when under test, due entirely to the fact that it was bolted instead of riveted, and that every rivet-hole had not been fitted with a bolt, but some with bolts, others with drifts only. Another matter is, that work sent abroad in sections must have some bold, distinctive mark, corresponding with a mark on the section adjacent as a guide to the work of erection. In braced structures there are so many portions exactly alike that, without such marks, the putting a piece of work together as it went together in the contractor's yard would be a tantalising job. The methods of marking generally adopted is that of letters and figures, as A 1, A 2, &c., up to 50 or 100, when B begins, and so on. More than this, it is necessary in massive work to have some further distinction more readily apparent, in order to effect the preliminary sorting out of the sections on their arrival at their destination; thus, in

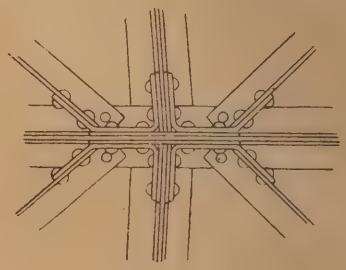


Fig. 192.

the case of a bridge, different shades of colour would be used for different spans, or for the girders for one side of the spans different from that used on the girders of the other side. In the latter case all the cross-girders would properly be painted two colours, one-half to correspond with the colour of the side to which that portion is attached, the other half painted to correspond with the colour of the side next which that colour goes. It is easy to paint this while the work remains in the contractor's yard, and it permits of the parts being all assembled without much supervision on reaching its destination.

In girder, bridge, and roof work, in which a very large number of similar pieces are required, a most important factor, both in economical and in accurate results, is the system of templeting—that is, no bars or sections are marked off by hand, no holes are marked out with compasses, no bevels are marked with the bevel, nothing, in fact, is left to be done by rule and compass, or by eye measurement; but templets are made by which the absolute uniformity of a hundred or a thousand similar pieces is insured without any marking off by rule and compass. A very great deal might be profitably written about the details of this system, but a summary only of the methods employed is consonant with the scope of this series.

There are two materials used for templets—wood and sheet iron. The first is employed largely because it is cheap, and is, indeed, quite

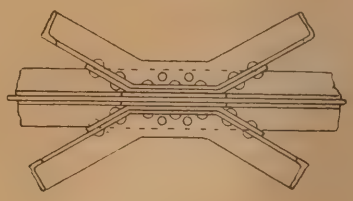


Fig. 193.

serviceable enough for many jobs; but iron is better for large contracts because it stands better, while wood is liable to go out of truth in a short time. The larger the templet the more reason is there for making it in iron; the weight for handling about need not be increased unduly, because lightening holes can be punched or the metal may be thin. Templets in wood are generally from ½in. to ¾in. thick, of yellow pine, free from knots and shakes, and straight in the grain; those in wrought iron are from ⅛in. to ¼in. thick. Holes

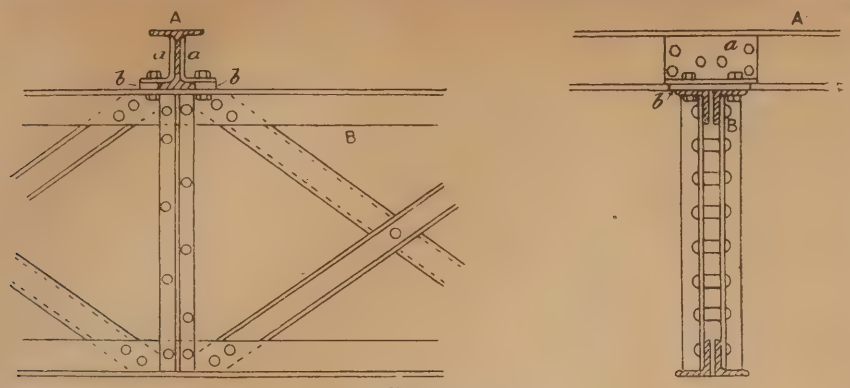


Fig. 194.

are drilled in the templets in the positions which the rivet holes are to occupy in the bars or plates or joint pieces; and edges, and ends are cut to the precise dimensions and shapes in which the work is wanted. Large templets for plates are framed, being open in the centre; templets for joists, struts, ties, angles, tees, are generally in a single width. Every templet is stamped with the number of pieces wanted, with the order

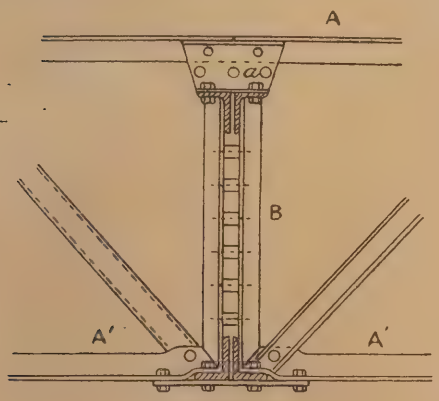


Fig. 195.

number of the job, and with any other particulars which facilitate the carrying out of the system of the shop. They are not destroyed when done with, but kept for reference, or for replacements, or duplicate orders, being generally placed in a stores or hung up against the walls of the shop or shed.

It is usual to lay the templet upon its job, and mark off edges and holes with a scriber on the surface of the bar or plate; if the holes are numerous, and often when not so, the surface of a plate, bar, angle, or tee is whitened over in order to show up the lines clearly. When holes

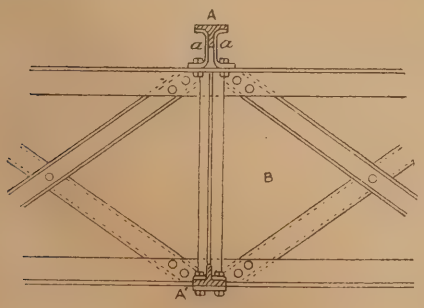


Fig. 196.

are drilled and not punched they are generally drilled directly through the templet, which is then clamped upon the work.

When planed joints are specified, that does not mean that the ends of angles, tees, bars, and other sections must necessarily be done in a planing-machine. They may be so done; but, if cut off truly with a cold iron saw, the result is equivalent to a planed joint. The saw cuts slowly, but more rapidly than a planer tool. Work can easily be set upon the saw-table to be cut square, or to any angle required, and one cut through of the saw leaves the ends perfectly true and smooth. Channel-irons can be sawn in the same way. The edges of plates must, of course, be planed; but these are generally superimposed, so that several ends are operated on at once. As long ago as in the early '70's, the best girder-work was put together with planed joints and drilled holes; the use of iron templets, multiple drilling-machines, and cold iron saws was practised even then in the best firms; this is more than can be said for much rough work even to-day. No shorn edges nor punched holes were permitted on the bridge work of the Manchester Ship Canal, nor are they allowed in any great contracts.

Nothing looks much worse in plated work than overlapping ends and edges, and most inspectors are particular on this point, and will often insist on projecting edges being chipped off level; there are some curved edges in which overlapping becomes unavoidable, but, in most cases, overlapping need not occur if edges are planed or sawn, and rivet-holes punched or drilled accurately. When a number of plates for the top and bottom flanges of girders are to be riveted together, the edges should all be planed first and the rivet-holes drilled in place. The ends of built-up members do not often come flush when they are planed or sawn first by templet and riveted afterwards. The best method of obtaining absolutely flush ends in such a case is to shear the ends roughly, within from ½in. to 1in. first, then, after the parts are riveted up, to saw the ends off at once with a cold iron saw; this is easily done, and takes no more time; as a rule, less than attempting to cut every part to exact length at first. The value of this method is more apparent in the case of bevelled than of square ends. It is a troublesome job to match a number of pieces, plates, strips, and angles in respect both of length and bevel, but this can be readily secured if the ends are sawn finally.

Coverings for joists are varied to suit the nature of the work which has to be connected; the simplest is a plain plate, next come tee-irons and angles. Plates and tee-irons are mostly used to fish plain plates together at the joints; angles are sometimes employed for the same purpose, but mostly for covering the joints of angles. Illustrations of these have been already given.

Angles are used largely to connect pieces of work at right angles, but there are limitations to their employment. If the leverage on a joint is great, and no reinforcement or other support is available, then the angle is not sufficient, but a gusset or gusset brackets must be used; if, however, a joint is held by other joints, as, for instance, a framing which is held rigidly against cross or diagonal movements, then the angle-joint alone is sufficient. There is evidently as much diversity in the forms of joints as in the elements of structures themselves. A few selected examples may now be offered.

Joints between common joists at right angles, Fig. 186, are made by means of angles riveted to both joints; the abutting joists are fitted tightly between the flanges of the transverse joist, and the angles need not fit at top and bottom, but will clear the throat of the joists, as shown; the number and spacing of the rivets will depend on the depth of the section. If the section is so shallow that only one rivet can be got into the depth, then angles with wide flanges must be used, in order to get two rivets into the breadth of flange, Fig. 187.

Instead of fitting the abutting joist closely between the other, as in Fig. 186, a method which requires fitting with chisel and file, or cutting on a planing or shaping machine, the joist is often joggled or set on the bottom edge A, Fig. 188, by the smith, and the top edge B is not fitted closely. When the abutting joist is shallower than the other, say, to the line *a*, the bottom edge is fitted by either method, or sometimes it is made simply to rest upon the bottom flange, as at C, without shouldering. When a shallow joist is fitted to another, the top edges being flush, support is rendered to the trimmer-joist by means of an angle riveted to the main one, as shown in Fig. 189. Fig. 190 shows shallow joists united to a deeper one, midway, with a pair of angles, and no support beyond that afforded by bolts. The union of channels would be similar to that of joists.

The union of joists and channels offers less difficulty than that of most other sections, because a better abutment can be secured in the first than in the second cases; in angles and tees, for example, an abutting flange must stop short at the flange of the principal member, while the web of one must pass on to the web of the other. In the union of angles a central web generally occurs to render necessary also packing plates. Fig. 191 shows the abutment of two members, A B, built thus against a similar central member, C. The web-plates and the vertical flanges of the angles pass on to the vertical flanges of the angles in C, the web-thickness being filled up with packings; the

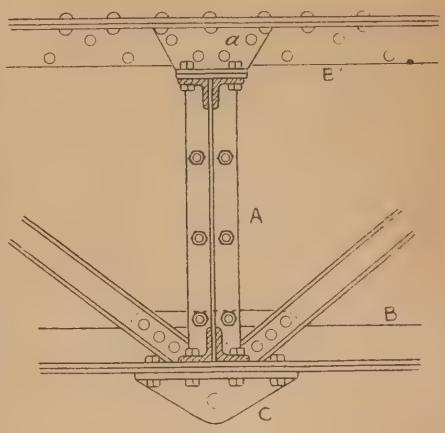


Fig. 197.

horizontal flanges of A and B stop at the edges of the angles in C, and the whole are connected with angles or with forged knees, as shown, riveted together.

Fig. 192 illustrates the attachment of angle-irons to a main member at different angles by means of brackets of wrought iron bent to the shapes required and suitably riveted. Fig. 193 illustrates the attachment of two angles to a main member by bending without cutting abutting portions; the union could be effected without any joint pieces, but the rivet-holes would weaken the angles and the joint plates shown reinforce the weakened angles.

The union of built-up girders is effected in very many ways. Fig. 194 illustrates the jointing at right angles of a rolled joist A on a girder B, A is a roof rafter, and B a purlin. The top and bottom members of B are formed of angles, placed back to back, with a space between to take the ends of the bracing. The bracing consists of channel irons, the flanges of which are cut away next the ends, in order to allow of the web passing between the top and bottom angles, between which the bracing is riveted; the bracings are united at the centre, where they cross, with a rivet. The strut consists of two strips of tee-iron, fitted outside the top and bottom angles of the purlin, and riveted to one another with distance-pieces or ferrules between. The attachment of the rafter A above is by means of forged brackets *a a* made of plate bent and riveted to the side of the rafter and bolted to the top angles of the purlin. Packing blocks *b b* are inserted between the lower portion of the bracket and the top angles of the purlin, the bolts passing through the packings.

Figs. 195 and 196 show an attachment at right angles of bracing rafters A to the same purlin B; both are of lattice work, and the latter is not so deep as the former. The top and bottom flanges of the rafter are of tee-iron. At the top, the tee-iron A passes over the purlin, and is fastened to the latter with brackets of bent plate. At the bottom the tee-irons (Fig. 195), A¹, are set to fit over the angles which form the bottom flange of the purlin, and are tied together in place with a

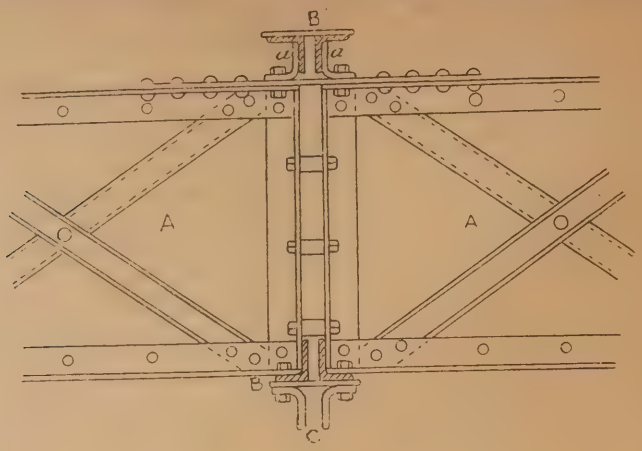


Fig. 198.

cover or joint-plate bolted to the tee and through the flanges. A strut is riveted across the purlin at the point of attachment; it is formed of two tees riveted to one another with distance-pieces between.

Figs. 197 and 198 show a method of attachment of purlins to principals; the top and bottom flanges of both are formed with angles placed at a little distance apart. At the ends of the purlins A A, tee-irons are riveted between its angles; these abut against the bottom angles of the principal, and are bolted to each other with distance-pieces between. The top angles B¹ are connected with a cover-plate riveted to the angles. The upper portions of the purlins and principal are connected with brackets *a a* formed of bent plates; C shows how a bracket for the attachment of a tie-rod may be made and attached. J. H.

ROWTON HOUSE, NEWINGTON BUTTS.*

THE subject of our illustrations is the third of a series of "Rowton" houses. The first, situated at Vauxhall, was the outcome of an endeavour upon the part of Lord Rowton to provide accommodation for a large class of men who, for want of buildings of this type, were forced to spend their lives amid the indescribable surroundings of the majority of common lodging-houses, or the isolated and miserable existence of the lodger in a small house already overcrowded. In undertaking this work he was fortunate in obtaining valuable advice and assistance of Sir Richard Farrant, who has for many years been engaged upon large schemes for the artisan class in London and the suburbs. Rowton House, Vauxhall, with its 475 beds, was opened in 1893, and proved an immediate success, encouraged by which, a company was formed, with Lord Rowton as its chairman and Sir Richard Farrant as one of its directors, for the purpose of extending this work in various parts of London. Rowton House, King's Cross-road, was immediately put in hand, with 677 beds, and has proved equally successful, the accounts showing a full house for every night after the first month. The return from these buildings show that, while providing what has been described as a "working-man's hotel," substantially built, and with every consideration for the inmates' comfort, it is possible for the payment by the lodger of 6d. per night to produce a fair return on the capital expended.

The site of Rowton House, Newington Butts, is ideal in many respects; it is in a wide passage-way at right angles to Newington Butts, thereby avoiding the noise of that busy thoroughfare, and has along its entire frontage a large, well laid-out public recreation ground, formerly the site of the church of St Mary, Newington, and its churchyard. It is in the centre of a most populous and poor neighbourhood, with large numbers of that class who use buildings of this type, and the proximity of the Elephant and Castle, but a few hundred yards, renders it possible for workmen to start from that centre to every part. Externally, the elevations have been built in pressed Leicester brickwork, relieved with mingled gaults and dressings of Mr. J. C. Edwards's pinky-buff terracotta; the brickwork throughout is in Portland cement; the floors coke breeze and steel joisting; the roof to front elevation breeze and steel-framed slabs with green slates nailed direct thereon; other roofs in asphalte on breeze concrete; staircases, which run from bottom to top of building, in Portland cement; floors, where not wood, are cement and granite chippings; all other floors solid oak block, those on ground-floor oak-laid herring-bone. The walls of all rooms and corridors in the basement are ivory-glazed brickwork (excepting in sitting and bedrooms occupied by females employed in the catering department); on the ground-floor all corridors have dado in two tints, and above, to ceiling, in ivory bricks, all glazed work, while in the rooms used by inmates a similar dado is built with plastering above, distempered to a tint, as a ground for the framed engravings that are hung thereon; the staircases, landings, four w.c.'s, and sink space with drinking-water (for night use only) on each floor, are all built in ivory-glazed brickwork; the walls of cubicles are distempered to a terracotta tint. Two staircases, placed at the extreme end of the cubicle floors, give access to cubicles, the disposition of these being governed by the necessity of making it impossible for a lodger to be trapped by fire; and they are so planned that in the event of such an outbreak, a way of retreat is left open in the event of one staircase being blocked; at the top of building a railed-in footway is carried from one staircase to another, to complete this portion of the scheme, across the flat asphalte back roofs. Each floor is subdivided by divisional walls to check, if not stop, the horizontal spread of fire, and, in addition, to facilitate isolation and efficient fumigation in the event of a case of contagious disease. Five points, fitted up with fire-hose, are provided on each floor. The cubicles, 804 in number, are arranged on six floors, and are uniform in size, excepting where breaks in the elevation increase their length, with partitions 7ft. 6in. high between each and 6ft. 6in. high next corridor, leaving a free space to ceiling for purposes of ventilation. The minimum cube space for each lodger on cubicle floors is 427ft., the partitions of cubicles are framed woodwork, painted and varnished, and the flooring is nailed direct to the breeze concrete. Each cubicle has but one single bed in it, fitted with wire-woven mattress, horse-hair mattress and bolster, blankets, sheets, and quilt, and a chair, shelf, clothes' hooks, and utensil are provided. Every cubicle throughout the building has a window under the control of the occupant. Two officials sleep on each floor.

The building has been erected by Rowton Houses, Limited, by their own staff of workmen, from the designs and under the superintendence of their architect, Mr. Harry B. Measures, of 16, Great George-street, Westminster.

* A double-page view of this building appeared in last week's Building News.

A NEW FOLDING TEE-SQUARE.

A TEE-SQUARE with a "shifting stock" is very often a convenience to a draughtsman when engaged in isometrical and perspective drawing. But for engineering and architectural drawings, such as plans, elevations, and sections, distinguishing drawings from pictures, the plain and simple orthographic projection is, and will be always, employed. As a rule, especially in architectural orthographic drawings, the majority of the lines are situated in two planes, the vertical and horizontal, although on the antiquarian or double elephant sheet they are all in the same plane—that is, the plane of the paper itself. Both in drawing and surveying instruments improvements are continually being made, nor does progress stop at mere ameliorations. Frequently the modifications, while retaining to some extent the radical features of the prototype, cause so serious an alteration in it that the inventor or designer himself would be puzzled to recognise his own handiwork or brain work.

In Fig. 1 is represented the new form of tee-square folded up, in which *a* is the pivot or pin upon which the movable arms work,

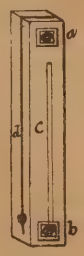


Fig. 1.

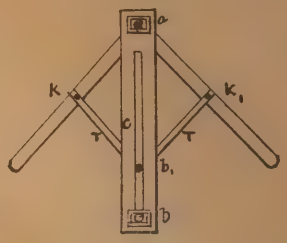


Fig. 2.

b is a mill-headed screw which moves up the vertical slot *c* and actuates the arms, and *d* is the slot provided in what might be called the blade of the square, to allow the arms or the two halves of the stock to work. In Fig. 2 the square is shown unfolded — that is, with the movable arms open, and the millhead screw *b* has been shifted along the slot *c* from *b* to the position indicated by b_1. Although not shown in the figures, the scale of which is too small for the

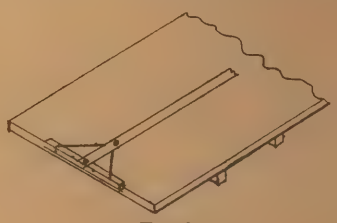


Fig. 3.

purpose, the edges of the groove *c* are graduated, so that any angle can be measured or divided, as the case might require, and the result recorded. The screw *b*, in order to obtain this last desideratum, can act as a clamping screw, and so fix the position of the movable arms K and K_1 until the value of the angle is duly registered.

It is evident that if the arms be pushed out to

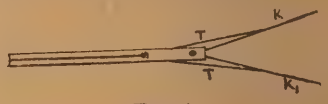


Fig. 4.

an extent which brings them square to the blade, and clamped by the clamping screw in that position, the square may be used as an ordinary T-square, as shown in Fig. 3. But the arms would have to be made a good deal shorter, and some other adjustments introduced, which would

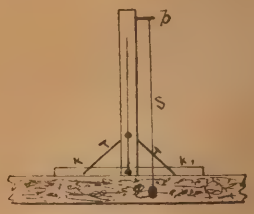


Fig. 5.

rather hamper the instrument when employed for other purposes. Were the arms not capable of being extended beyond the position shown in Fig. 3, which is a diagram pointing out how the square might be applied to an ordinary drawing-board, then no angle could be measured exceeding a right angle. But by pushing the clamping screw as far as the upper extremity of the groove or slot, the arms can be caused to assume the position shown in Fig. 4. It is very

seldom that such very large angles, approaching to 180°, are even needed to be determined, but this little instrument can be used for that purpose, if necessary. It can also be readily made to act as a level, as shown in Fig. 5. All that has to be done is to screw in a temporary plug, *p*, suspend a plumb-line, S, from it, and raise one of the movable arms K or K_1 until the blade of the square is parallel to the plumb-line. The profile of a moulding can be ascertained by a very simple process, and there are numerous other applications of this handy little implement which will suggest themselves to the practical artisan and workman. T. C.

FIREPROOF FLOOR TESTS.

SOME important tests have been made by the New York Building Department, a full description of which, illustrated by diagrams, appears in the *Engineering Record*. The building for the tests are described in detail. The Roebling system of flooring is thus described. The floor-beams are 10in. 25lb. I beams, placed 3ft. 10¾in. between centres, with a clear span of 15ft. between brick walls, well bolted to 12in. girders, and stiffened by two tie-rods to each bay. They have a safe uniform load as applied to test 263lb. per square foot. The centring of the arches consists of No. 19 four-warp wire cloth, stiffened by means of $\frac{7}{16}$ steel rods, woven into the cloth at intervals of about 9in. This centring was in sheets, and sprung in between the floor-beams in the form of an arch, with the ends of rods abutting against the beams. Over the centring two $\frac{5}{8}$in. steel rods were laid parallel to beams, and secured to each stiffening rod. Heavy galvanised wire was dropped from every other stiffening-rod, and attached to the wire cloth of the ceiling. The concrete filling over the wire arching covered the top of beams about ¾in., and above this another quality of concrete was laid 2in. thick, in which were bedded the floor sleepers at right angles to floor-beams. The concrete between beams was composed by bulk of 5 parts of cinders, 2 parts sand, 1 part cement, and 1·35 parts water. This construction withstood the severe test of a maximum temperature of 2,300° and a deflection of 4·485in., loaded with 150lb. per square foot over the centre. The concrete and iron beams after the fire test were red-hot, even after water had been played on it. The plaster and wire netting were burned off. The wire netting was completely burned off in the naked arch, but the arches were found in good condition. The concrete arch was unaffected by the fire and water. The beams, after a subsequent loading, were found to have a permanent deflection of 2¼in. The load applied to produce this result was 600lb. per square foot, applied over the central bay of floor. The Thomson system of flooring and the M'Cabe floor were also tested, and the results are fully recorded in the logs. The latter stood the test well, though a load of pig iron 600lb. per square foot was evenly distributed over the central arch.

A marble bust of the late Miss Frances Mary Buss was unveiled on Friday at the Camden School for Girls, Prince of Wales's-road, N.W., of which, together with the North London Collegiate School for Girls, she was the founder. The bust was executed by Mr. E. Roscoe-Mullins.

An altogether better class of properties was on offer at the Mart last week, including several landed estates, which, with the exception of one or two of the larger lots, met with a favourable reception. Investments of a more ordinary character were also in good demand, and the prices obtained were generally satisfactory. The aggregate realisation amounted to £133,051, the first time since the close of the summer season that a total running to six figures has been recorded, and an unusually high return for the month of October. Last year only £27,016 was registered in the corresponding period, but that was much below the average.

The members of the sanitary committee of Bristol held a special meeting on Monday for the purpose of electing an assistant engineer and surveyor and two surveyor's assistants, appointments rendered necessary in consequence of the extension of the city boundaries. Mr. W. J. Steel, aged 30, assistant surveyor and water engineer to the urban district council, Tottenham, was appointed assistant engineer and surveyor. For the two posts of surveyor's assistants the choice fell first upon Mr. Ellis McKenzie, 29, of Manchester, and Mr. E. W. Lashmore, 27, chief assistant in the office of the borough engineer, Southampton, secured the second appointment.

OBITUARY.

Mr. Robert Price, of the firm of Furber, Price, and Furber, Warwick-court, Gray's Inn, died on Tuesday in last week. Mr. Price, who was in his eighty-fifth year, claimed to be the oldest practising auctioneer in the kingdom. Sixty years ago he entered the office of Mr. Charles Furber, and for the past 25 years he had been a partner in the firm. It is now more than two years since he appeared in the rostrum, but for many years he enjoyed a great reputation as a "chattel" valuer. The contents of the famous Argyle Rooms and the Surrey and Vauxhall Gardens were sold under his hammer, and there were few men who had had more experience in this class of work. Mr. Price still continued to live over his office, and it was there that he died, after a short illness.

CHIPS.

Mr. Alfred Austin, the Poet Laureate, attended the opening of the new Science and Art School at Ashford on Wednesday in last week.

The citizens of Sheffield, as a token of their appreciation of the Duke of Norfolk's year of office as Lord Mayor, have given a commission to Mr. Onslow Ford, R.A., for a marble statue of the Lord Mayor in his robes of office, to be placed in the new town hall, recently erected from Mr. Mountford's designs.

The completed wing at Blair's College, near Aberdeen, which forms the first instalment of the new seminary intended ultimately to supersede the old structure, was opened on Thursday in last week with full Catholic ceremonial. The building occupies the western portion of the site, and is a plain substantial erection of three stories. The classrooms are on the ground floor, and above are situated the rector's and professor's apartments, while the upper floor consists of the dormitories for the students.

An arbitration is proceeding at Preston, before Mr. D. Watney, to fix the amount of compensation to be paid by the London and North-Western and Lancashire and Yorkshire Railway Companies on the compulsory acquisition by them of property on Fishergate Hill, Preston, belonging to Messrs. Harding, the proprietors of the Preston tramways. The property is required by the railway companies for the purpose of widening the line at the dangerous curve outside Preston railway station, where the Scotch express was wrecked in July of last year.

The tram-lines from Lytham to St. Anne's were, on Tuesday week, inspected on behalf of the Board of Trade. The lines have been laid some time, but owing to the difficulty of procuring a site for the erection of a charging station at the Lytham end, trams have not been run yet, although the length from St. Anne's to Blackpool has been used for several months. The terminus at Lytham is in Clifton-square, and the lines go down Church-road, along the railway at Ansdell, thence along Clifton Drive to St. Anne's, and on to Blackpool.

The German Emperor unveiled, in the Theatre-square at Wiesbaden on Monday, a statue of his father. The Emperor Frederick is represented standing, in the uniform of the Second Cuirassiers, of which his Consort is Honorary Colonel. The statue is of bronze, and is about 12ft. high. The pedestal, which is of granite, is adorned with reliefs, and stands on a raised platform. The sculptor, Herr Uphues, is said to have been assisted in his work by the Empress Frederick.

The memorial stone of a new church for the united Congregational and Evangelical Union bodies in Perth was laid on Saturday. The church, which is estimated to cost £5,000, is situated at the junction of Kinnoull-street and Murray-street. The architects of the building are Messrs. Steele and Balfour, Edinburgh.

"The Progress of Art in English Church Architecture," by T. S. Robertson, will be published shortly by Messrs. Gay and Bird. The work, which is intended to be a help to those who desire to realise the ideal of beauty as it is expressed in Gothic architecture, is illustrated by sketches from churches of all the periods of English architecture.

A large company assembled at Manchester College, Oxford, on Monday, at a meeting for the acceptance of Mr. Arthur Greg's gift of a carved oak screen and benches for the chapel.

St. Margaret's Church, Halstead, Kent, has recently been enlarged, an expenditure of about £900 having been made in providing a new north aisle and vestry. On Tuesday the Bishop of Dover performed the opening ceremony.

St. Michael's Church, in Gresham-street, London, has been turned into a bank. The change has been brought about by the London Joint Stock Bank, who have acquired the building, and converted it into one of their branch businesses.

Building Intelligence.

Bath.—The Duke of Cambridge opened on Monday the new annexe to the Pump-Room, and laid the foundation-stone of the Art Gallery. The main feature of the additions to the Pump-Room which has been carried out from plans by Major Davis, F.S.A., is a large concert-hall placed at right angles to the Roman bath. There is a central dome to the roof, 55ft. high, and at each end semi-domes 40ft. high. These domes are carried by arches resting on ten columns of Pavonazza marble, with Devonshire marble bases and gilded capitals, and they are enriched by plaster-work. In the spandrels of the centre dome are figures of the Four Seasons modelled in low relief by Mr. Schenke. Each is represented by a female figure standing on a winged globe, on which are indicated the Signs of the Zodiac of the particular season. There is a promenade, and spacious corridors run round the building and communicate both with the terrace overlooking the Roman bath and with the promenade. The corridors themselves are vaulted and domed throughout, and lighted principally from the top with a circular eye in the centre of each dome. A prolongation of the north corridor leads directly into the east vestibule of the old Pump-Room and connects the extension with the old building. In this north corridor is a separate entrance from the Abbey Churchyard, while at its north-east angle is the staircase down to the museum. This corridor and staircase are adorned with columns of Devonshire marble. Along the east corridor are the ladies' parlour and the gentlemen's smoking-room, while along the west are the ladies' and gentlemen's cloak-rooms and attendants' room. From the centre of the west corridor a stair leads to several rooms over the east end of the old pump room appropriated to the orchestra and a music library. The building throughout is lighted by electricity. The space beneath the building is to be used as a museum for Roman and other antiquities; its walls, piers, and arches are all carried out in cream white glazed bricks. It is paved with red cement divided into squares with bands of Pennant stone. There was at first an idea of covering over the Roman bath, and although the plans were altered so as to leave it open to the sky, a good deal of work has been done in connection with it. The design adopted has as its model the atrium of a Roman house. The bath is in a hall some 110ft. by 68ft. On each side of the water stand the remains of the piers which carried the vaulting of the roof; of these piers and the surrounding walls an average height of four or five feet remains all round. Over the columns on the east, south, and west sides stand statues of eight of the Roman emperors and generals engaged in the conquest and occupation of Britain under the Romans, with an ideal bust of Roma on a terminal at the south-west angle. These are all the work of Mr. G. A. Lawson, H.R.S.A., the sculptor of the circular friezes on the municipal buildings. The Art Gallery will complete the range of municipal buildings opened several years ago, and has, like that block, been built from designs by Mr. James M. Brydon, F.R.I.B.A., of London.

Carlton.—The new Church of St. Botolph, Carlton-in-Cleveland, was consecrated on Friday, the 15th inst., by the Archbishop of York. The church is designed in the 14th century style of English Gothic, and consists of a nave and chancel, with clerestory, under one unbroken roof; a west tower, which is only completed as far as the nave-roof level at present, north and south aisles, and south porch. The internal walls are of dressed local stone, as well as the exterior. The main roof is of barrel form, with a boarded and panelled ceiling of oak. The church has been designed by Mr. Temple Moore, and the contractor is Mr. R. P. Brotton, of Bilsdale.

Crewe.—The Earl of Crewe, on Saturday, opened an Art School, a Technical Institute, and a Sanatorium at Crewe. The buildings have been erected at a cost of nearly £20,000. The architect of the technical institute and art school, which together form one block, was Mr. James Stephens, F.R.I.B.A., of Manchester and Macclesfield; the builders were Messrs. A. and H. Hulse, of Winsford, and the clerk of works was Mr. S. Dobson, of Crewe. The building is designed in the English Renaissance style; the front is of Ruabon brickwork, with enriched terracotta panels designed by the architect. The building

has one principal entrance, and a subsidiary one out of Richard Moon-street to the laundry and cooking departments, which are isolated from the other parts of the building. On the north side of the building the art rooms are found. A painting and life room is 27ft. 7in. by 16ft. 10in. by 14ft. 8in., equipped with easels, furniture, &c. There are also a modelling room, 16ft. 10in. by 16ft. 10in. by 14ft. 8in., art master's room, modelling stores, and art stores on the ground floor. On the first floor are a general classroom, 22ft. by 17ft. by 14ft., lecture-room, 53ft. by 29ft., with windows on three sides, which will be utilised as a chamber for the Crewe Town Council to hold their meetings in, and adjoining is a lecturer's or committee-room. On this floor are also an elementary art room, 56ft. by 30ft., and an antique room, 22ft. by 18ft., and on the floor above are the caretaker's rooms. The Sanatorium occupies an isolated area of five acres off Middlewich-street, and consists of an administrative block and five pavilion blocks.

Darlington.—The new technical college was opened on Friday by the Duke of Devonshire. The building is situated in Northgate—the principal thoroughfare—and has been erected from the designs of Mr. G. G. Hoskins, J.P., F.R.I.B.A., of Darlington. The central tower rises 80ft. from the pavement level, and the building itself is three stories high. It has a frontage to the street of about 140ft , and a like extent is covered by a wing on the south side. The style of the building is Perpendicular Gothic, of the florid English type, which prevailed from 1460 to 1570. The vestibule is a conspicuous feature. The main structure is of brick, with facings and windows of Burmantofts tawny bluff terracotta, supplied by the Leeds Fireclay Company, and there are two figures, representing Science and Art, over the gables, which flank the central tower, which rises to a height of 80ft. On the semi-basement are workshops for various trades, including woodwork, metallurgy, plumbing, carving, cookery school, laundry, &c., and on the ground-floor there are the chemical laboratory classrooms, physical lecture-room, administration rooms, rooms for engineering and drawing classes, optics, &c. The first floor, which is nearly all given up to art, includes a splendid art room 90ft. by 30ft. There are over 560 students in the different departments. The building, which was illustrated by a perspective in our issue of February 1, 1895, has cost about £13,000. The contractors for the principal trades were:—Excavators', bricklayers', masons' work and terracotta and fire-proofing, Messrs. McKenzie Brothers; carpenters' and joiners' work, Mr. R. T. Snaith; slaters' work, Mr. John Wandless; plasterers' work, Messrs. Thos. Robinson and Son; plumbers' work, Mr. Emmerson Smith; glaziers' work, Mr. Robt. Smith; painters' and decorators' work, Messrs. W. H. and W. Hoskins, all of Darlington; marble terrazzo pavement, Mr. Jos. F. Ebner, London; stained glass, Messrs. Atkinson Brothers, Newcastle-on-Tyne; wrought-iron casements, Mr. Geo. Wragge, Salford; ornamental wrought-iron gates, grilles, &c., and gas fittings, The Princess Art Metal Works Co., Manchester. Mr. Jos. Dalton was the clerk of works.

East Markham, Notts.—The church of St. John the Baptist, which was refounded at the end of the 14th century by Judge Markham, was reopened a fortnight since, the occasion being the dedication of the altar and the blessing of the Brameld memorial window. The tomb of the founder of the church is in the chancel. It was much defaced by the Parliamentarian soldiers in the 17th century. The church, which is of the Perpendicular style, has a large chancel and two side aisles and a lofty embattled tower. Its proportions are magnificent, and one of its chief beauties is the clerestory windows. It also contains several ancient monuments and armorial paintings of the Markhams, Cresseys, Merrings, &c. The restoration was begun in 1883, when the fabric and the roof were considerably improved and strengthened, and it is now intended to improve and replace the fittings. A start has been made by providing new altar and hangings, and by inserting at the east end of the church a stained-glass memorial window in memory of the late vicar, and it is proposed later on to restore the screen and loft, on which will probably be placed an organ. During the improvements, when the floor was being taken up in the north aisle, the discovery was made of an old altar slab, which lay as a paving stone in front of the chancel. The window was designed by Messrs. W. Bucknall and J. N. Comper, of Westminster. The cost was in excess of £400. Messrs. Brameld and Smith, of Brazenose-street, Manchester, are the architects for the restoration.

Giggleswick.—The Duke of Devonshire recently laid the foundation-stone of a chapel which is about to be built for Giggleswick School by the munificence of Mr. Walter Morrison, M.P., vice-chairman of its governing body. The school is in a romantic spot in Ribblesdale not far from Settle. Hitherto it has lacked a chapel, and one is now about to be erected on a rocky knoll, where it will form a conspicuous object in the landscape. The general character is to be Gothic. The plan, which is unusual, consists of a Latin cross, with a dome over the crossing, surrounded at the four angles by turrets, which are crowned by small cupolas. The choir is placed under the dome, and the shallow transepts contain each a gallery, that in the north transept being intended for the organ. The school will occupy the nave, which is lighted by a clerestory, and has a narrow and low aisle on each side for access to the pews. The materials will be chiefly the local stone of various kinds, including a black limestone, which will be used in bands or chequers with the lighter-coloured masonry. Owing to the rapid fall of the ground, height is found under the chancel for a vestry, which will be reached by a stair in the north-east turret. The dome will be of concrete, with a wooden covering, laid with sheet copper, and it is to be surmounted by a stone lantern and a cross of gilded metal, resembling those on Oriental churches. The principal dimensions are:—Length, 101ft.; breadth of transept, 54ft.; of nave, 46ft.; height of dome above the floor of nave, 85ft.; and above the vestry floor, 92ft. The plan shows seats for 344, with a good deal of free space. The architect is Mr. T. G. Jackson, R.A., and the work is being carried out under his direction, without a contractor, by Mr. Evans, his clerk of works.

Golcar, Huddersfield.—New board schools in Crow-lane were opened last week. They have been erected from plans and under the supervision of Mr. Jos. Berry, architect, Queen-street, Huddersfield. The building, which comprises mixed and infants' departments, has a central hall, 54ft. 3in. by 32ft., and five classrooms, two classrooms providing accommodation for 50 children each, and three classrooms for 40 children each; whilst 60 places are provided in the central hall, making a total of 280 places in the mixed school. In the infants' department there are 146 places, and a total of 426 in both schools. Two rooms are also provided for the head-teachers. There are separate entrances, lavatories, a cloakroom for girls, boys, and infants. There is also a woodwork-room for 36 pupils and a cookery-room for 40 pupils. The floors are laid with wood blocks on concrete. All the internal joiners' work is pitch-pine, varnished; and the partitions between the classrooms and central hall are utilised as museum cases glazed with clear glass. Rising galleries are formed in all the classrooms, which are fitted up with deal desks and cupboards. The schools are heated with hot water on the low-pressure system by radiators. The playgrounds are covered with stone asphalte macadam, and are fenced in. The accepted tenders amounted to £4,304 18s. 6d., being £10 2s. per head without the places provided in the woodwork and cookery-rooms.

Gosforth.—The new Home for Crippled Children in Salter's-road, Gosforth, near Newcastle-on-Tyne, was formally opened the other day. The site covers two acres of land, and the new buildings will afford accommodation for 110 children (73 boys and 37 girls) and the necessary staff of officials and servants. The style of architecture is Classic in feeling, and Domestic in character. On the right of the entrance are the master's and matron's sitting-rooms, girl's playroom, workroom, or classroom, and beyond a schoolroom. To the left of the entrance is the committee-room, reading-room, and library, and boys' playroom. These rooms face south, overlooking the playgrounds, and are connected by a main corridor 6ft. wide and 123ft. long. There is a similar corridor over, and both have fireproof floors. The first floor of the main building over the rooms before enumerated contains two dormitories for 27 beds each, and four for 10 beds each, master's, matron's, and nurses' bedrooms and linen store. Behind the main corridor, on the ground floor, are the lavatories and cloakrooms for boys and girls, dispensary, and matron's stores, and the boys' and girls' staircases, and on the first floor four bathrooms supplied with hot and cold water. In the centre, and behind the main buildings, is the dining-hall and kitchen block (with dormitory on first floor for 36 beds), scullery, bakehouse, larders, servants' hall, and tradesmen's entrance, and along the north front, on the one side, is the laundry, and on the other workshops and storerooms approached by covered ways through the cloakrooms opening out of the main corridor. Each of the three large dormitories has attached thereto an annexe for sanitary offices disconnected by the usual cross-ventilated lobby and a fire-escape staircase leading to the open courtyards. The contract for the erection of the new building was intrusted to Mr. S. B. Burton. The work has been carried out under the personal superintendence of Mr. Edward Shewbrooks, architect, of Newcastle, assisted by Mr. Codling as clerk of works.

Kingston-on-Thames.—On Monday last the Mayor of Kingston opened the public baths which have been erected by the corporation from the designs of Messrs. Francis J. Smith and Maurice B. Adams, FF.R.I.B.A., joint architects. Mr. W. Cunliffe, of Kingston, is the builder, Messrs. Z. D. Berry and Sons the pumping and heating engineers, and Mr. C. J. Parker is the clerk of the works. We published a view and plan of the buildings in the Building News for March 12 last. The accommodation provides, besides the full-sized swimming-bath with a pond 90ft. by 30ft., a series of first and second-class slipper-baths for men, and a series for women. Club-rooms and an establishment laundry are provided; separate entrances are provided, so as to use the bath as a hall. The façade is treated in a picturesque manner with shaped gables in stone and red brick. Mullioned windows and stone arched doorways give solidity to the effect, the design being modelled after the English Renaissance. The interior is rendered bright by colour. Electric light is used throughout. Economy of administration has governed the plan, and Alderman Coppinger, the chairman of the baths committee, in proposing a vote of thanks to the architects, on Monday, said that he was familiar with a large number of baths throughout the country, and he asserted with confidence that the cost of their new public baths compared in every way, especially in accommodation and artistic elevation, most favourably with any others to be seen anywhere, and they were, in respect of price, unique.

Lowestoft.—The foundation-stone of the new Technical and Art Schools was laid last week by Sir Savile Crossley. The institution will be the only one of its kind in East Anglia, being what is described in the code of the Science and Art Department as an "organised science day school, giving a thorough and progressive course of education in science, combined with literary or commercial instruction, adapted to students whose education is such as would fit them to enter Standard VII. of a public elementary school." At the end of 1895 architects were invited to send in plans, and a considerable number responded to the invitation. Those of Mr. G. W. Leighton, 6, Princes-street, Ipswich, were selected, and after certain modifications had been made tenders were asked for, and that of Mr. A. Bedwell, at £4,995 was accepted, the site having meanwhile been purchased for £950. The building will be of red brick, with Bath-stone facings, and will consist of two stories. The ground floor will comprise the following rooms, approached by a corridor from the entrance on Clapham-road:—On the left of the corridor there will be a lecture-hall, capable of seating 250 people, preparation-room for preparing experiments, dark-room for photography, head master's room, and practical woodwork room. On the left of the corridor there will be a cookery-school, with kitchens, pantry, &c.

Motherwell.—A new police office and barracks are being built at Motherwell, Lanarkshire. The plans show the present structure remodelled with considerable extensions, and raised to a height of three stories. The first-floor accommodation comprises charge-room, waiting-room, and private rooms for superintendent, inspectors, and subordinates. A long corridor off the charge-room communicates with eight ordinary cells and one association cell. On the second floor there is a large muster-room and drill hall, and the third story contains eighteen

dormitories for single constables, with dining-room, recreation and writing rooms, bathrooms, &c., together with a specially-heated apartment for drying the clothes of the men in wet weather. There are six houses for married men, separate from the administration and cell departments. Courts are provided on the site for outdoor recreation and drill. The old offices will give place to a composition in the Scottish Baronial style. The plans show the building plainly treated, and to be executed in stone. The probable cost is between £7,000 and £8,000. Mr. Alex. Cullen, F.S.A., Motherwell, is the architect.

Paignton.—The new church of St. Andrews, in Sands-road, which has been built in sections from plans prepared by Messrs. Fulford, Tait, and Harvey, of Exeter, was dedicated by the Bishop of Exeter on Tuesday week. The entire cost has been about £8,000, almost the exact sum mentioned originally by Mr. Robert Medley Fulford, F.R.I.B.A. (now the Rev. R. Medley Fulford, Rector of St. Andrew's, Grenada, West Indies) as its probable cost. Built in freely-treated French Gothic of the 14th-century style, the church is designed to seat 400 worshippers. It is constructed of red brick burnt from clay in the parish, with dressings of Ham Hill and Bath stones. A feature of the building is the inlaid and sculptured marble pulpit. Byzantine in character, it is chiefly constructed of Devonshire marbles, although yellow magnesian limestone is also introduced. At each angle are canopied niches in solid marble, having golden tesseræ inlaid backgrounds. These niches contain statuettes in white Castellina marble, representing respectively St. Augustine, St. Boniface, Bishop Lacey of Exeter, St. Columca, and Frederick Temple, the present Archbishop of Canterbury. In the panel immediately beneath the preacher's desk is a representation of the crucified Christ, also in white marble. This pulpit is the handiwork of Messrs. Harry Hems and Sons, of Longbrook-street, Exeter. The old bowl is Early Norman, wrought in Paignton red sandstone. It is circular, richly carved, and ornamented by cable moulds and intricate strap ornament. It had a resting-place in a neighbouring garden; but last year it was restored to its original home, the parish church of Paignton. It has now been removed to the daughter church just dedicated, after being repaired at Messrs. Harry Hems and Sons' studios. The first portion of the church was built by Mr. E. P. Bovey, of Torquay, and the final part by Messrs. Stephens and Son, contractors, of Exeter. During the greater part of the work, Mr. James Baker was the contractor's foreman, and Mr. C. Noble the clerk of works.

Sheffield.—The Homes for the Aged Poor, erected by the Sheffield guardians in connection with the scheme for the classification of paupers, were opened on Thursday, the 7th inst., by the Lord Mayor, the Duke of Norfolk. The building fronts to Smilter-lane, and is built on land between that on which the Children's Homes have been erected and that in which the great building of the workhouse stands. At present only eight of the homes have been built, with room for extension to twenty-four. In the centre is the administration block, and on each side four domiciles. They are for married couples, and vary somewhat in design to those intended to be built for either two single men or two single women. Baths are provided, and there is a large clubroom, in which they can all meet together. The ground has been laid out with a walk and terrace in front of the row, and flower-beds and grass plots, with seats, the inmates being encouraged to tend the gardens. The central block includes bedrooms and stores room for administrative purposes. All the apartments to be used by the aged couples are now on the ground floor, and there is also provided a long ambulatory for walking exercise in wet weather. Mr. George Carr was the contractor for the buildings; Mr. S. H. Uttley fitted the baths and did all the plumbing; Mr. C. J. Innocent, of 17, George-street, Sheffield, is the architect.

Stalybridge.—The foundation-stone of the free library to be presented to the town of Stalybridge by Mr. J. F. Cheetham was laid the other day. The site, which is situated on the east side of Trinity-street, near the Victoria Market, is provided by the Corporation, and a new post-office will be included in the new block of buildings. Mr. Cheetham has undertaken to defray the cost of the erection of the library, the amount estimated being about £6,000. Mr. Medland Taylor, of Manchester, is the architect of the library, and Mr. Henry Tanner, of H.M.'s Office of Works, Whitehall, has prepared the design for the post-office, a similar treatment for both buildings being adopted. The elevations show a block of buildings, Jacobean in style, with big mullioned windows and bold cornices. The work will be carried out in stone, with some red brick introduced in the chimneys and in the plain wall surfaces. To Trinity-street there is a frontage for the two buildings of about 130ft., two-thirds of which is occupied by the library. This façade is broken up by boldly projecting and gabled bays. There are upper floors to both library and post-office along Trinity-street front, that of the library being mainly occupied by a lecture hall, which extends nearly the whole length of the building. The other principal rooms of the library are a large newsroom, a reference library, a lending library, and boys' and ladies' reading-rooms. A central hall gives access to all these rooms, which are ranged round it, divided off by glazed partitions. The reference library will be furnished and treated as a private reading-room. It has two large bays and an ingle nook, in which there will be an open fireplace. The site has been cleared of the old buildings and workshops which have hitherto stood there, and it is probable that active building operations will be commenced early in the new year.

COMPETITIONS.

Bootle.—The competition for the proposed Technical School has just been decided. The town council received 22 sets of plans and designs for the buildings, the estimated outlay being £15,000, and called in as assessor Mr. W. E. Willink, A.R.I.B.A., of Castle-street, Liverpool. Acting upon his advice, they resolved, on the recommendation of the Free Library and Museum Committee, to divide the first and second premiums, together amounting to 80 guineas, between Messrs. Best and Callon, of Prince's Mansions, Victoria-street, Westminster, and Messrs. Woodhouse and Willoughby, 100, King-street, Manchester, and to award the third premium of 20 guineas to Mr. A. J. Rowley, of High-street, Oxford. Although the merits of the first two designs were obviously so evenly balanced that the assessor could not see his way to place either distinctly first, Mr. Willink advised that the plans of Messrs. Best and Callon were "better adapted to meet the requirements of the school," and this view being adopted by the town council, that firm have accordingly been appointed as architects for the building.——Another competition is pending at Bootle, and it is to be hoped will be more definitely decided. The town council have also resolved to advertise for competitive plans for new fire-brigade and police sub-stations, and to offer premiums of 50 and 25 guineas, under certain conditions, to the plans placed first and second in order of merit by a professional referee to be engaged to adjudicate upon the plans sent in. The limit of cost is £14,000 for the fire-brigade station and firemen's dwellings and £1,500 for the police sub-station. Plans are to be sent in by December 31st.

Bury Art Gallery and Free Library.—A specially convened meeting of the Art Gallery Committee of the Corporation of Bury, Lancs, was held on Thursday in last week to receive the report of the assessor (Mr. R. Knill Freeman, F.R.I.B.A.) upon the plans, sent in for competition, for the new Art Gallery and Free Library which it is proposed to erect in Moss-lane. There were 22 sets of plans, consisting of 109 separate drawings, sent in. The assessor reported favourably upon the following seven:—"Mezzotint," submitted by Messrs. Woodhouse and Willoughby, Manchester; "Octagon," Messrs. Cheers and Smith, Blackburn; "Plan," Mr. John Johnson, London; "Diadem," Messrs. Gibson and Russell, London; "Star in a Circle," Mr. F. J. Parkinson," Blackburn; "Simnel," Messrs. Maxwell and Tuke, Manchester; and "Ballon d'Essai," Messrs. J. D. and S. J. Mould, Bury and Manchester. Mr. Freeman further recommended that the three premiums be awarded as follow:—(1) "Mezzotint," (2) "Octagon," (3) "Plan." It was decided that the public be permitted to view daily during the present week from ten to five o'clock, and that the Art Gallery Committee meet at a later date to decide which of the premiated designs be recommended to the council for adoption.

Leicester.—The design of Mr. Hy. Harper, Nottingham, architect, has been selected for the new church and schools (Primitive Methodist) proposed to be erected at the junction of Hinckley and Fossee-roads, Leicester. The church will seat 1,000 persons, and the schools will accommodate 1,000 scholars in three departments, infants, juniors, and institute, each with assembly hall and class-rooms. The cost will be £6,000.

Leeds.—Seventeen sets of plans have been received for the dead meat market and abattoir which it is intended to erect in Leeds. The sub-markets committee of the corporation spent two hours and a half on Friday examining the plans. They will hold another meeting in a few days to make a further inspection, and to reduce the list from which a selection may ultimately be made.

Peterborough.—The city council have held a special meeting to consider plans and suggestions for improving and enlarging the present municipal buildings, and after examining schemes prepared by local architects for members of the council, and estimated to cost respectively £14,000 and £2,500, resolved to invite architects to send in competitive designs for additions to the present building, the cost being limited to £2,500, and £50 was also voted in premiums, with the understanding that the principal prize shall merge in the ordinary commission, should the author of the design placed first be appointed architect.

CHIPS.

In the list of receiving orders published in Friday's *Gazette* the name appears of Harry Willard, of Tunbridge Wells, architect.

The new Law Library, Liverpool, is being warmed and ventilated by means of Shorland's patent Manchester stoves, patent Manchester grates, and patent exhaust roof ventilators, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

Mr. J. Passmore Edwards has subscribed £6,000 towards the building of a Friendly Societies' Convalescent Home at Herne Bay. He will lay the foundation-stone on Saturday, the 6th of November. The building will stand on a site of 7½ acres in extent, about a mile from the town, and will accommodate 50 beds.

During the past three months St. Mary's Parish Church, Bellevue, Edinburgh, has undergone extensive alterations and improvements. The electric light has been introduced into the building, more modern heating arrangements have been carried out, the sitting accommodation has been improved, and the interior has been redecorated. The total cost of the works, the plans of which were prepared by Messrs. Sydney Mitchell and Wilson, architects, was about £1,000.

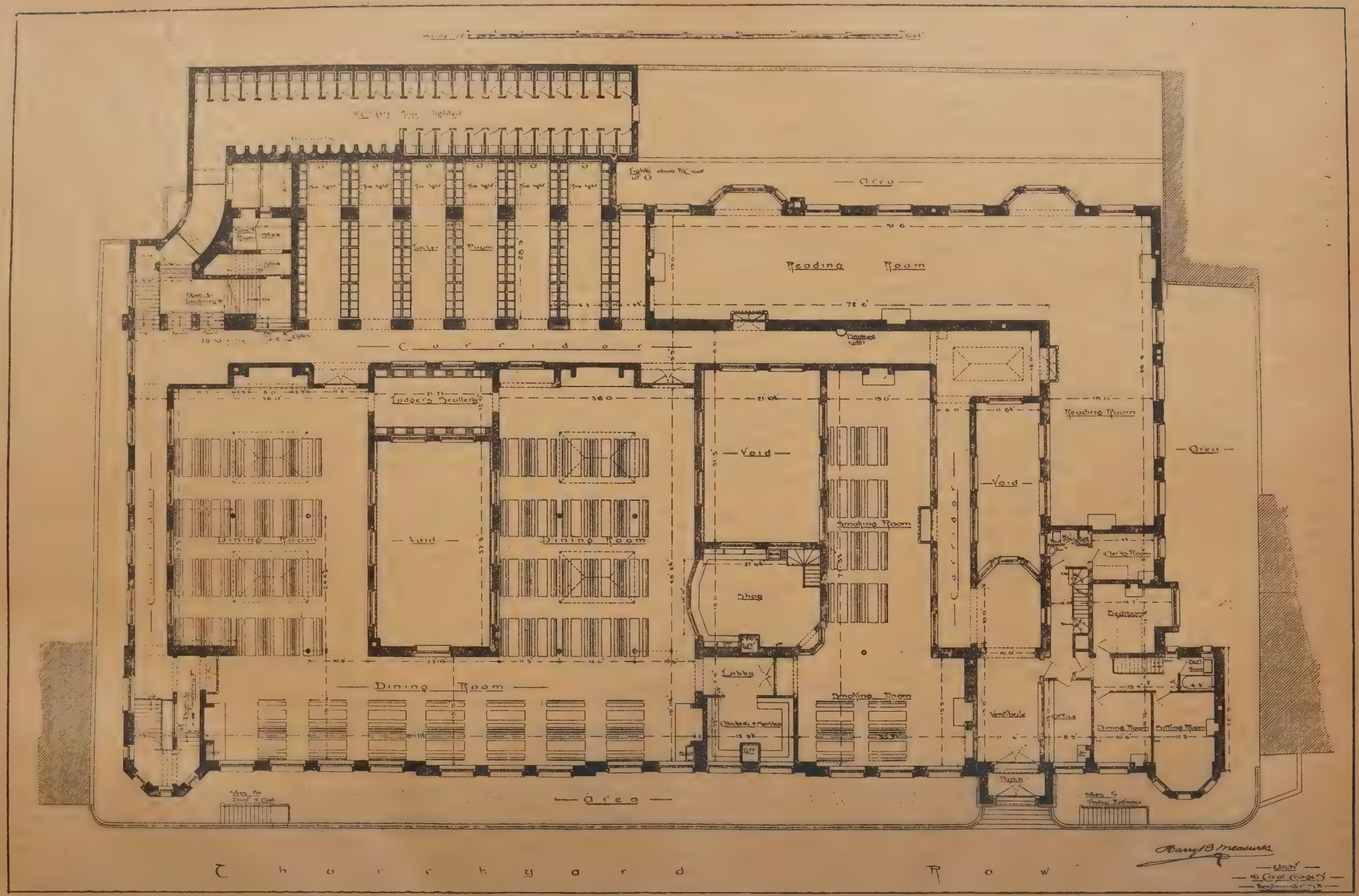
The first section of the new Court-houses in Glasgow was occupied on Friday for the first time. On the street floor of the new portion are the offices allotted to the Justices of the Peace department and those of the small-debt department; the first floor is devoted to the chambers of two of the sheriffs, and a jury Court-room, with retiring-rooms, and the second and third floors will be occupied wholly by the Procurator-Fiscal's department. The new section has been under reconstruction for more than two years, and a similar period will elapse before the reconstruction of the older portion of the building is completed.

A Local Government Board inquiry was held at Whickham, on Friday, before Colonel Albert J. Hepper, D.S.O., R.E., in regard to an application by the Whickham Urban District Council to the Local Government Board for sanction to borrow £1,200 for works of street improvement, £6,620 for works of private street improvement, and £1,698 for works of sewerage.

It is proposed to erect new parish buildings at Saltash, from Mr. Edmund Sedding's designs. The old schoolroom at the south-east corner of the church is to be utilised in the new buildings. Messrs. Hobbs and Bartlett's tender has been accepted, and the building is to be commenced at once.

A new church was opened on the 14th inst. at Ballasalla, near Castletown, Isle of Man. St. Matthew's new church has just been opened in Lower Douglas, and in Upper Douglas a new church is contemplated to meet the growing population in that district. An effort is being made to restore St. George's Church, for which £2,000 has been raised. St. Thomas's and other edifices in Douglas are being restored and redecorated.

At the Northamptonshire County Council on Friday Mr. Charles Edward Paget, M.R.C.S., medical officer of health for the borough of Salford, by 51 votes to 1 was appointed county medical officer, at a salary of £700 a year and expenses. There were 48 applicants for the post.



ROWTON HOUSE, NEWINGTON BUTTS.

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RENAISSANCE ARCHITECTURE IN ENGLAND.—NEW BANK AND BUSINESS PREMISES, STROUD GREEN ROAD, N.—CHRIST'S HOSPITAL, HORSHAM.—DESIGN FOR NEW CHURCH, EXETER.—NEW HOUSE AT HAMPSTEAD.—COTTAGE AT LIMPSFIELD.—HOUSE AT OAKLEIGH PARK.—PLANS OF ROWTON HOUSE, NEWINGTON BUTTS.

Our Illustrations.

RENAISSANCE ARCHITECTURE IN ENGLAND.

This work, by Reginald Blomfield, M.A., is reviewed on p. 571.

BANK BUILDINGS, STROUD GREEN ROAD, N.

This block of buildings has recently been erected upon a commanding site at the junction of Stroud Green-road and Hawley-road, N., and the premises at the corner are occupied by the London and South-Western Bank. Messrs. Truefitt and Watson, MM.R.I.B.A., of 5, Bloomsbury-square, are the architects. The lower portion is built entirely in white Mansfield stone, while the upper stories are faced with red bricks with stone dressings.

CHRIST'S HOSPITAL NEW SCHOOLS, STAMMERHAM, NEAR HORSHAM.

On Saturday the 23rd (to-morrow), it being the anniversary of the founding of Christ's Hospital Schools in Newgate-street by King Edward VI., His Royal Highness the Prince of Wales will lay the foundation-stone of this vast pile of buildings, of which Messrs. Aston Webb, F.S.A., and Ingress Bell are the joint architects. The plans were chosen in competition, and we illustrated the majority of the designs submitted by the selected competitors in the Building News for June and July, 1894. Since then a controversy has been carried on by those who have sought to upset the erection of these admirable schools on the site at Horsham, which was purchased by the governors for the purpose. The bird's-eye view given to-day from the architect's Royal Academy drawing shows the whole scheme, which has been modified somewhat in detail from the original plan, though substantially the arrangement follows out the first idea. There can be no doubt as to the excellent character of the plan as a whole shown by the block plan published herewith, and, architecturally, the governors are to be congratulated on the choice which was made when their architects were appointed, for the selected design, as we said at the time, was undoubtedly the best, admirable as some of the other schemes unquestionably were. The original detailed plan, now being carried out in the main, will be found in the Building News for June 22, 1894. We have no further particulars at the moment.

NEW CHURCH, EXETER.

From the Royal Academy we give a drawing of this church, as designed by Messrs. Hall, Cooper, and Davis, architects, Scarborough. There were a very large number of plans submitted for the work, and this among the number. It is freely handled in many ways, and is suggestive, as an endeavour to get away from the usual methods for ecclesiastical work, without needlessly departing from the historical type which long usage has established as fitting.

NEW HOUSE AT HAMPSTEAD.

The general idea in designing the house which is the subject of the present illustration has been to obtain some of the excellent effects produced by the beautiful old manor houses of the 16th and 17th centuries which are so numerous in this country, where, with very moderate dimensions, a certain amount of dignity is obtained by a somewhat symmetrical front, combined with the regularity which is the result of an attention to convenience and economy. The building is of brick, covered with rough-cast (as a protection against the driving rain to which the house is exposed), with stone dressings. The mullions are generally of stone, but in some parts of the house, not shown in the present view, they are of wood, and the gables of black and white half-timbered work. The porch, shown in the sketch, has the dining-room on the right and the drawing-room on the left, and in the rear is a lofty hall with large windows for the display of some fine old stained glass. It has a coved ceiling of plaster-work, and the ceilings of the principal rooms are also enriched. There is a billiard-room, morning-room, schoolroom, and boudoir, in addition to the usual bedrooms, &c. The chief rooms have hangings and panelling on the walls, and tall oak mantelpieces. The garden, which is rather difficult to arrange on account of the rapid fall of the ground, will be carried out with terraces and balustrades in the style of the house. The contractors are Messrs. Stephens and Bastow, of Bristol, and the architect is Mr. Thomas Garner, 7, Gray's Inn-square.

COTTAGE AT LIMPSFIELD.

This cottage overlooks one of the most extensive views in Surrey, and on this account two sitting-rooms have been placed upstairs and one bedroom is on the ground floor. The building is very simple and inexpensive, but solid oak of plain design has been used inside, with old Dutch tiles for the fireplaces, and the rooms are effective and pleasing. Mr. R. Brasier was the builder, and the amount of his contract was £705. The architect is Mr. Arthur Keen, of Gray's Inn.

HOUSE AT OAKLEIGH PARK.

This house, also from the designs of Mr. Arthur Keen, was recently built in Athenæum-road for Mr. James Collingwood. Messrs. Woodrow and Pitcher were the builders, and they executed their work in a very creditable manner.

ROWTON HOUSE, NEWINGTON BUTTS.

(A description of these illustrations appears on page 576).

CHIPS.

The Property Committee of the Hull City Corporation have agreed to sell to the Hull and Barnsley Railway and Dock Company the whole of the land known as the Western Reservation, this being required for quay and storage accommodation.

Mr. H. C. Oakley, of Southampton, has been appointed Master of Design at the Leeds School of Art.

Mr. H. H. Law, a Local Government Board Inspector, attended at the Todmorden Town Hall on Friday to inquire into an application made by the town council for sanction to borrow £4,150 for public walks and pleasure grounds on the Stile estate, and £6,500 for the purchase of certain premises opposite Waterside Mill for a depôt, fire-engine station, wharf, stables, &c. No opposition was offered.

Noticeis given in the *London Gazette* that a petition has been presented to her Majesty in Council by Thomas Bonnar and others and the Worshipful Company of Painters, praying for the grant of a charter of incorporation to "The Institute of British Decorators," and her Majesty having referred the petition to a committee of the Lords of Council, notice is given that all petitions for or against such grant shall be sent to the Privy Council on or before the 24th prox.

The West Riding Rivers Board, at a meeting held on Friday in the Town Hall, Wakefield, considered two schemes for the alteration of the offices of the board—scheme A, which provided for the alteration and extension of the existing offices at an estimated cost of £750; scheme B, which included the provision of a new board and other rooms, at an estimated cost of £1,050. The board decided to discuss the matter in committee.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Birmingham Architectural Association.—The annual conversazione of this association was held on Friday last, by the permission of the Royal Society of Artists, at their galleries in New-street. In addition to the attractive exhibition of paintings on the walls, there was a collection of drawings, photographs, &c., of local architectural work, supplemented by others sent by several leading London firms. Mr. Alfred Gregory's band played a selection of instrumental music during the evening.

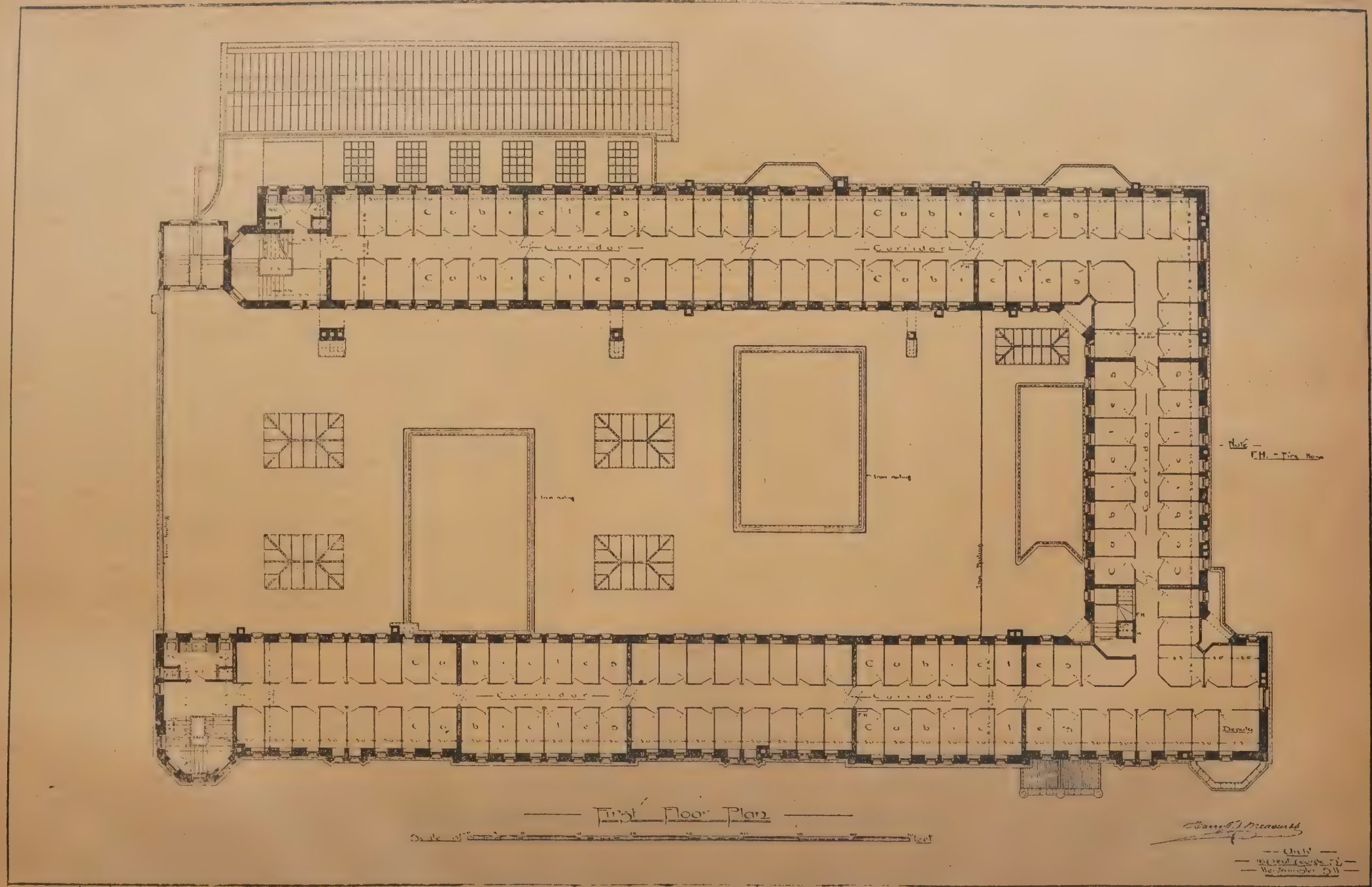
Royal Institute of British Architects.—The inaugural meeting of the session 1897-8 of this Institute will be held on Monday, Nov. 1, at 8 p.m., when the opening address will be delivered by Professor George Aitchison, A.R.A., president. The programme for the subsequent meetings is as follows:—Nov. 15, "Notes on Renaissance Architecture in Malta," by A. S. Flower, M.A., F.S.A.; Nov. 29, business meeting; Dec. 13, "Brickwork Tests: Report on the Third Series of Experiments," by members of the Science Standing Committee; Jan. 17, 1898, award of prizes and studentships, preceded by business meeting; Jan. 24, President's address to students, presentation of prizes; Feb. 7, "The Housing of the Drama," by E. O. Sachs; Feb. 21, "The Mediæval Campanile at Rome," by J. Tavenor Perry; March 7, business, including election of Royal Gold Medallist; March 21, "The Heraldry of Antiquity," by G. H. Birch, F.S.A., and "Heraldic Drawing," by J. D. Crace; April 4, "Artistic Copyright," by G. Harmand, Avocat à la Cour d'Appel, Paris; April 18, "Domestic Architecture in the United States," by A. N. Paterson, M.A.; May 2, annual general meeting; May 15, "The Libraries of the Middle Ages," by T. G. Jackson, R.A.; June 6, business, annual election; June 20, presentation of the Royal Gold Medal, address by the president.

The Auctioneers' Benevolent Fund.—The thirty-fourth annual general meeting of the donors and subscribers to the Incorporated Auctioneers' Benevolent Fund was held on Monday at the Mart, Tokenhouse-yard, Mr. Daniel Watney (treasurer) presiding. In the report for the year ending 30th June last it was stated that the subscriptions had exceeded those of any previous year, the amount being £393, whilst the donations were close on £36. The investments now had reached the figure of £9,035. A larger number of cases than usual had been relieved during the year, and the committee expressed the hope that there would be a corresponding increase in the number of subscribers to this deserving charity. The chairman said that the report was, he thought, a very satisfactory one. Ten years ago the investments were £4,014. Now they were over £9,000. Again, ten years ago the annuities were seven in number, and now they were 14. He moved the adoption of the report. The motion was seconded by Mr. H. J. Thurgood, and agreed to, and the retiring members of the committee, Messrs. C. E. Cæsar, F. Lewis, C. Oakley, E. W. Rushworth, H. J. Thurgood, and S. Walker, were re-elected.

Lady Margaret Charteris laid, on Friday, the dedication-stone of the church of St. Cuthbert's, Millwall, to which will be added a club and school-rooms.

The Bishop of Ripon will shortly consecrate the new church of St. Luke at Harrogate, which has been built to meet the requirements of the thickly-populated Skipton-road district. The cost of the building, exclusive of the upper part of the tower and spire, is £8,000. The seating accommodation is for 800 persons.

The City Court of Common Council received at their last meeting a report from the Bridge House Estates Committee, making proposals for dealing with premises in Finsbury-circus, West-street, Finsbury-pavement, Albion-place, London-wall, and Blomfield-street, at the expiration of the present leases in 1899. The committee suggested that the whole of this great area should be rebuilt and improved, and they anticipated that the rental value of the ground would be increased from £4,000 to £20,000 a year by the improvement. The report proposed the formation of a new street parallel with Moorgate-street, and that the whole area should be put up to public competition as building land. Strong opposition was offered to the proposals on the part of the present tenants of the properties, and its consideration was adjourned till Thursday in next week.



ROWTON HOUSE, NEWINGTON BUTTS.

"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.

NEW HOUSE AT HAMPSTEAD. THOS. GARNER, ARCHT.

COTTAGES · AT · LIMPSFIELD · SURREY · ARTHUR · KEEN · ARCHT

Ground Plan.
Arthur Keen
Archt

HOUSE · AT · OAKLEIGH-PARK · N · ARTHUR · KEEN · ARCHT

"PHOTO-TINT" by James Akerman, 6, Queen Square, London, W.C.

Staircase Whitecross Street E.C. Existing 1888

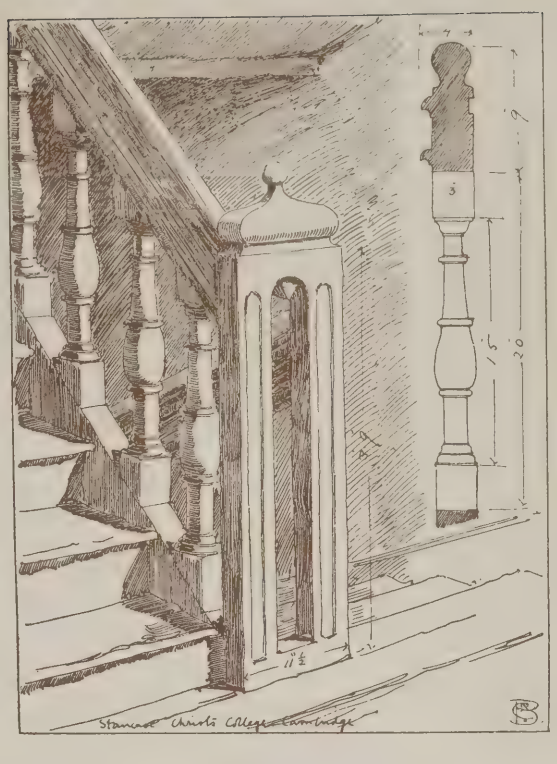
Christ's. school. Sal

Centre of Front Wilton

Staircase Great Wigsell Hawkhurst 1886

Illustrations reproduced by permission of Geo. Bell & Sons

Wolseys Arms Terra Cotta Plaque
Hampton Court



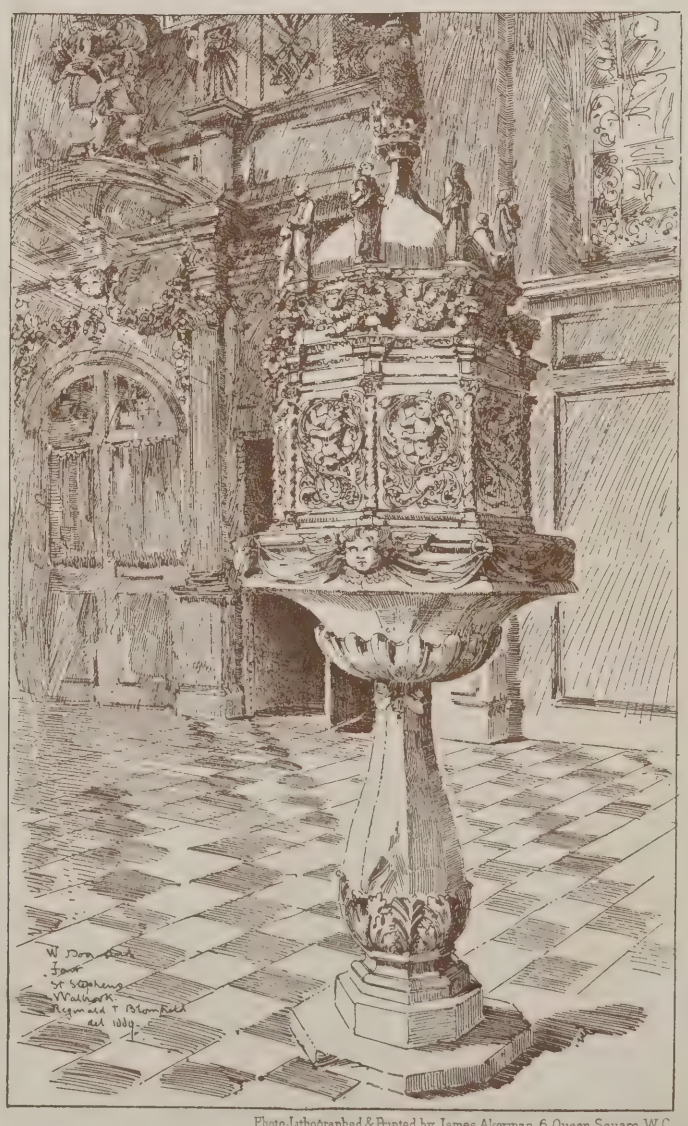


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

CHRIST'S-HOSPITAL· THE·NE

MESSRS ASTON·WEB

FOUNDATION·STONE·TO·BE·LAID·BY·H

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

BOARDING · SCHOOLS · NR HORSHAM ·

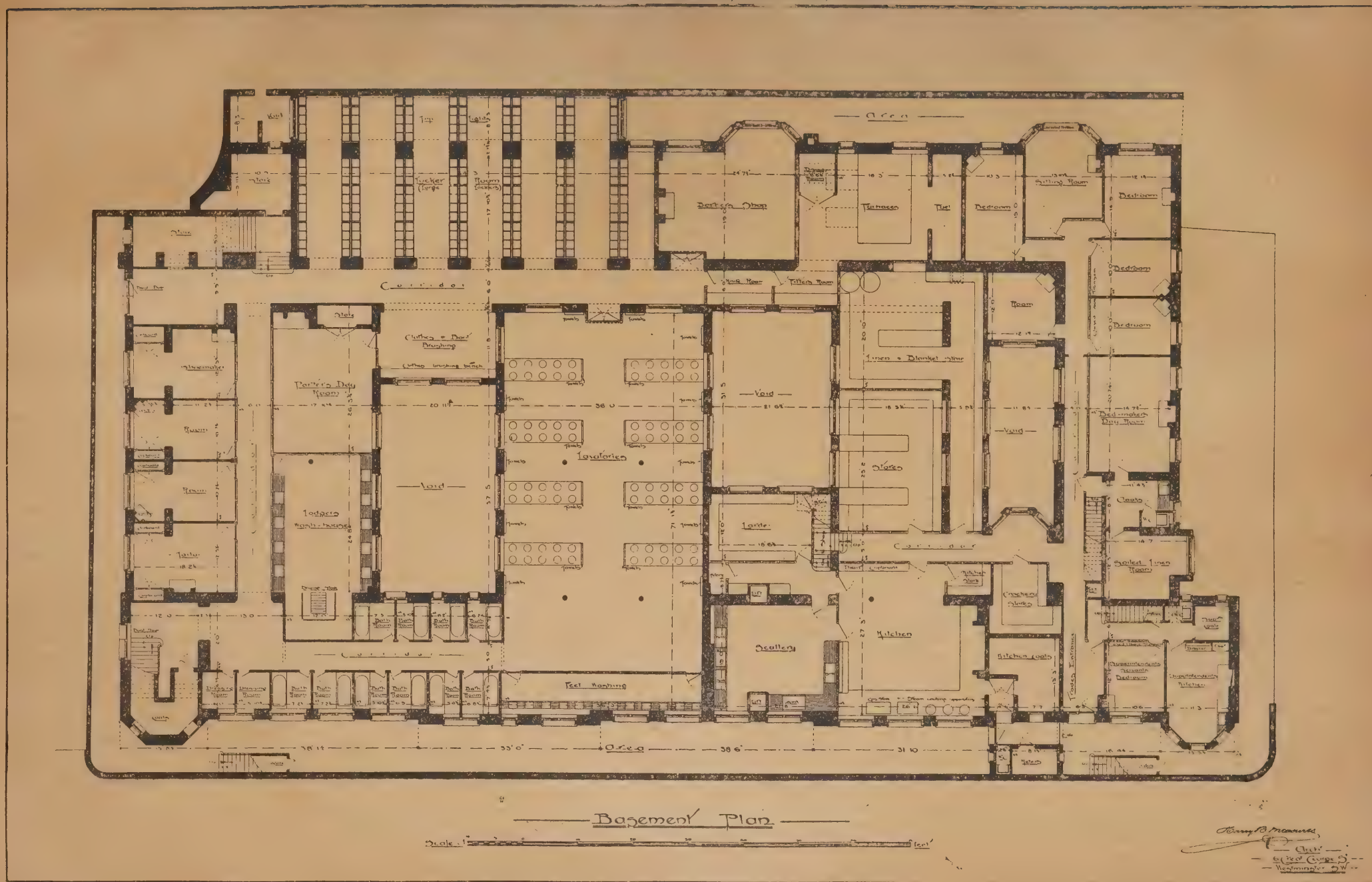
· INGRESS BELL · ARCHTS ·

H · THE · PRINCE · OF · WALES · K · G · TOMORROW ·

"PHOTO-TINT," by James Akerman

NEW BANK & BUSINESS PREMISES · STROUD GREEN ROAD · N · MESSRS TRUEFITT & WATSON ARCHTS

Photo-Lithographed & Printed by James Akerman to Queen Square W.C.



ROWTON HOUSE, NEWINGTON BUTTS.

Engineering Notes.

Apperley Tunnel.—The Midland Railway Company are about to undertake an improvement which will have a great effect in facilitating the traffic between Leeds and Bradford and Leeds and the North. The improvements that have now been going on on that part of the system have practically been bought to a standstill on account of the obstacle presented by the Apperley and Shipley tunnel, about three-quarters of a mile in length, which will not allow of the continuation of the four sets of metals now carried up to within a short distance of each side of it. It is proposed to construct a second tunnel alongside the existing one, and through this will be continued the four sets of metals that have been laid almost as far as Apperley Bridge. The new rails will join the main line again on the Leeds side of Shipley, at the point where the four roads have been laid from Bradford in the direction of Leeds. Already negotiations are proceeding for treating with the landowners, and a Bill will be promoted by the company in the next session of Parliament for power to acquire the necessary land and construct the tunnel.

City and South London Railway.—Under the engineering supervision of Sir Benjamin Baker and Mr. David Hay, Messrs. John Mowlem and Co. are carrying out the extension works of this railway, which comprise the boring of a couple of tunnels from the Borough side of London Bridge, under the bed of the Thames, and on to Lombard-street (where the difficult task of preserving the Church of St. Mary Woolnoth intact while constructing a railway station in the earth beneath the building is being accomplished), and thence to Short-street, Finsbury-pavement. This work probably will be completed by the end of next year. The company has power to continue the railway as far as the Angel, at Islington, but that work has not yet been put in hand. Meanwhile the company is arranging to proceed forthwith in the work of extension at the other end of their line by carrying the railway from the present southern terminus at Stockwell to Clapham Common.

Mersey Dock Extensions.—The important scheme of dock extension at Liverpool was formally submitted to the Mersey Docks and Harbour Board at the last meeting. The works committee, with a view to providing increased accommodation for vessels of the largest class, recommended for approval a scheme of the engineer, which will involve an estimated expenditure of £316,000. They also recommend that borrowing powers be sought for defraying the cost of these projected works, in addition to £817,000 for works authorised by the Act of 1891, and £300,000 for the construction of the new tobacco warehouses at the Stanley Dock. The total sum required will be £4,433,000. At the south end it is proposed to construct four branch docks, two on the west side of the Queen's and two on the west side of the Wapping Docks, flanked with double-story sheds, and to deepen and widen those docks and the connecting passages. There is to be a 630ft. graving dock on the site of the present Queen's half-tide dock and a 620ft. graving dock on the site of the present Brunswick graving dock. The Coburg, Brunswick, and Union docks are to be deepened and otherwise brought up to present requirements. The improvements at the north end include the construction of a branch dock on part of the site of the Sandon graving docks, flanked with double-story sheds. There is to be a graving dock of 1,000ft. long and 90ft. wide near the Huskisson dock. Part of the Sandon dock is to be converted into a deep branch dock, and the Huskisson branch docks No. 1 and 2 are to be improved and deepened. The outcome of the scheme is that provision will be made for a very large number of vessels of 800ft. long, for a number of vessels over 900ft. long, and, roughly, about 250,000sq.yds. of shed floor. It also provides three excellent new graving docks, and a new entrance is made into the southern system. The south-end docks, which are to be brought up to date, were constructed from 80 to 100 years ago, and when the Wapping and Brunswick docks were constructed, a vessel of 150ft. was looked upon as a big ship.

Montreal.—The great Victoria Tubular Bridge, carrying the Grand Trunk Railway across the St. Lawrence River, Montreal, which was built by Robert Stephenson during 1854-1859, is to be replaced by truss spans carried upon the original masonry piers. The old bridge was one of the wonders of engineering skill at the time of its erection. The work upon the new structure has been commenced in the present year under the supervision of Mr. Joseph Hobson, chief engineer, Grand Trunk Railway. The tubular bridge was a single-track structure, and formed a continuous iron tunnel, the tubes being connected over the piers; and though in recent years ventilating opening have been cut, yet the smoke and gases from the engines have induced corrosion, while there has been some corrosion of the floor system by the brine dripping from the modern refrigerator cars. The rails are carried on longitudinal timbers. The new bridge will contain two lines, and will, like the present bridge, have 25 spans; 24 of these will be 254ft. long, and the other will be 348ft. span. All the spans will consist of two pin-connected trusses, 31ft. 2in. centre to centre, and 40ft. deep, with plate-girder floor beams suspended from the pins of the bottom chord. The chords will be parallel, making trusses of uniform depth, except that the 348ft. span will have a curved upper chord. Across the top of each pier, under the ends of, and parallel with the trusses, are 14 rolled joists 24in. deep, seven on each side, and upon these rest the shoes. The rails of the two tracks will be spiked to sleepers 23ft. long, laid in troughs composed of two angle irons. Heavy timber guard rails will be laid outside the rails of the permanent way. The floor girders extend about 17ft. beyond the trusses, carrying a roadway 12ft. wide, and a footwalk 4ft. wide. A local electric tramway company will run a service of cars over the bridge in the space between the railway trains. The trolley will be suspended from the top lateral bracing by insulated hangers. The bridge is to be of mild steel. The trusses will be erected by the Detroit Bridge Works, but the building of the trusses has been distributed as follows:—Ten by the Detroit Bridge Works, nine by the Union Bridge Company, and six by the Dominion Bridge Company.

Newfoundland.—The Newfoundland transinsular railway is now an accomplished fact. The line extends from St. John's, the capital, on the eastern coast, to Port-aux-Basques, at the south-western extremity of the island, 50 miles from Cape Breton. A railroad now unites all England's possessions in this quarter of the globe, stretching from the Atlantic to the tidewaters of the Pacific, unbroken save at Cabot Strait, between Port-aux-Basques and Sydney in Cape Breton, which channel will be bridged by a fast ferry steamer, covering the distance in six hours. The trip across Newfoundland will be made in 24 hours. The line is narrow gauge (3ft. 6in.), laid with 50lb. rails, and was built by R. G. Reid, of Montreal, who constructed much of the Canadian Pacific road. All the bridges are of steel with native granite piers and abutments laid in ashlar masonry. For the accommodation of tourists large hotels will be built at suitable points along the line. The main or through line is 547 miles long, with a branch line of 29 miles to Brigus, Harbour Grace, and Carbonear, another of 26 miles to Placentia, and a third of 12 miles to Notre Dame Bay. The total mileage is about 615, and the cost has been 15,600dol. per mile, a total of 9,594,000. There remain stations, terminals, and docks to be built yet, which will increase by 500,000dol. the colony's total outlay for railway purposes.

The parish schools in St. Nicholas Churchyard, Ipswich, were formally reopened on Thursday in last week by the Dean of Norwich, after having been rebuilt from plans by Mr. Frank Brown, of Prince's-street, Ipswich, and conversion into a parochial hall. The new hall measures 38ft. by 25ft., and is 18ft. in height. It is seated with chairs for 300 persons. Mr. W. Grayston, of Ipswich, was the builder.

At a special meeting of the urban district council for Mold, Mr. Edwards, of that town, was appointed as surveyor, in succession to Mr. Isaac Jones, resigned. It had been said at a previous meeting, that no candidate from England or even South Wales would have a chance if accepted, and of the 29 candidates the selection by the committee comprised five names, four of residents in the town and one at Swansea, the latter being, of course, at the bottom of the poll on the preliminary voting.

A license has been granted by the East Sussex magistrates for a residential hotel to be erected on the roadside between Crowborough Cross and Uckfield. The total cost of building and stables, for which Mr. Samuel Denman, of Brighton, is the architect, will be between £15,000 and £20,000.

STAINED GLASS.

Birmingham.—The west window in St. Philip's Church has been filled with stained glass as a memorial to the late Bishop Bowlby. It was designed by Sir Edward Burne-Jones, and has been executed partly under the direction of the late Mr. William Morris, and since his death completed by his firm. The subject is "The Last Judgment," thus completing the original scheme, the three chancel windows illustrating the Incarnation, the Crucifixion, and the Resurrection and Ascension. The highest portion is, says the *Birmingham Post*, occupied by the figure of Our Lord in glory, wearing the crown of thorns, His right-hand raised in blessing, His left-hand pointing downwards. He is seated on the great rainbow throne, beneath and around which is shown the light of a broken and troubled dawn. Behind the figure of Our Lord are seven angels, bearing the seven vials, standing out from a crowd of seraphic and angelic forms which fill the background. Beside the Judge, a little lower, are two angels, one of whom holds the sealed book, while the other holds the chain and the keys which are to bind the Great Dragon, the Spirit of Evil, when judgment is completed. The centre compartment of the window is allotted to the Angel of Judgment, blowing the trumpet which calls the quick and the dead before the judgment seat. Behind, and again somewhat below this figure, are towers and cities shaken by an earthquake into ruins. Again below, in the nearest compartment, is a group of those who are answering the call to judgment—men, women, and children. Below all a line of cold, flat, grey tombs forms the base of the design.

CHIPS.

The new church of St. Luke at Harrogate will shortly be consecrated by the Lord Bishop of Ripon. The church, which seats 800 people, has been erected at a cost of £8,000.

In order to provide for a great increase of traffic, the Great Northern Railway Company is about to double its branch from Luton to Dunstable. The widening of the main line between King's Cross and Huntingdon is proceeding rapidly, and already several sections have been opened for traffic.

The Islington Vestry has decided to subscribe £2,000 towards the purchase of the Churchyard Bottom Wood, Highgate, provided that the balance of the purchase-money—£23,000—is otherwise subscribed.

The remarkable collection of Greek coins of Asia Minor formed by the late French Ambassador, M. W. H. Waddington, which has recently been purchased by the French Government for the Bibliothèque Nationale for £16,840, places the French collection of the Greek autonomous and imperial coinages of Asia Minor far ahead of those of the British and Berlin Museums.

The Nottingham Corporation on Saturday purchased the city tramways at a cost of £80,000, representing a payment of £10 per share.

The work of surveying and building the railway between Moscow and Windau is being actively proceeded with. The section between Tukum and Windau, 104 kilomètres long, will be completed and opened for traffic next summer.

In commemoration of the Diamond Jubilee a set of hemispherical chimes of ten bells has been erected at St. James's Church, Bermondsey, at the expense of an old parishioner. The fine peal of ten bells, which had not been rung for a long time, has also been put in thorough order. The bells were dedicated on Saturday. These commemoration schemes are in addition to the building of almshouses in the parish, towards which nearly £2,000 has been subscribed.

At the last meeting of the Weymouth Town Council it was stated that the Great Western Railway Company have in contemplation important works of railway extension, under an arrangement with the Government. At present the district of Wyke Regis, overlooking Portland Roads, and where are situated the Whitehead torpedo works, are not served by any railway, the nearest line being the joint line between Weymouth and Portland. It is now proposed to make a line to pass through Westham and Wyke, passing by Sandsfoot Castle to Newton's Cove. In connection with this scheme the Weymouth Council are applying for a loan of £11,000 for purposes of harbour improvements.

At the last meeting of the Burton-on-Trent Town Council, a long and animated discussion took place on the application of the late surveyor (Mr. J. E. Swindlehurst), now city surveyor of Coventry, for the payment of £150, for professional service rendered in respect of outstanding corporation contracts, the contention of several members being that the claim was exorbitant, and it was agreed that the matter be referred to the committees affected, after an amendment, offering £75 in full settlement, had been defeated.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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NOTICE.

Pound copies of Vol. LXXII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

RECEIVED.—P. J. S.—I. T. C.—H. R.—O. B. and Co.—G. J. H.—T. P.—W. and Son.

"BUILDING NEWS" DESIGNING CLUB.

JOHN R. PATRICK. (We fear you do not read your BUILDING NEWS, otherwise you would have seen the subject with which the Club opens the present session, published in last Friday's issue, on page 540.)—H. P. GREEN. (Yes; the drawings are returned to the competitors. One sheet of paper of the stated size should only be used.)—SMALL FRY. (Age is no criterion. We want contributors not so young as to be unprepared to learn, and not too old to be beyond work.)

Correspondence.

COMPETITIONS TO BE AVOIDED.

To the Editor of the BUILDING NEWS.

SIR,—Is it still beyond the powers of competent architects to resist the temptation to indulge in gambling? If it were, surely the local authorities would not be so persistent in their endeavours to organise lotteries in the form of architectural competitions. Here is a sample: A town that shall be nameless requires a public building, to cost several thousands. Two premiums are offered as a bait. The aggregate amount of the premiums is probably not more than one-twentieth the sum that the foolish competitors will find themselves out of pocket after the lottery is over; and, by the way, only one-sixtieth of the amount expended will need to be paid to innocents who are attracted, because, as usual, the larger premium will merge in the commission. The maximum remuneration to be gained by the successful competitor for services to be rendered, will be, in round figures, £500, provided he be appointed architect; but, after all his expenses in preparing sketch-plans (which in reality will be gratuitous work), he is asked to plunge deeper and deeper into expense before he can, with certainty, hope to secure the commission, for he must be prepared to secure a builder's tender to carry out the work for the specified sum, which will, in the first instance, involve the architect in surveyor's charges equal to, say, one-third his ultimate remuneration, which he must run the risk of having to pay should he be so unfortunate as to exceed the stipulated outlay, which, in the very nature of things is the most probable result of open competitions, because the man who succeeds is usually the one who can venture to promise what it is frequently impossible in the end to obtain for the expenditure proposed.

Surely it would only be fair, when promoters of competitions do select designs which in their judgment or their advisers' appear desirable and feasible within the prescribed limit of cost, that they should at least bear the cost of taking out quantities and procuring tenders, whether the amount thereof comes within the prescribed limit or not. In that case the architect who competes, and succeeds in having his design selected, but who may fail to obtain tenders which are acceptable, has incurred quite sufficient loss and disappointment in paying for the work done, without being expected to bear the cost of quantities also.

One thing is often overlooked, even by professional assessors and others who advise promoters. An architect is supposed, after he has designed a building *sufficiently for competitive purposes*, without precise details, and in the absence of a bill of quantities, to have the faculty of determining to within 5 per cent. or 10 per cent. the probable cost of executing his scheme. I make bold to assert that, except as regards very small undertakings, such an idea is based upon one of the greatest fallacies the human mind ever conceived. Contractors are men who are presumed to have a most perfect knowledge of prices of materials and labour, and what do we find? Can they tell, if they look at the sketch plans and report of an architect, what a building will actually cost? When they are supplied with detailed bills of quantities, which it may have taken weeks or months to prepare, how do their tenders compare with each other? Do they agree within anything approaching 5 per cent. or 10 per cent.? Look at the published summaries of tenders in the professional papers—if possible, at some of the unpublished lists which every experienced architect has procured. Among men of experience, it is known that builders' tenders vary enormously.

The public need to have these matters driven home. Professional assessors and advisers to promoters need to be more candid and business-like in their advice. I have had experience both as a practitioner and an adviser in these matters, and it is due to those whom I have had the honour to advise to say that I have never failed to convince them of the folly of seeking to induce architects to give their services without reasonable remuneration. Speaking generally, I hold that open competitions are a failure and a delusion to competitor and promoter alike. Limit competitions, with the right kind of assessor, who, besides being an art critic and an expert, must be a man of sound common sense, who realises that architects, no more than other men, can afford to work for nought, may be satisfactory; but the client is in most cases wisest who can make up his mind as to what he requires, and then retains a reliable, candid architect known to understand the class of work to be executed to be his adviser.—I am, &c., M.S.A.

POOR MORTAR.

SIR,—If your correspondent "F. J. N." will read Mrs. Merrifield's work on "Cennino Cennono," and Eastlake's "Materials for a History of Oil-Painting," he will be able to form some idea of the kind of lime used by the old Roman fresco painters, and possibly thereby that used by the Roman builders, for it is not unreasonable to suppose the supplies for both workers would be drawn from the same source. As regards the experiment your correspondent relates, performed by Professor Lewis, the professor made one very important mistake—viz., excluded the air from nearly all the lime—thus your correspondent says "He (*i.e.*, the professor) joined pieces of flint with slaked lime, and freely exposed the pieces to the air." Now by doing this, the lime was inclosed as a layer between the two pieces of flint which were joined together, and as a consequent, the catalytic action of the atmospheric oxygen could not take place except at the edges of the layer of lime. If the professor had covered the pieces of flint with a not too thick layer of lime, and then exposed same to the air, he would have been experimenting on the right lines, for the atmospheric oxygen could then have reacted on the lime and the flint beneath it. Building mortar is porous (I am excluding hydraulic lime from consideration, as I made no reference to that in my initial letter on this subject), and therefore air can penetrate the half-moist layer of mortar that is usually laid between bricks, and as a consequence the air has full play on the lime and particles of sand inclosed therewith.—I am yours, &c.,

H. C. STANDAGE,
Consulting Chemist to the Colour, Varnish, and Leather Trades, and Manufacturing Chemist.

SIR,—Your correspondent "F. J. N." points out that the kind of lime has been ignored by your correspondents. This is not quite so, for the merest tiro must be aware of the fact that lime obtained from chalk is a different compound to that obtained from blue lias limestone, the former being a nearly pure lime, which cannot combine with sand chemically to make a silicate of lime; whilst the latter lime has in itself a large proportion of silica and alumina in a state eminently calculated to make such a combination not only possible, but a necessity. It follows, then, that chalk lime must set without forming any silicate of lime, which is not true of lias lime. That the two limes differ considerably, and consequently require different treatment, is evident, for one is soluble in water, and the other is not.

The expression, "stone" lime, is apparently one used only locally, where chalk lime is used too. It can have no particular meaning where the local limestone is a hard rock, like mountain limestone. This latter yields a lime as pure as chalk lime. I quite agree that where several names are given to one substance, these should be enumerated once for all; but when the modern name is given, it should be used exclusively afterwards, so as to accustom experts in building to the use of proper scientific names. I am obliged for Mr. Standage's explanation, and sorry my letter should have caused him any annoyance, for "no offence was meant."—I am, &c.,

W. E. M.

CHIPS.

A Conservative Club-house is about to be built at the corner of Queen-street and Regent-terrace, Penzance, from plans by Mr. Henry White. The estimated outlay is £1,500.

Under the Employers' Liability Act of 1880, the number of cases tried in the English County Courts last year was 258. The amount of compensation claimed was £36,943, and the total of the amount awarded was £12,540.

A drinking fountain has just been completed in Manchester-road, Bury, Lancs, the gift of an anonymous donor. Mr. T. R. Kitsell, A.R.I.B.A., of Plymouth, was the architect, and Messrs. J. and E. Goad, also of Plymouth, executed the work. It is English Renaissance in style, and is built of grey Dartmoor granite, with cornice and canopy of Portland stone, and columns of red Aberdeen granite. The cost has been £600.

At Christ Church, Lee Park, S.E., one of Sir Gilbert Scott's edifices, opened 40 years since, a chancel screen richly carved in Kentish oak, and decorated in style, has just been erected. It has been executed by Messrs. Harry Hems and Sons, of Exeter.

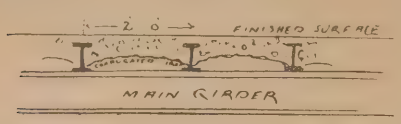
New roller flour mills have been erected in Battersey Field, Whittlesey. The mill, which is built of local bricks, is three stories in height, and has been erected by Messrs. R. Clark and Sons, Whittlesey, the woodwork being supplied by Mr. Charles Miller. The machinery has been put down by Messrs. Turner and Son, of Ipswich, and includes six sets of rollers, provision being made for adding others. Steam power is utilised, and a new steel boiler, with Galloway tubes has been put down. Special provision is made against fire, the partition doors between the mill and the granary being lined with iron.

The second annual dinner of the Peterborough Master Builders' Association was held at the Angel Hotel on Tuesday in last week. The chair was occupied by Mr. D. Gray (president of the Association), and the vice by Mr. J. Ruddle, and among those present were Messrs. J. W. Rowe, H. Hammond, James Hicks, J. Nicholls, J. Bridgefoot, M. Hall, W. Jellings, F. H. Cooke, Watson, J. Lucas, J. J. Taylor (secretary), &c. The chairman proposed "The Architects and Surveyors of Peterborough." Messrs. Ruddle and Cooke replied. The toast of the evening, "The Peterborough Master Builders' Association," was given by the vice-chairman, who said the building trade in Peterborough seemed unusually prosperous, whilst the brickmaking industry in the neighbourhood had acquired an almost world-wide renown. Mr. J. W. Rowe responded, and other toasts followed.

Intercommunication.

QUESTIONS.

[11814.]—**Fireproof Floor.**—Can any of your readers inform me if a concrete floor can be successfully laid as sketch below? Would the corrugated sheets between joists be liable to sag while concrete was being laid?



Would rough strutting under the sheets be required, and what thickness of concrete would be necessary? The top surface would be finished as an ordinary cement floor.—Doubtful.

[11815.]—**Emigration.**—(1) What part of our colonies (or of any other country abroad) would you recommend a young surveyor, &c., to emigrate to for a partnership or a good situation? (2) By what means may he advertise from here for the above situation, &c., and through what papers? (3) Do you recommend any young surveyor to emigrate without getting a situation abroad before he goes?—W. B. E.

[11816.]—**Walls after Fire.**—What is the proper treatment to walls after fire? Can the effect of smoke on brickwork be killed by applying a solution? If so, what? A practical suggestion will be esteemed.—W. F. T.

[11817.]—**Hospital Construction.**—I shall be glad to know of a cheap work on hospital construction.—Hospital.

[11818.]—**Discharge from Sewer.**—What would be the theoretical rate of discharge from a 12in. glazed stoneware pipe sewer, circular section, without bends, 6,700ft. long, with a fall of 1 in 400 (*a*) flowing full, (*b*) half full? And how are the results calculated?—Romsey.

[11819.]—**Flow of Sewers.**—If a pipe sewer of cylindrical section of given length and fall will discharge so many cube feet per minute if flowing half-full, how much more will it discharge if full? If a similar pipe sewer half a mile long will discharge when flowing half-full and full given quantities, will it not discharge less if longer—say five miles long? I have been referring to the tables of discharge in "Hurst's Pocket-Book," but they appear only to be founded on the assumption that a sewer of given diameter and fall will discharge the same amount whether long or short—*e.g.*, diam. 12in., fall of 1/10,000, gives velocity ·378ft. per second, discharge 8·91c.ft. per minute, and would appear to be applicable to a sewer 10,000ft. long with a fall of 1ft., or another 100,000ft. long with a total fall of 10ft. Is that correct?—M.

REPLIES.

[11794.]—**Parpoint Facing with Brick Lining.**—In reply to "Gallatown," the term "Parpoint" is purely a Yorkshire term given, I take it, by quarry owners to distinguish rock-faced wall-stones; the true term for this class of walling, according to authorities on building materials, is "regular coursed rubble," and it is immaterial as to being faced both sides, as in parapets, &c., or lined with other material, such as brickwork. In respect to the "through-stones" being damp-conductors, this is contrary to my experience, as this class of stone is very dense. With a more porous stone, by all means use a galvanised-iron wall-tie in preference.—Albert C. Freeman.

[11799.]—**Woodwork of Windows.**—The practice of measuring painting varies much. The usual way is to measure the superficial quantity per yard including knotting and stopping. Measure the superficies of window front over full size of openings for painting frames, the width of window to be measured to include returns to the wall; the same with the height. Take width of shutters, adding for edges inside of boxings by the height. The linings to be collected, elbows and soffits. The sash-frames are numbered, and state if extra size; also the sash-sills. The squares to be taken by the dozen.—Metric.

[11802.]—**Flashings.**—The sketches are not very clear as to the part they represent. Either plan would keep out the wet. The term "flashing" is applied to lead let into the joints of the brickwork and made to lap over the gutter or over the slating of a roof. An apron is in one sense certainly a part of the flashing, and seems to be applied to that piece of lead which hangs over the lead which is turned up against the brickwork; but both terms are often used for the same thing.—A. B.

[11804.]—**Building Construction.**—Rivington's work is one of the best for construction; but for other branches "Honoris" should consult other treatises. "Mitchell's Building Construction" gives more than Rivington. It treats of stability of walls, showing the use of formulæ; sewer construction, tall chimneys, graphic statics, calculation of girders, roof covering, fire-resisting construction and sanitation, hot-water apparatus, &c. This work is compiled to prepare for the examinations of the Science and Art Department, the R.I.B.A., Surveyors', City Guilds, &c., and will give "Honoris" all he wants for the purpose.—G. H. G.

[11809.]—**Fire Insurance.**—I think the architect is acting with more independence if he keeps clear of appointments of this kind, and it is *infra dig* to accept such agencies. Certainly it is not quite professional to advertise that his buildings are insured during erection in the particular office. Notwithstanding, a great many provincial architects become agents, and if they do not push their connection with the office they represent before their clients, there can be no strong objection.—Ajax.

[11809.]—**Fire Insurance.**—I do not know whether it is *infra dig* for an architect to be an agent for a fire insurance co.; but I knew a member of the Council of the R.I.B.A., now deceased, who was such an agent. There is the manifest advantage to the architect that if he is an agent, and arranges that all his buildings are insured through his agency, he knows exactly when, how, and precisely on what terms and conditions his buildings are insured, which he never does when the builder is left unaided to insure.—W. M. R.

[11810.]—**Joists in Concrete.**—F. King had better use the expanded metal lathing, which can be fixed to concrete ceiling by metal hooks. This will supersede the use of wood ceiling-joists partly buried in the concrete. No doubt the partial burying of any wood in concrete will accelerate decay if the wood is not seasoned. The "Danville Asbestic is a good fireproof plaster, which can be used on laths or the expanded metal or "Jhilmil" girders, and would be suitable for F. King's purpose.—G. H. G.

[11811.]—**Cost of Draughtsmanship.**—The amount of draughtsmen's salaries varies so much that it would be impossible to say what is a fair percentage on the average outlay. No doubt in some cases it may be said that quite 2 per cent. of the architect's percentage goes for draughtsmen, as in the case of competition work, where the drawings are all prepared by assistants. In offices where the principal is actively engaged in interviews and general business, and his architectural work is chiefly done by assistants, the salaries must make a considerable percentage of the remuneration. No doubt this is the main reason why so many architects take pupils who are likely to become good draughtsmen. I know firms who entirely depend on their pupils for the drawings, and thereby save a large amount in salaries; but it is neither just to the pupils nor to their own reputation.—Architectus.

[11812.]—**Professional Charges.**—Surveyors' charges vary in regard to the charges for these duties. For preparing estate plan and laying out, the charge ought to depend on the time and trouble involved. If "S. H." has kept an account of his time in preparing the plan, he can charge so much per day, say £2 2s., or he can charge a percentage on the ground-rents of the houses shown. The charge for taking levels, preparing plans, sections, and specifications for the roads, and copies, must be charged on the estimate of the cost, say from 2½ to 5 per cent., or by time employed. Negotiating sales of lots are charged for at a stipulated rate, or sometimes a sum equal to the year's ground-rent is charged for letting. In regard to question (*b*), the superintendence of buildings during their erection and certifying for leases, the charge is sometimes one-half per cent. up to £5,000, and above that by agreement. This superintendence is necessary to see that the conditions are fulfilled. Scales of charges are given in surveyors' handbooks.—G. H. G.

[11812.]—**Professional Charges.**—I am sorry not to be able to give the information "S. H." desires, as I have more than twice inserted almost identically the same query in "Intercommunication," but no one has yet taken the trouble to reply. Is professional jealousy the cause of this?—Vedra.

CHIPS.

The Safety Tread Syndicate, Ltd., of 15, Barbican, London, E.C., have purchased the business of the Positive Nut-Lock Washer Syndicate.

At a meeting of the sanitary committee of the Bristol City Council, held on the 14th inst., the following gentlemen were interviewed with reference to the appointment of assistant city engineer:—Messrs. H. W. Harding, Bristol; A. W. Metcalfe, Bristol; T. L. Perkins, Bristol; L. Wigan, Bristol; E. Frobisher, Leicester; L. P. Marshall, Norwich; G. M. Martin, Leeds; G. G. May, Ipswich; W. J. Steele, Tottenham, N. Mr. W. J. Steele was eventually appointed.

The foundation-stone of a new girls' school was laid at Felixstowe on Tuesday week. The building completes a group of schools for 900 children began some years since, and, like the earlier portions, will be erected from designs by Mr. E. F. Bisshopp, architect, of Ipswich. It will comprise a main room and three classrooms, cloakroom, and lavatory. Mr. Thomas Ward, of Felixstowe, is the contractor.

At the monthly meeting of the urban district council for Hants, held on Wednesday week, it was decided to borrow £23,990, a sum which has been sanctioned by the Local Government Board, for the carrying out of various public works in the district.

A scheme for the construction of a gigantic canal for establishing communication between the Black Sea and the Baltic has been submitted to the Russian Minister of Ways and Communications, and has been very favourably regarded. Administrative steps have been taken to assist in the realisation of the scheme.

The five-light east window of the parish church of St. Boniface, Bunbury, Cheshire, is about to be filled with stained glass at the cost of Mr. Ralph Brocklebank, as a Jubilee memorial. It will be erected from designs by Mr. Edward Frampton, and will represent the Crucifixion, the outside lights containing full-length figures of St. Boniface, and of St. Elizabeth of Hungary.

To the series of memorial windows in course of erection in the Chapter-house of Lichfield Cathedral has been added a light at the south-east corner in memory of the Venerable T. B. Lloyd, Archdeacon of Salop, who died at the rectory, Edgmond, on February 25, 1896. The centre panel is occupied with a figure of Alexander de Stavenby, forty-fifth bishop of the diocese, who was consecrated in 1224. The artist is Mr. C. E. Kempe, of London.

The Eccles Town Council have notified the Local Government Board of their intention to borrow £4,928 for works of sewerage and storm-water drainage in the borough.

LEGAL INTELLIGENCE.

Local Authorities and Defective Roads.—Judge Yate-Lee was engaged several hours on Saturday at Whitchurch County-court in hearing an important action, brought by John Stephen Walley, a trainer of horses, against the urban district council of Whitchurch, Salop. The claim was for £50 damages, for injuries sustained by his mare through the collapse of a road near Whitchurch on the 6th February last. On the day in question the mare was being ridden by a servant of the plaintiff to a meet of hounds, when the road collapsed underneath the animal, causing serious injuries to its knees and rendering it unfit to compete at several steeple-chase meetings at which it had been entered to run. The road in question is repairable by the defendants, who receive an annual grant from the county council for the purpose. It was stated in evidence that in 1895 a sewer was laid under the road at the exact spot where the accident happened, and the plaintiff's case was that the road gave way through the defendant's servants not having filled up a cavity in the trench in which the sewer was laid, and the point at issue was solely one of the liability of the council. For the defence several witnesses gave evidence, amongst them being Mr. I. Matthew Jones, surveyor to the Chester Corporation, and Mr. Samuel Davies, surveyor to the Wirral Rural Council, both of whom had examined the road. Mr. Jones attributed the collapse to the effect of a thaw after frost. The subsoil was a shifting sand, and during a thaw the road would become broken up and the surface water would cause such pressure on the subsoil as to create a cavity where there was little resistance. The incline at this point was 1 in 40, and his view was that, through the washing of the sand, a cavity had been created beneath the macadam, which gave way the moment the horse got on it. Mr. Davies gave similar evidence, and agreed with the theory advanced as to the cause of the accident. His Honour held that the defendants were liable for an act of misfeasance. He accepted the theory put forward by Messrs. Jones and Davies, and rejected the theory of Mr. Webb, architect, on the part of plaintiff. He held the defendants responsible for the surface of the road after laying the sewer. The cavity might have been prevented by laying cross drains or having drains on the edge of the road. The defendants had not done enough in repairing the road, and judgment would therefore be for the plaintiff, with costs on the higher scale.

"Waiting Money."—Three men, engaged in the building trade at Millwall, applied to Mr. Mead at the Thames Police-court, on Monday, to grant them summonses against their employer for not paying each of them 10d., "waiting" money. The magistrate elicited that the applicants were supposed to be paid at twelve o'clock on Saturday, but were kept an hour waiting for their money. It was on account of that time they wanted to claim. Although the amount was so small, they had, in consequence, discharged themselves, and had wasted a day coming to the Court. As the men were unable to produce any agreement, Mr. Mead refused to grant summonses, and observed it seemed to him the complaint was a frivolous one.

Wooden Inclosures and the London Building Acts.—At Worship-street Police-court, on Monday, the case of A. Payne, district surveyor of East Hackney (South) and North Bow, v. D. Allport, of the Wire Wove Roofing Co., was heard before Mr. Haden Corser. The defendant had erected a factory at 417, Old Ford-road, inclosing one end temporarily in wood, contrary to the above sections; the company was then reconstructed and the buildings stopped. The district surveyor required either that the factory should be inclosed as required by the rules, or that a license should be obtained from the London County Council under Part VII. for the wooden structure. The defendant, who was represented by a solicitor, did not dispute that he was in the wrong, but asked for time. The district surveyor explained that he had given as long a time as he was able under the Act, and ultimately an order was made to amend the work in six months, "the defendant not objecting," the defendant to pay costs.—A second followed ("Payne v. S. Clay"). In this case the defendant had erected a shed, with substantially-built wooden walls and a slated and iron roof, above the size allowed in the exemptions, and also within the prescribed distance of the centre of the road adjoining, contrary to section 13. The defendant maintained that the building was only a fowls' house, and the road adjoining was his own private way, though the district surveyor showed that it led to two factories, one of which certainly was a freehold independent of the defendant, and to four dwelling-houses. An order was made to amend in 28 days. Twelve shillings costs.

District Surveyor's Fees for Work Done by Deputy.—At Southwark Police-court, on Tuesday, Mark Patrick and Son, builders, were summoned by Bernard Dicksee, district surveyor, for non-payment of his charges, amounting to £23 12s. 6d., for inspecting and supervising the erection of stands

within the premises of Day and Martin (Limited), Borough-road, to view the Jubilee procession. The complainant stated that he had 600 stands to look after, and that he deputed Mr. Brown, a young assistant to an architect, to inspect those erected on the premises in question. Personally, he saw nothing of them except from the street, but he was entitled to his charges. The stands at each window were separate structures, and, although they only held seven persons each, he charged for "inspecting" them the same fees. He also charged for inspecting six stands, which he disallowed on Mr. Brown's report. For the defendant it was contended that the stands were not "structures" within the meaning of the Act, and that the complainant was not entitled to do his work by deputy. Moreover, the young gentleman employed as deputy, apparently about 18 years of age, did not possess the qualifications required for the exercise of large and responsible powers and duties. The hearing was adjourned.

Re A. M. Hiscocks.—The debtor, an architect and surveyor, of 115, Borough High-street, formerly of the Vestry of St. George the Martyr, Southwark, has presented his petition, and the usual receiving order was granted. An order of adjudication was also made.

CHIPS.

At the last meeting of the town council of Middlesbrough, an electric-lighting scheme, estimated to cost £25,000, was passed, as was also a scheme of drainage to cost £10,000.

A new mission hall in connection with St. Stephen's Church has been erected in West-street, Walthamstow. The hall provides seating accommodation for 200 people, and is a substantial structure with open-timber roof. The exterior is faced with Woodford red bricks. The work was carried out by Messrs. E. Fuller and Sons, the architect being Mr. J. Hewitson Shaw, A.R.I.B.A., of 32, Albert-road, Walthamstow, and 22, Billiter-street, London, E.C.

In the November issue of the *Pall Mall Magazine* is a short romance of the times of Henry of Navarre, entitled, "How Bois-Rosé and I Captured the King." The author is Mr. Edward W. Jennings, A.R.I.B.A., who has frequently contributed to our illustrated pages. His last drawings were published in July, 1895, and were all taken from bits of Renaissance architecture on the Loire. It was while on a sketching tour in the neighbourhood of Laon that he formed the idea of writing the present romance, which is founded on strict facts.

In a short paragraph which appeared in our last issue, p. 541, it was stated that the church of St. Gabriel, Willesden Green, which was consecrated on Oct. 7, was designed by Mr. R. Philip Day. This was incorrect, and Messrs. W. and C. A. Bassett Smith and R. Philip Day should have been described as the joint architects.

The largest and most important sale of freehold business sites ever held in Leeds was conducted on Friday afternoon in the Town-hall by Messrs. Hepper and Sons, who disposed of 54 lots of Corporation surplus property for £71,048 2s. 9d. The most important lot, part of the old Post-office site, was sold at £75 per yard, or £49,950, to the Standard Life Insurance Company.

The gilded iron gates communicating with the interior of the Marquis of Exeter's princely mansion at Burghley have recently undergone renovation at the hands of painters and decorators. The folding gates on the north front are approached by a flight of steps rising to the level of the terrace. They are designed in the *cinque cento* style of Italy, being wrought into groups of flowers and wheat ears, and rampant lions issuing from cornucopias. The gates on the west front are of similar design, but of larger dimensions, and the central panels bear the initials of the nobleman who had them erected. For about 30 years both sets have been exposed to rain and storm without the application of new gilt, and during that time the iron has become corroded in many places, and some of the delicately-wrought parts are more or less damaged. The work of restoring them was a short time since placed in the hands of Mr. T. Hart, of St. Martin's, Stamford, who has now executed the order.

Mr. H. H. Law, C.E., Local Government Board inspector, held an inquiry at Hipperholme on Friday with regard to an application from the district council for sanction to borrow £3,000, for erecting public offices.

Calcutta is now, says the current issue of *Indian Engineering*, the builders' paradise. The earthquake has injured almost every private house; tenants are led to believe that the houses they inhabit may collapse and bury them any day; and house owners are in despair, as they have no choice but to submit to whatever terms the builder may impose. It used to be formerly a very keen competition between builders to secure work; it is now a keen competition between house owners to secure builders who will do their work at all on any terms whatever.

WATER SUPPLY AND SANITARY MATTERS.

Carlisle Water Supply.—The Carlisle Town Council have, after a discussion of two and a half hours, adopted, unanimously, the recommendation of the Water Committee, founded on a report by Mr. Eaton, C.E., to obtain a supply of water for the city from the river Gelt, at an estimated cost of £120,000. It is proposed to tap the sources of the Gelt at Geltsdale, the gathering ground being 7,500 acres in extent. The water will be brought in pipes to the existing main at Harraby Hill, a distance of 11 miles. The storage reservoir will be at Castle Carrock, and there will be a service reservoir at Cumwhinton. The supply is ample, and it is probable that the rural districts, or some of them, between Castle Carrock and Carlisle, may, in the course of time, take their water from the corporation. Steps will be taken to promote the necessary Bill in Parliament during next Session.

Douglas.—The Douglas Town Council at their last meeting adopted a report of the water committee that it is desirable that additional water should be provided at the earliest possible opportunity to meet the rapidly-increasing requirements of the borough. To do this the committee recommended the adoption of a scheme of Mr. G. H. Hill, civil engineer, of Manchester, to provide a new reservoir in West Baldwin, at an estimated cost of £49,000. The proposed new reservoir will store 300,000,000 gallons, compared with 105,000,000 gallons in the reservoir at Kerrowdhoo, which was the alternative scheme, at a difference in cost of £1,500. The council voted unanimously in favour of the recommendation, and the town clerk was authorised to make application for legislative authority for carrying out the scheme.

Oldham. — The formal opening of the new sewerage works for the town of Oldham took place last week. For some four years the works have been in progress, and they are now practically, but not absolutely, completed. When they were begun it was estimated that the cost would be about £200,000, but that sum will be exceeded by about £65,000. The effluent obtained will, it is believed by Mr. H. Law (the engineer for the committee), be satisfactory to the Mersey and Irwell Joint Committee. Oldham is peculiarly situated on several hill-spurs, with their consequent depressions or valleys, the highest point in the borough being 1,225ft. above the level of the sea, and the lowest 350ft. It has within it 71 miles of sewers, which are all connected or in process of connection with a sewer 10½ miles long. The sewers vary in size from 12in. to 6ft. at the outfall works. The depth is from 10ft. to 160ft. below the hills. The average depth is about 40ft., and the greater part has been in tunnel, necessitating 62 shafts. With such depths underground it is necessary to have substantial work to stand the pressure above, especially in view of the different natures of the ground to be passed through, varying from flowing quicksand to hard rock, and also to disturb as little as possible the buildings *en route*. The most difficult part, that of going under Platt's works, with heavy machinery above, and within a few feet of a chimney, was surmounted without disturbance, and with only a very little damage. The committee decided, after consideration, to make the sewers of concrete. Their experience was that it was not a cheap way of making them, but it was an exceedingly strong one, far better than the ordinary way, and specially adapted for their requirement of strength and solidity. Oldham is said to be the only town that has made such a length of sewers in concrete, but the conditions are exceptional. The works are also constructed in concrete, and an automatic means is adopted to raise the sewage from the low-lying parts of Hollinwood, which is below the level of the works. The effluent, after leaving the works, is treated on 72½ acres of land. As the land is water-tight, 18in. deep of the land has been excavated and filled with screened engine ashes and with drain tiles at the bottom, to drain it to a point where a valve is fixed. These filters hold each 120,000 gallons. The work is exceedingly simple, and only cost about £600 per acre, while it complies with the Government's stipulation of using the land.

The work of extending the pier at Walton-on-the-Naze was begun on Monday in last week.

The memorial stone of a new Constitutional Club at Harwich was laid by the Countess of Dalkeith on Saturday. The building is English Renaissance in style, and will occupy a site of 93ft. by 78ft., and will cost £3,200. Mr. James P. Alison is the architect.

Mr. Alderman Booth, who will be the Mayor of Southport for the ensuing year, is a well-known artist. He is a member of the Royal Cambrian Academy, and was for some time art master at the Bradford Technical College, and fills a similar position at Wigan at the present time. He was one of the founders of the Art Exhibitions at Southport, has been a member of the Southport Town Council for twenty years, and also occupies a seat on the borough bench.

Our Office Table.

The Cambridge Town Council, judging from the published report of their meeting last week, and from what transpired previously, seem to be making a sad muddle over the erecting and finishing of their Municipal Offices and Guildhall. The undertaking has been in hand for some years on and off, one project after another being advocated and partially carried out. Mr. Wm. M. Fawcett, F.S.A., the architect, carried out the first portion of his plan, which was in its turn based somewhat upon previous ones. His design for the front block of buildings was exhibited at the Royal Academy in 1893, when we illustrated a view of it (Jan. 6, 1893). Recently, however, a far larger project has found supporters, it being contemplated to extend the site and inaugurate a more complete scheme in harmony with the advice given to the council by their architect years ago. Somehow or other, for reasons not evident to those unacquainted with the internal differences which have divided the counsels of the promoters on this subject, the position of Mr. Fawcett became modified, and it seems to be becoming invidious, for Mr. John Belcher was appointed for a given agreed fee to prepare a new elevation and report. This has been done, and the meeting to which we refer was called to consider his scheme. He proposes to remove all the present buildings north of the Hall, and recommends the council to build a piazza the whole width of the façade, making a long colonnade for use as a carriage shelter or porte cochère for setting down arrivals. Above is a balcony approached by casements from the reception rooms on the first floor. The style is of the Later Renaissance, to be executed in Portland stone with Colley-Weston stone slates for the roofs. The principal staircase is devised in Sicilian marble, and the estimated cost for the structure is about £40,000. However, in the end, the debate resulted in the withdrawal of the motion which the Mayor had proposed in favour of adopting these plans by Mr. Belcher, and the amendment, as the substantive motion, was carried, so that, for the present, the matter is relegated to limbo possibly, and, in any case, the result must be far from satisfactory to all parties. The council seem to have two different architects, both members of the Council of the Royal Institute of British Architects, and the promoters, who, perhaps, "might be happy with either were the other dear charmer away," have both architects on their hands. The Mayor stated one reason why he favoured Mr. Belcher's scheme, as being due to his anxiety to confer a benefit on posterity, but the voting which followed the discussion indicates a contrary opinion among these Cambridge worthies which apparently accords with the Irish M.P.'s question, "What has posterity done for us, gentlemen, so why should we provide for posterity? Sufficient unto the day is the evil thereof." The Town Council will probably bring the matter up again some day; they cannot leave it where it is with credit to all concerned, particularly if justice is to be done to Messrs. Fawcett and Belcher.

The City Corporation has had another great windfall for its Guildhall Art Gallery, in the form of the gift by Mr. D. P. Sellar, of Brentwood and Kirremuir, of a collection of 290 pictures by old Dutch, Italian, and English masters. The generous donation has been gratefully accepted, and the Lord Mayor will go to see the pictures with Sir E. J. Poynter early in November. The gift will hasten the consideration of the urgent necessity of providing a larger and more suitable gallery for the reception of the Corporation's art treasures.

The engineer to the London County Council has informed the highways committee of that body that there are some cracks in the Queen Victoria-street subway near the Mansion House and also at the Blackfriars end, caused apparently by the execution of works at a lower level, but he states that it is as yet impossible to fix with any degree of certainty to what extent the subway may be affected. The committee, recognising the fact that there are in the subway both water and gas mains, have informed the companies owning them of the circumstance, and that special facilities would be afforded them for the protection of their mains. They have thought it necessary, in order to insure swift detection of any danger of the mains being interfered with by any further subsidences, to have them kept constantly under observation, and for this purpose to employ watchmen both by

day and night, and they are informed that it has also been necessary to retain after the usual hours the subway inspectors, who have special knowledge as to the mains in the subway. The committee think it probable that the cost of the supervision may eventually be recovered, and have instructed the solicitor to take any steps he may consider necessary to safeguard the council's interest in the matter.

With regard to the recent action of the Birmingham Corporation in throwing overboard the recommendation of the committee to intrust the planning of the proposed new asylum to Messrs. Morton and Chamberlain, and deciding to obtain plans in a limited competition, as reported by us last week, page 541, "A Bristol Architect" of nearly 40 years' standing writes supporting the action of the committee. He says that, in his judgment, speaking as one intimately concerned during the whole of his practice with the working of competitions, the Birmingham Asylum Committee exercised a most wise discretion in setting their faces resolutely against that system for the new buildings, and for the following reasons, which were, more or less, doubtless, present to their minds:—(1) That no branch of the profession other than asylum planning has got more completely into the hands of a select few, and those about the most extravagant and careless as regards expenditure to be found in the whole of London; and (2) that it is better, all things being fairly equal, not to go out of Birmingham for plans and superintendence. He adds that he could give proofs of the inner working of these competitions, which, in nine cases out of ten, have had a distinctly unfortunate result for the public purse.

Under a Parliamentary Bill the St. Anne's-on-Sea Urban District Council have carried out a great improvement to the beach, which for many years was but a barren waste of sand and pools of water. St. Anne's has only been in existence 21 years. The front formerly belonged to the St. Anne's Land and Building Company, but the council, under an Act of Parliament, acquired it. The works, which have been of a costly character, have been in progress since January last, and are now completed. Prior to the commencement of the work there was opposition from the residents on the front, but, now that the work is completed, it is found that the mounds, &c., do not interfere with the outlook from the houses on the front, as was at one time feared. The old narrow promenade has been considerably widened, and along the whole length rockery has been placed to a height of about 5ft. On the inner side of the rockery earth has been banked up and trees planted. Lawns intervene between these and the roadway, and they are to be used for tennis and children's playgrounds. Shelters, fountains, and bandstands have been built, and the work has entirely altered the appearance of the front.

The Science and Art Committee's report upon the administration and cost of the museums of the Science and Art Department, issued on Saturday, calls attention, as had been anticipated, to the danger of destruction by fire to which the priceless collections at the South Kensington Museum are exposed. The committee regard it as their immediate duty to lay before the House of Commons their very strong opinion that permanent buildings for the adequate accommodation of the collections at the South Kensington Museum should be proceeded with without delay. They are of opinion that it will be a source of grave discredit to the country if the settlement of this matter, which has been the subject of consideration by Governments for many years, and of endless correspondence between the departments concerned, is any longer delayed.

Mr. C. H. Brodie, F.R.I.B.A., of 17, Southampton street, W.C., writes a warning note in Monday's *Times* as to the risk of a similar epidemic to that now raging at Maidstone, which is, he alleges, almost invited by the drainage arrangements in North London. This district is, he says, served by a main sewer of the London County Council, which takes the drainage of part of Kilburn, in the county of Middlesex, by means of branch sewers. In times of heavy rainfall the volume of water coming down from the higher ground of Hampstead, &c., not only prevents the Kilburn drainage from passing away, but forces the sewage from the main sewer up the branch sewers and drains, and frequently causes both storm water and sewage to rise in the basements of certain houses. This has happened twice this year, and in the last great storm of September 29 the houses were flooded with the storm water and sewage to a depth of 15in. to 18in. The Willesden authorities state that, although very desirous to prevent it, they are helpless in the matter, and that the remedy lies with the London County Council, whose main sewers are of insufficient capacity to properly drain the district.

A conference of representatives of the Poor-law Unions of Cumberland, Westmoreland, and the North Lonsdale Division of Lancashire was held at the County Hall, Carlisle, on Friday, to discuss the proposed establishment of a joint asylum for imbeciles and epileptic poor. The chair was taken by the Rev. A. F. Carwen, chairman of the Whitehaven Union, and nearly all the unions were represented. Mr. Jenner-Fust, Local Government inspector, was present. After some discussion it was agreed to appoint a committee, consisting of a delegate from each union desiring to join in the scheme, for the purpose of obtaining information, and draw up a report to be submitted to the various boards of guardians. In reply to a question as to where the institution was likely to be built, the Chairman mentioned Threlkeld, near Keswick, as a convenient centre, land being cheap there, water good, and the district healthy.

People passing along Princes-street, Edinburgh, have recently been surprised, says the *Scotsman*, to see what appeared to be a new structure on the face of the Castle Rock. The structure in question, however, is not a new one. It is, in fact, the old masonry platform on which was reared a derrick or crane for lifting water-buckets from the tower of the well-house beneath, and has thus come to be called the "Wallace" (properly well-house) cradle. This was the only supply of water available for the garrison. This ancient relic of the time when the Castle was a fortress had gradually become disintegrated and unsafe. It has now been repaired by the division officer in charge of the Castle buildings. Not a single stone has been moved out of its place, and the joints have been filled with cement mortar. The repairs have, unfortunately, given the structure a new appearance, but in a year or so the smoke of the valley will no doubt tone it down to the colour of the rock. To the west of it, the buttress of the picturesque watch-tower at the angle has also been newly pointed.

Mr. John H. James, M.S.A., who gained silver medals from the Royal Society of British Architects and in the National Competition for his measured drawings of Llandaff Cathedral, has now written a complete history and survey of that building, the greatest of the four Welsh Cathedrals, which is to be published by the *Western Mail* Publishing Company. Numerous illustrations will be given, including a plan, elevations, details, and sketches in full-page and double-page plates. The book will be printed and finished on cream vellum (size 12in. by 10in.), and bound in holland with a design on the cover in gilt and colours. We published some of Mr. James's drawings which will appear in the "History and Survey of the Cathedral Church of Llandaff" in our issues of July 12 and 26 and August 2, 1895.

The annual statement of exports from Aberdeen to the United States for the year ending Thursday in last week has now been made up by Mr. Andrew Murray, Advocate, U.S. Consular Agent for the Aberdeen District. From this statement it appears that there is a decrease for the year over all in the value of the exports of about £2,000. The total value of the exports for the year amounts to 413,802dol., as compared with 423,165dol. in 1896. The striking feature in the returns is the very large falling-off in the exports in polished granite. In 1896 the value of the polished granite exported was about £55,452; this last year it has fallen to about £37,000, or a decrease of the large amount of about £18,500. It is another serious feature of the returns that the granite exports have been smallest in the quarter just ended, as indicating that the trade is still on the downward trend. For the quarter ended 31st December last year the exports amounted to fully £10,000; for the quarter ended 31st March last to about £7,200; for the quarter ended 30th June to about £12,700; and in the last quarter the value went down to a little over £7,000. The increase in the American tariff is the most obvious cause for the falling-off, and coming as it did upon an article on which the margin of profit was rapidly becoming a disappearing quantity, this latest increase has been seriously felt. But the growing development of the American native quarrying and stonecutting industries has tended to the repression of the Scotch export trade; and particularly would this be so in the face of the combined extensive use of foreign granite by Aberdeen manufacturers for American orders. The returns now to hand call for the serious attention of Aberdeen merchants, if the American branch of the staple industry of the city is to continue in a prosperous and healthy state.

CHIPS.

Mr. Harrison Later, the arbitrator between Messrs. Watson and Wilson, contractors for certain works at Lake Thirlmere, and the Manchester Corporation, has been sitting for the past fortnight to hear evidence. The contractors' case is not yet finished, and no estimate can be formed as to the date on which a decision will be arrived at.

At Magourney Church, near Cork, a carved oak communion table was dedicated last week. It is Perpendicular in style, is 7ft. long by 3ft. 3in. in height, and is divided into three compartments. Messrs. Harry Hems and Sons, of Exeter, carried out the work.

The large block of flats and shops which is being completed on the site of Heath Lodge, 514, Wandsworth-road, Clapham, S.W. (now known as Heath-terrace) has been executed from the designs, and under the superintendence of, Mr. T. E. Lidiard James, F.R.I.B.A., of Lonsdale Chambers, 27, Chancery-lane, London, W.C. The contractors are Messrs Holloway Bros., of Victoria Works, Queen's-road, Battersea, and Mr. J. C. Lewis has acted as clerk of the works.

Messrs. White and Sons, metal workers, of 237, Oxford-street, London, have erected in the church of St. Alban, at Birmingham, a light, but very beautiful, iron chancel screen, from the designs of Mr. J. L. Pearson, R.A., a gift to the church by his wife, in memory of the late Mr. James H. Mole, one of St. Albans' warmest friends and benefactors, and for some time churchwarden. The screen consists of five arches resting upon a chancel wall. The central gate is surmounted by a large light iron cross. The ornamentation throughout is in wrought iron ribbon scroll work. An artistic feature of the new screen lies in the great variety of design displayed in the almost innumerable scroll terminals, no two of which appear to be alike.

A new peal of bells and a clock were dedicated at the parish church of St. Veryan last week. The work has been done by Mr. Stokes, of Woodbury, and Mr. Cornish, of Plymouth; the former being contractor for the bells, and the latter for the clock. The bell-chamber was entirely gutted, new oak beams, floor, and oak frame for six bells being fixed in the place of the old decayed timber. The three old bells were sent to London to Warner's foundry—two to be turned and one to be recast; the firm also cast three new bells to make a peal of six.

The corporation of Wolverhampton a short time ago decided to pave certain streets with wood blocks; and during the past week Mr. H. Holloway, contractor of that town, has been engaged in preparing a portion of Dudley-street for the change in the character of the pavement of the thoroughfare. On Monday morning the first wood block was laid by Alderman T. V. Jackson, the chairman of the public works committee, to whom was presented a silver-headed axe, bearing a suitable inscription. A portion of North-street and Stafford-street will also be laid with wood blocks.

A London syndicate contemplates erecting at Newquay a promenade pier, with a pavilion, landing stage for steamers and boats, the pavilion to be used for entertainments, skating, &c. The engineer is Mr. Robert H. B. Neal, C.E., of Plymouth, who had received instructions to make a survey and report.

On Friday, at Hull, Col. W. L. Coke, M.I.C.E., Local Government Board Inspector, held an inquiry into the application made by the city corporation for sanction, under a local Act of last session, to an agreement for the purchase of the undertaking of the Kington Gas Light Company. The town clerk, Mr. E. Laverack, said that Hull was supplied by three gas companies, the Kingston being the oldest, and situated in the heart of the city. The price agreed upon between the corporation and the company was £92,500, figures which were based upon an average of the company's profits, which last year amounted to £4,976. The purchase was really part of a scheme by which they hoped to dismantle the works altogether, and make a new street through the area. A local solicitor objected to the amount of the purchase money as exorbitant. Ald. Massey, chairman of the gas committee, gave evidence in support of the scheme, as did also Mr. F. J. Bancroft, waterworks engineer. Mr. Newbiggin, of Manchester, said that if he had been engaged by either of the parties directly interested to make a valuation, his price would have been £115,000. The inquiry was closed.

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TWO QUALITIES OF WORK.

THE virtues of honest design and construction are often obscured by the means undertaken to attain them. We place before us an ideal of transcendent beauty, which we then proceed to deface or rob little by little, that at last nothing is left of the original. A well-conceived design, say, for a municipal building is prepared by the most skilful of architects; but before it enters upon the contract stage the process of degradation has been steadily at work. The draughtsmen have unconsciously done their best to rob the design of all the spirit and freshness which it possessed when it left the pencil of the artist; slight changes of proportion have been made in the façades and salient features; the tower has been spoilt of its contour; the mouldings have suffered in their profiles; cornices and projections have been reduced, and sculptural ornament has been denuded of its boldness and accentuated relief, and all this change has been simply due to the redrawing to a larger scale of the original sketch. The accents of touch due to the pencil of the artist are lost in the scaled geometrical drawing in a flatness of treatment or a dull level of draughtsmanship. Or it may be "a ghost" has produced a design which cannot be sustained in the actual building where materials have to be treated, and practically the scheme undergoes so complete a change, that what was, at least, artistic in conception gives place to a very ordinary and commonplace building. There is often much that is impracticable in the drawings of architects' details that have to be altered or modified in the execution; but we are not now speaking of this, but of designs which, by the process of reproduction lose their character and intention. Then comes the still more destructive process of making the drawings square with the bill of quantities. Alterations and a general "cutting-down" follow, to the dismay of the architect. Even if the working drawings are not left to the quantity surveyor to modify and alter to suit his bill, the change actually takes place, for it is the bill, and not the drawings, that is followed. Imagine such alterations as these: brick substituted for stone, reduction in thickness of walls, cornices cut down in projection, three-quarter or whole columns struck out and pilasters substituted, the curtailment or mutilation of all details and joinery throughout the building. Thus reduced and pared down, the design of the architect is ready for tendering. It is now, in the pages of the "quantities" at least, a mere ghost of its former self; the whole life is taken out of it, but as yet the owners and the public know nothing of what has been done on paper. The next step in the process of degradation is left to the wily contractor. One thing is specified, another thing is contracted for, and the dual nature of the transaction is sometimes shared in all round by owner and architect, by architect and contractor, and by contractor and sub-contractor or manufacturer. Each is ready to profess one thing, and do another. Have we not heard of the architect accepting illicit commissions from the contractor and tradesmen?—and what is this but specifying with one hand for the best and with the other accepting a bribe for an inferior article? Happily this kind of dishonesty is not common, but it sometimes takes another and less objectionable form. The acceptance of the low tender can only mean one of two things: the desire to take advantage of the builder in a pecuniary sense, or a compliant attitude towards him in the passing of his work, which is scarcely honest to the client. In short, the architect is willing to accept an inferior article, though he has specified the best. When the lowest tender is taken it means generally that there are two qualities, or that the specification is elastic enough to accommodate both—a kind of duality of conscience that is very objectionable, to say the least. But it does not end here; the contractor and the manufacturer resort to the same thing for their mutual advantage. The lowness of the tender has to be made up in some way. The conciliation of the architect is one means; another is the practice of getting the manufacturer to quote a low price on the understanding that the high quality of the goods described will not be demanded, or that another tradesman will bid lower. The way this is is done has been described. The trading firm is placed in opposition to a competitor in the same trade, who is willing to supply the goods at a reduced price, but the quality of the goods is kept secret. Thus the inferior article is placed in competition with one of superior merit, and the deluded tradesman reduces his price accordingly. This practice can be at once checked if the architect specified with more fulness, and supplied more detail, or insisted on samples of quality being submitted with the tender. In the manner we have described, it becomes easy to substitute workmanship of a quality very different in kind to that which has been specified.

Everyone knows how very hard it is to maintain the standard of quality in certain materials and workmanship, and there are several ways of subverting the specifications and drawings. To take such a material as brick. With the several varieties of clay and manufacture on the market, it is impossible to insure a delivery of goods always up to the mark. Imperfectly-burnt place-bricks and grizzles find their way into the building, even when the clerk of the works is on the alert. Sappy deals and battens and shaky timber in balk are surreptitiously introduced; cast iron of inferior quality; castings like pillars and girders find their way on the work that are not without blemishes like air-holes and cracks; stone with vents and veins, intended for piers and to bear heavy loads, is delivered. In such cases the samples afford no guarantee, but are merely a pretext to blind the architect who relies on them too implicitly. Sub-contracting also has in some instances made it easy to circumvent the architect's intentions by doing away with the personal superintendence of the contractor. The usual clause which runs, "The contractor is not to sublet the works or any part thereof without the consent of the architect," is, no doubt, a useful proviso to keep the contract in the hands of one person, and yet it is sometimes beneficial to let the work to someone who is more skilled, as for example, an engineer for heating or ventilating, an artist for the supply of stained glass or metal work, or for decoration. Whichever way it is, the question should be decided by the architect at the initial stage of the work. If the sub-contractor enters into an agreement with the contractor to execute the particular work, providing all materials, and to complete the same in accordance with the plans and specifications, indemnifying the general contractors from all loss and damages which may be sustained by the latter in consequence of his own neglect, there would be little harm done; but the fact is that contractors who make low offers sublet portions of the work without consent, and often without any binding agreement between them, so that the architect has to deal with more than one party without satisfactory redress, much to the hindrance of the building and to its disadvantage. Let us imagine a case where the contractor has sublet the labour of the brickwork. The architect finds fault with the pointing; many of the joints are left unfilled with mortar, or the prescribed quantity of lime is not used. He appeals to the contractor, who is the responsible party, and he in turn to the sub-contractor, and there the matter ends. No correction is made, and all the architect can do is to make a deduction, if that is possible. If it is the carpentry and joinery, or the plumber's work that is sublet, the affairs become more vexatious and troublesome, and any restitution, if demanded, threatens arbitration or litigation.

The profession are not altogether exempt from blame. Detail drawings are often made in excess of the contract and quantities, and the contractor derives a double advantage by objecting to carry them out, for he not only scores a point by showing their excess, but he is enabled to take advantage by substituting inferior materials. The builder says he cannot execute a detail for a casement window which shows thicker frames and a more elaborate system of jointing than he tendered for; but if prevailed upon to carry it out, he omits something equally important, and puts on an inferior weather-fastening to the casement. When will the architect learn the lesson of preferring the plainer way of doing a thing, which is more likely to be executed with care? How often an architect tries to insert a piece of ornament or carving; but how little he thinks what he gains by winning over the builder to carry it out! Something else is omitted: the builder takes care that he shall not lose by it. Perhaps another extra enrichment in a cornice, but at how great a cost!—inferior timber or bad door fastenings—and so it is throughout. The "give-and-take" principle does not answer when the building price is low all round—when everything is cut down to the finest. So long as the desire of the client is to obtain a larger quantity of work for his money than is either honest or straightforward, we cannot wonder if the contractor does his best to obtain his share by no less unscrupulous means. When tendering is no longer a kind of mock auction confined to men who try to win by undercutting a fair profit, when a tender is only submitted on an identical basis and a clear understanding of the designer's intention, these drawbacks to good architecture and building will disappear.

ROYAL SOCIETY OF BRITISH ARTISTS.

WITH much that is average, we have here a number of works which mainly are experimental or imitative of "advanced" schools; but even these latter are more to be desired than the commonplace and nauseating sentimentalities which pander to the public taste and overwhelm the picture market. In the central gallery of the Suffolk-street institution several landscapes, sea, and river-scapes are hung. One large contributor is Montague Smyth. "In the Fen Country," a dark, misty effect, the vein of much of this painter's landscape work, always naturalistic, but never commonplace. "Across the Dunes" (35), "Homeward" (40), "On the Quayside" (212), "Bathing Time" (221), are all honest and sympathetic renderings. Tom Robertson's luminous seascape, "On the Ayrshire Coast" (10), and "The Way to the Farm"; "Evening Glow," by Adam E. Proctor; "Yarmouth Trawlers," by G. S. Walters; an evening effect by J. Sanderson Wells (21) are a few other works which rise above the average level. To pass for a moment from landscape to the imaginative. What is to be said of

F. Cayley Robinson's allegory, "The Return of Spring"? We have on former occasions spoken with some pleasure of the work of this promising artist. There is always a quaintness and poetic symbolism in it. In this picture we have all the elements of a fine idea, but spoilt by the utterly dejected and inanimate-looking maidens who are floating in mid-air down the courtyard of a Mediæval castle, dropping from their hands daffodils. Grace and rhythmic motion are undoubtedly present in Mr. Robinson's composition; the warmly-lighted dormitory window, through which a young mother is seen in bed with her new-born babe, and the many signs of a regeneration of nature and of life are evident; but the grotesqueness of the drawing is carried to an extreme. A clever and humorous figure-study is H. M. Liven's "A Lesson in Anatomy," an elderly Frenchman or professor holding a wooden-limbed doll, with which he is illustrating his lecture (23), is at least fantastic. His other subjects, and his figure of a man, pleased, but helpless under the influence of drink—"Where Ignorance is Bliss," &c. (208)—are simple but clever satires. Abbey Altson sends a figure-subject, "Meditation," well drawn, in the figure of a girl in black leaning on mantelpiece before a small five-o'clock tea-table, in the glow of a lamp. J. W. T. Manuel's small figure-sketches, though slight in colour, are brilliant and spirited—especially his "Etoile de Paris," a bright and vivacious danseuse. S. M. Laurence's "Kynance Cove" is broadly handled, and the colour of sea and rock fresh. Arthur Ryle's vigorous landscape sketch (29) is a clever impression. In a few dashing strokes of colour he gives the effect of light on the wild moor and the dark stormy clouds. More finished is Arnold Helcké's "Sunshine after Rain," cattle watering at a brook. Over the fireplace a few pictures arrest attention, but of an ordinary kind. A large landscape in the centre—"A Summer's Morning"—represents a small harbour. The bright streak of sea on the horizon and the masts of vessels lying at anchor, are relieved by a large tract of uncultivated foreground. The tufts of furze and rank grass in the latter are well painted. Terrick Williams' "A Sunlit Sea" (52), is luminous, the atmosphere and sunlight admirable. Near it a bold and vigorous picture by F. A. W. T. Armstrong, "The Torrent," must be noticed; a torrent from some mountain side is sweeping down with relentless force, carrying débris and trees in its devastating path. His other works—Coombe Dingle, Bristol and Lake, Capel Curig—are forcible "notes" or sketches. A small delicately-painted study of a girl adjusting a necklace, seated on a marble bench in a colonnade overlooking the sea, has a Tadamaesque setting; but it lacks tone. A child study (54), by G. Hillyard Swinstead, is gracefully painted. Another clever figure subject by Adam E. Proctor's "Three Generations," is a group of gipsies seated round a large cauldron of boiling water. In the sunlight behind are a whirligig and other attractions of a country fair. Fresh in colour is Alfred S. Edwards's coast view "The Birthplace of Cuyp" (60), and a pleasant girl's face is N. Prescott-Davies' "Sun Kissed."

Sir Wyke Bayliss, the president, contributes a splendid interior of "St. Peter's, Rome," showing an evening effect in the vast basilica. The perspective is taken from a nearly central position in the nave, and the lighted dome with the great central high altar under its baldacchino closes the vista. The gleaming light on the mosaics and marble pavement, and the panels and arabasques of the piers and arches, is enhanced by the sombre shadow tones of the arcades and vault, all painted with inimitable skill. The scarlet of the vestments in the procession add brilliancy to the scene. His other great interior is in the N.W. Gallery, and represents Amiens (234), a still more successful feat of drawing and colour. The darker masses of screens and stalls give effect to the lofty nave bathed in light of jewel-like richness and tone.

In the centre position on the long wall is a beautiful work by Sir Edward Burne Jones, Bart., a large painted decorative design showing the mosaic subject over the chancel arch in the American Church of St. Paul's, in Rome, set up in 1893. Sir Edward has here exhibited the great powers of his imaginative genius. The subject is "Christ upon the Tree of Life." The composition is in every way dignified and original. The centre figure of Our Saviour is seen at the apex of the pointed arch, springing out of a conventionalised tree, whose root rises from the crown of arch, and whose branches ramify in beautiful curves bounded by an outer arched form. A landscape occupies the space directly over the arch. The outstretched arms of Our Lord give the form of the Cross to the central figure, though the artist dispenses with the Crucifix itself. On the left side (right of the Saviour) is Adam, typical of man; on the other side stands a graceful figure of a woman, holding Abel at her breast, Cain clinging to her skirts. These figures stand on a lower level, over the haunches of the arch, and in the landscape. At the side of Adam is a sheaf of wheat, and by the side of the woman a lily as the emblem of purity. Nothing can be more dignified, and while it is strictly symbolic, it is also decorative. The figures are devoid of archaic stiffness, and that of Christ is dignified and pathetic. The scheme of colouring on the panel is in a low key, and in blue of subdued shades. The portrait of the President, by T. F. M. Sheard (93), is characteristic as a likeness, and well painted, though we cannot say the personality is realised. J. Fitz-Marshall's "Disputed Territory" (64) is clever—a pup and kitten disputing possession of a chair. Henry Thos. Schäfer's "Fairer Than Morning," a study of a girl in light drapery; the amber tones in T. Robertson's "On the Lagoons" (75), W. Peter Watson's "An East Anglian Port" in Norfolk (71), a clever sketch by Val Davis, "The Path" (69), the large landscape by A. Meade, "Morn" (96), tenderly painted, John M. Macintosh's harmony of colour "Red Osiers," and Stuart Lloyd's "Haunted House" (130) may be named. Leonard Watts's study of a girl at prayer, "Ora Pro Nobis" (113), is handled with feeling.

In the other galleries a few pictures deserve a passing notice. "Meditation" (138), by Joseph H. Bentley, is a nice study; there is some cleverness in G. A. Holmes's "A Study in Natural History" (139), also a large landscape (147), a winding river passing through misty meadows, by Fred Milner, and the admirable colour in Alfred S. Edwards's "A Fisherman's Haven" (150). Robt. Goodman's "Early Harvest" is strong in its colour and tone, the sunset effect and the blue clouds rising are painted with much feeling and firmness. W. Ayerst Ingram's ambitious seascape "Evening," is feelingly painted. Hal Hurst's study of a girl holding violets and wearing the same flower in her hair, is delicate and refined, and his work, "The Spirit of the Water Lily" (177), an idealised study of a nude figure seated on a bough of a willow tree over a placid lake with water-lilies, is an ambitious work for a young member. The drawing of the figure is graceful, and the colour delicate.

Mr. G. H. Sime's work, too, is promising; his portrait, a full length of a lady in shades of heliotrope, standing against a light blue curtain, is an experiment in colour. Another lady's portrait, Mrs. W. Simonds, by J. Sanderson Wells (163), is a more finished example, and the colour scheme of white satin and brown against a rich blue background is pleasing. Sir Wyke Bayliss has a charming little interior of St. Marks, Venice. One or two spirited works are seen in the S.W. Gallery. J. W. T. Manuel is daring in his garish picture "Rosherville," a motley gathering of East-Enders, 'Arries and 'Arietts, soldiers and sailors and their lasses, on a vivid green lawn surrounded by statuary, &c. The chief note of contrast is the vivid blue dress of a girl and her sailor lad. The work is strong enough for a signboard as regards colour. The picture by Wright Barker, "Ambition" is a masterly horse study; two unharnessed horses catch sight of galloping hunters through a field, one of them is restive, and with frenzied eye is held with difficulty. "The Lonely Road" (200), by S. H. Sime, is a dark country road by a churchyard; beyond are the flickering lights of a city. A gentleman and lady in evening dress are walking home; their figures by moonlight cast a weird shadow on the road; but there is more—the work suggests fearsomeness. "A Night Out" (210), by R. Ponsonby Staples, is painted with considerable force. The crowd of playgoers in evening dress seated round the stage of a theatre is full of animation. A young lady in front stalls dressed in a low-cut silk dress and the elderly *habitué* by her side are drawn with much expression. Above it Oscar Eckhardt sends another study of London life in "Artificial Ice," a good title for the *posse* of ladies in fashionable hats and capes, who are looking at skaters on the rink. The large, almost graceless, picture of "The Annunciation" has little that can suggest such a theme; the cold colours are unpleasant. "Hallow E'en," by R. Gemmell-Hutchison, is a work of some power.

The North-west Gallery (water colours) has a cleverly-conceived subject, "Touchstone and the Shepherd" (215), by John Eyre, brilliant in colour; near it W. Lee Hankey's "A Full Tide" is broad, and there are liquidity and reflected light on the water; H. Sylvester Stannard has a fine marsh or river-scape broadly handled (218). Frank Spenlove-Spenlove sends a richly-coloured pine-wood subject, "The Golden Hour" (219), "Early Morning, Dordrecht," in nice tone, and several other drawings. Geo. C. Haité has some delightful sketches in broad simple washes as "The Bridge," "A Country Road," "An April Shower" (295), "Apple Auction," all brilliant and natural. W. Harding Smith is a contributor of several good works; amongst these we notice his "Sunrise, Venice" (223), "Emmanuel Hospital, James-street" (280). Of other works, we can mention only those of Albert Kinsley, a view of Margate from the West Beach (226); of W. H. J. Boot (250); and R. Machell's allegory "The Kingdom of Heaven is Within You" (274), chiefly clever as a symbolic and decorative design. Oscar Eckhardt has a bright figure study, "Roses, Roses all the Way," a lady driving amidst a shower of roses, and another subject on the screen by W. Lee Hankey, a girl in a stubble field (314), is worth notice for its simple treatment.

LESSONS FROM THE PARIS CHARITY BAZAAR.*

INTRODUCTION.

I PROPOSE to recall some of the facts of the recent Paris Bazaar Fire, and I shall be doing so, gentlemen, before the members of the profession with whom to a great extent will rest the responsibility of future catastrophes of this description. Great Britain alone has an approximate total loss of property by fire of seven million pounds per annum; and remember, this is an absolute loss of the nation's wealth, and the wealth of the communities concerned. The annual

* By Edwin O. Sachs, F.S.S., Architect. A Paper read before the Architectural Association on Friday evening last. (See report of discussion on p. 610 *post*.)

loss of life is very heavy, and the number injured exceedingly large. Now, quite apart from sentimental reasons, is it not very curious that in such a practical country as ours we should allow this constant drain on life and property, and, what is more, allow it to a far greater extent than is the case in several other countries which are by no means so businesslike as we are, and are certainly not doing so much to prolong life as we do in this country? You know it is the old saying that "laws are made to be broken," and I am sure many of you pride yourselves on your "cuteness" in having found some outlet, some makeshift or excuse, for avoiding some of the few requirements laid down by the public authorities in this matter of safety from fire. Oh, gentlemen, we all know how proud the architect is when, say, he has a factory case, with the lives of hundreds of employés involved, and he can go to his client and say: "Sir, I have saved you that emergency staircase which figured so prominently on your schedule"; and mentally, perhaps, he thinks of the extra twenty-five guineas he will get for his successful negotiation. We know, gentlemen, how proud the theatre architect is, when fighting against some long list of requisitions, he can point out to the lessee: "I have saved you that exit; I have saved you that reduction of seats"; and, maybe, he also thinks of the extra fee, but certainly he never—any more than the architect with the factory case—gives a thought to the lives of those who enter the building on which he has advised. Don't let me be misunderstood, gentlemen; every architect not only has the right but the duty to express his opinion on the requirements or requisition with which the public authority wishes his client to comply. But I consider it reprehensible, nay, wicked, to oppose every regulation for the safety of life and property, for the mere sake of opposition, and for the mere sake of pleasing one's client. Study the requisitions conscientiously, and if you find exaggerated demands on the part of the authorities—mistakes, faddism—certainly try your best to get your client out of spending unnecessary money. If the authorities know you to treat matters seriously and fairly, you are sure to have far more consideration given to your arguments than if the reverse is the case. But, again, don't oppose for the sake of mere opposition, or because it is the fashion to try to "best" the authorities.

THE PARIS BAZAAR BUILDING AND THE FIRE.

After these preliminary remarks, let me give a few facts about the Paris Bazaar fire, and the construction of the building which was the scene of the holocaust. Firstly, it should be noticed that the scene of the catastrophe was in a temporary structure used for theatrical purposes. Both the stage and seats had only been removed to enable the structure to be adapted for the organisation of a charity bazaar. Next, it should be noted that the site of the building (Fig. 1) was in the Rue Jean Goujon, close to the Rond Point of the Champs-Elysées on the one hand, and to the Cours La Reine on the other, and hence it was situated in a much-frequented part of the city. It was not hidden away in some back garden or placed in some outlying suburb. Roughly speaking, the ground has a frontage of over 90 mètres, or nearly 300ft. Its depth averages 45 mètres, or 150ft. Nearly 80 mètres of the frontage was taken up by the temporary building, the average depth of which was 13 mètres, and there were several small additions to the back—namely, a refreshment-room, a large store-room used at the time of the catastrophe as a cloak-room, and the fatal cinematographe-room. The last-named annexe, which will be seen from the ground plan (Fig. 2) was not, as far as the plan shows, in direct communication with the main building for entry and exit, the approach being from outside, and the visitors passing through door No. 3. The main building covered about a third of the superficial area of the site, while two-thirds, having an average depth of 32 mètres, had not been built on. The site was inclosed on the back and two sides by walls of various heights, from 15ft. upwards, and by the party-walls of some adjoining houses. One of these blocks, the Hotel du Palais, has windows overlooking the ground.

THE PLAN OF THE BUILDING

shows a long gallery constructed of a series of framed trusses, the whole of the work being in timber. All the walls were match-lined on both sides. The roof was partly covered with tarred felt and partly with glass. The total cost of the structure was about 12,000 francs, or about £480, of which sum nearly half was spent on the materials employed. The contractor carried out the work with particular regard to economy, and hence, perhaps, the lightness of the materials employed. So far as the contractor was concerned, the building appears to have been considered of a private character, little or no supervision apparently being exercised by any of the local authorities. The principal entry was through two doors, placed centrally, No. 1 and No. 2, and the visitors passed through a small vestibule and inner lobby in each case. There were four additional exits at the back, Nos. 3, 4, 5, and 6, of which No. 3 alone seems to have been well known, owing to its forming the approach to the cinematographe annexe already referred to. There was another exit, No. 7, used for service purposes, with which only the management and the stall-holders were acquainted, and there was also a small door from the refreshment annexe, No. 8, into the open. In the front of the building there were several windows to the office, the ladies' room, &c. On both sides of the gallery there were rows of stalls, and the construction of these, together with the section of the building, is shown in the diagram I have had specially prepared from the working drawings in the hands of the contractor. (Fig. 3.) The frontages of these stalls were faced with scenery (Fig. 4), whilst the top of the hall was closed in by a velum of canvas. The decorations were elaborate, and, I must again add, particularly inflammable, while the articles for sale on the stalls were, of course, of a similarly dangerous character. Perhaps I should also mention that the decorations to the stalls were old, worn, and very dry. The floor was of wood, resting on timber sleepers. On the exteriors the only attempt at decoration had been in the central feature.

CAUSE OF THE FIRE.

There is no doubt that the fire originated in the cinematographe annexe, and the actual cause was due to carelessness in using the special lamp employed. It appears that the flames at once broke through to the gallery, and were drawn immediately across the hall to entrance No. 1. It will be seen from the drawings that the glass at the top of the building must have been broken almost immediately, through the enormous velum becoming a sheet of fire. Further, it is evident that the velum must have broken away from the points at which it was hung, falling on those beneath it. The tar on the roof also dropped in a molten or burning state. The plan will explain how those farthest away from the centre on the cinematographe side of the building must have been cut off directly the flames took a hold of the doors No. 3 and No. 1. It was further natural that there should then be a general stampede towards entrance No. 2, and to that part of the hall farthest from the cinematographe. The extra doors, No. 5 and No. 6, were apparently so little known that they were not used, and it appears that many of the visitors were caught at the entrance to the store annexe, which, I have already stated, was then serving as a cloak-room, and, hence, well known to many of the ladies, who, in the excitement of the moment, must have associated it with an exit. In this annexe most of the bodies were found.

DEFECTS OF THE PLAN.

It is not my purpose to discuss the plan in detail; but there is one thing certain, and that is, that at first sight the number of exits, eight in all, would appear sufficient for a substantially-built structure which has its floor on the ground level. There is one unfortunate feature of the planning of the Paris Bazaar I cannot, however, help noticing, and that is the manner in which the lobby to entrances Nos. 1 and 2 were set out with the view of excluding draughts. I am unable to get reliable information if the wings to these doors swung outwards. As to the doors Nos. 3, 4, 5, 6, however, I know that they opened inwards, and that one of them was blocked or bolted at the time of the catastrophe. Looking at the plan of the building, its construction and contents, and considering well all the defects that such a structure must contain, I would yet point out that the extent of this calamity was due in a great measure to the fact that the majority of those present were ladies whose clothes must undoubtedly have caught fire immediately the lengths of canvas velum and burning tar fell.

THE MAIN FEATURES OF THE CATASTROPHE.

To recapitulate the main features of this catastrophe, let me repeat that the building had its floor practically on the pavement level, and stood on its own ground, with its front on a broad public thoroughfare. There was vacant land at the back, a broad passage on the side, and a narrow one on the other. There were eight exits leading direct into the open, with an aggregate width of some 40ft. The visitors were mostly ladies dressed in spring apparel; the spread of the flames was exceedingly rapid, and their garments became ignited almost immediately. The general aspect of the fire was particularly dangerous. There is no doubt that many of the visitors practically died where they stood at the time of the outbreak, being enveloped almost immediately in the burning canvas which fell from above. Of the others who succumbed, many were entrapped either by being cut off from the exit, by finding these blocked when they reached them, or by not knowing their exact position. Of those who escaped by the principal exits, a large number were injured by the crush at the doors. Though the police and the fire brigade were within easy call, even the instantaneous arrival of a large force on the spot could scarcely have lessened the death-roll, owing to the rapidity of the fire, and the extent of the panic. I have not heard of any watchman or fireman having been stationed in the building; but had this been the case, it is not in the least likely that his efforts would have had any appreciable effect. The great heat from the fire appears to have prevented those who reached the land at the back from utilising this space as a refuge. A window at the Hotel du Palais was used by many escaping to the rear of the building, as the broad passage opening into the Rue Jean Goujon was apparently overlooked. A number of the visitors were, however, either killed or badly injured in the crush to reach this improvised means of escape through the window. In closing these remarks anent the fatal building, let me again remind you that no less than 124 lives were lost, and of the injured many even to-day are in a serious condition, or are practically human wrecks, owing to the nervous shock which they sustained.

FIRE-PREVENTION OF TO-DAY.

Now, if I may be allowed to classify, the Paris Charity Bazaar was a semi-public entertainment, held in a provisional building. As you know, our entertainments are either of a private character, of a semi-public, or of a public character, whilst the buildings utilised are either permanent structures specially erected for a specific purpose; permanent structures temporarily adapted for some such purpose; or they are provisional buildings.

SAFETY AT PUBLIC ENTERTAINMENTS.

As far as public entertainments in buildings specially erected for the purpose are concerned, nearly every country has already inaugurated some policy for preventing catastrophes. I hear speak of the theatre, the music hall, the assembly room, &c. Europe has in fact, every kind of legislation conceivable for the protection of the public in this class of structure. There has been hysterical panic legislation, ponderous regulations in which every detail is defined by law, also codes which leave practically everything at the discretion of an executive of experts, and regulations which are merely so by name, and are a farce because they cannot be put into force. There is no uniformity in the preventative legislation of the world, even in its elementary principles. I am not going to raise the many questions as to the proper executive for locally determining or enforcing the requirements, nor shall I enter into the merits of individual regulations. I will simply call your attention to the want of uniformity in the main and elementary principles for obtaining safety where we have to deal with buildings erected for specific purposes and where specific forms of entertainment are given. Personally, I hold that, for a theatre or music-hall, clear planning is of greater importance to the audience than clever forms of construction, or the employment of materials having considerable power of fire-resistance; and, further, I contend that in such buildings the regular attendance of fire-watches day and night, and more especially during performances, is more essential than any amount of regular or even surprise inspection.

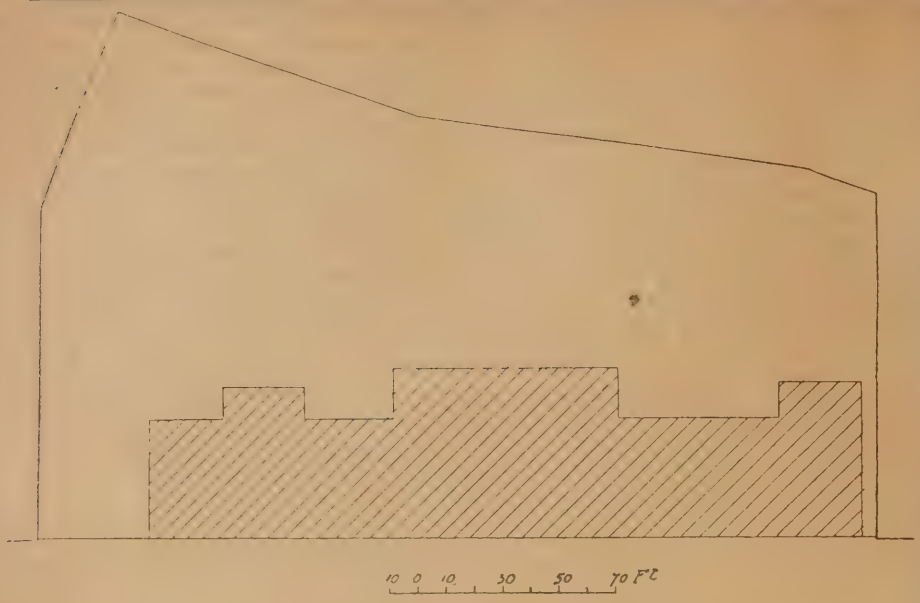

Fig. 1.

LIFE FIRST, PROPERTY SECOND.

I should, perhaps, say at once that I consider it the duty of the authorities to attend to the protection of life in the first place, and to the protection of property in the second. As we all know how easily a panic occurs without any fire, and how dangerous the rush of a frightened audience can be, the clear exit of ample dimensions and most direct route will be the greatest safeguard against loss of life, and perfect symmetry of plan of very great value. The prevention of a cause for panic is best guarded against by the constant presence of experienced and responsible firemen, who will on the one side recognise the possibilities of danger in time to prevent a fire, and on the other be able to act smartly in case of an outbreak. I do not wish to disparage good construction, or regular and surprise inspections; but I consider the most careful regulations as to construction and materials are of little practical value, so far as the safety of the audience is concerned, if at the same time the planning is not straightforward, and responsible firemen are not regularly in attendance. To take an extreme case, wood stairs wi l take the audience quite as quickly into the open as stone ones, and stone stairs with many winders and a complicated plan will be far more dangerous than wooden ones of straight flights of, say, fourteen steps each. Don't let me be misunderstood; of course, good construction and fire-resisting materials lessen the risk of an outbreak of fire, and I shall always advocate such construction and materials. But I have inspected many theatres, built of slow-combustion materials, and yet have found them dangerous in the extreme through bad planning; and I wish to point out that a building erected entirely of fire-resisting materials is not necessarily the safest.

PREVENTATIVE MEANS AT SEMI-PUBLIC AND PRIVATE FUNCTIONS.

But now all that I have said so far refers to the permanent building erected for a specific public entertainment. What is the state of affairs as to semi-public and private entertainments in buildings, halls, or rooms only temporarily utilised for gatherings of this description? Why, so far nothing whatever scarcely has been essayed, let alone decided. Legislation on the subject in this country is as non-existent as it is on the Continent. Why, we have not even as yet any practical definition as to what a private or a semi-private entertainment is. Where do the privileges of private entertainment cease? and when does an entertainment assume a public character, not only as such, but more especially in respect to public safety? Think of the many meetings, so-called private theatricals, subscription balls, and other fêtes! How is classification to be attempted? How are we to define our entertainments? But here is a suggestion, Is it necessary to classify at all? Is it essential to make limitations as to the different classes of our entertainments? I think not. Whilst most of our legislators at home and abroad are trying to define our entertainments and then to frame certain requirements for the safety of the public, why not let the character of the entertainment take care of itself? Let us look on every room over a given size as a place in which we may or may not congregate, with or without payment, to dance, to sing, to let others sing and dance, just as the case may be Let the superficial area of any good room and its position alone govern our requirements for safety; not the fact that it is a private dwelling-house, a saloon at an inn, a school-room, or a board room.

COMPULSORY PLANNING.

If the Building Act of to-day defines the thickness of a party-wall and its height above the roof, quite independent of the fact of a man giving a party, or lending his house for a drawing-room meeting, having a chemical laboratory in the place, dancing classes, or a school, why should there not be such planning compulsory as to prevent any room over a given size, be it a ball-room or a studio, being used without risk to life? Why should not every large drawing-room on the first floor have sufficient exit and staircase accommodation to deal with the maximum number of people who may press into that drawing-room, and let the same hold good for every class of structure, if a public-house, a schoolroom, or a chapel?

DANGEROUS VARIATIONS.

But now another point. How are we to assure ourselves that even if any one room or hall fulfils the ordinary requirements of safety as far as plan and construction are concerned, that the variations in the interior arrangement, in the decoration, &c., do not more than annul what the architect has done? Of course, a building, a room, or a temporary structure should be used for the object for which it is designed, and for no other purpose. But in reality we must consider the possible purposes to which a room may be put; in fact, the dangers of any decoration or paraphernalia necessary for the fulfilment of various objects must be considered at the time of construction. A hall which is used as a ball-room, and which is perfectly safe as such, may be a veritable death-trap when used for theatrical entertainments. A hall designed only for banquets, public dinners, &c., may become dangerous when utilised for bazaars, with all its temporary stalls and side-shows. The building must be designed to fulfil conditions of the greatest possible danger. Of course, many hold that we cannot limit ourselves to controlling the erection of buildings; but we must seek to obtain control over their employment, and the manner in which they are equipped for their different purposes. No doubt it is just the ordinary drawing-room, the ordinary assembly-room, the school-room, &c., which is used for so many purposes for which it is never intended, and that there are many dangers incurred on that account. Such control has been attempted in some Continental countries. But I think such control would be very hateful in these freer isles. We would, I am sure, rather build our houses and halls at once in such a manner as to be prepared for all risks rather than be constantly worried by inspections and the like. Hence, I say, rather let us at once build suitably for all emergencies. If we do that, we need not be constantly worried. Perhaps even improvement of plan and construction at the outset in a new building appears a very serious matter to you; but think, what does it really mean in nine cases out of ten? A few extra doors, and these so hung as to swing outwards; staircases perhaps somewhat broader, and not of a dangerous hanging type; hand-rails perhaps on both sides; a few safety bolts or latches. Surely this would not even interfere with a great art-architect's design, his colour scheme or details, and would this not save us endless worries of control over all private and semi-public entertainments?

UNSUITABLE PROVISIONAL BUILDINGS.

And now comes the question of provisional buildings erected for some specific purpose, such as a bazaar, and often allowed to remain in position for some indefinite period. Again, we find nothing has so far been done or decided so as to minimise danger in these structures—in fact, the meaning of a temporary structure has scarcely been defined. Is the large tent, built in the garden of a private residence, or on some verandah, a temporary structure or not in the meaning of the Act? And, if so, why are such tents erected with impunity for all manner of social functions throughout the London "season"? Well, gentlemen, to my mind the less temporary

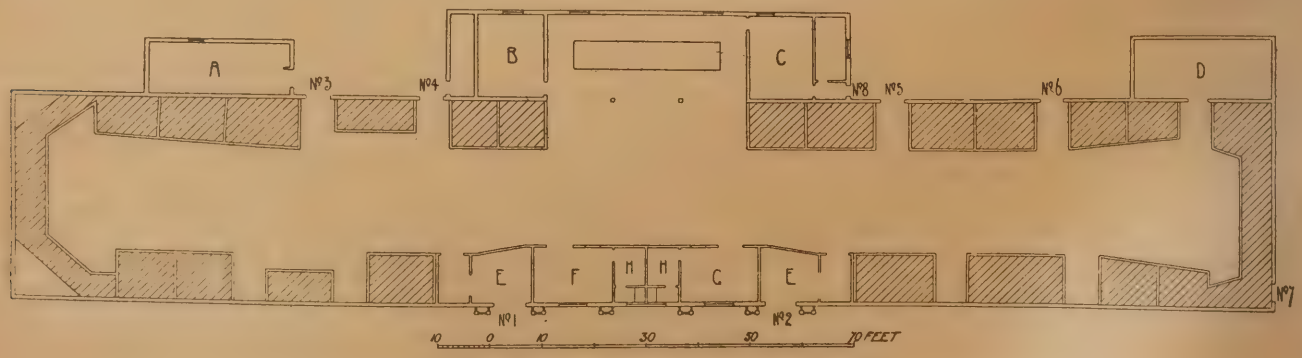

Fig. 2.

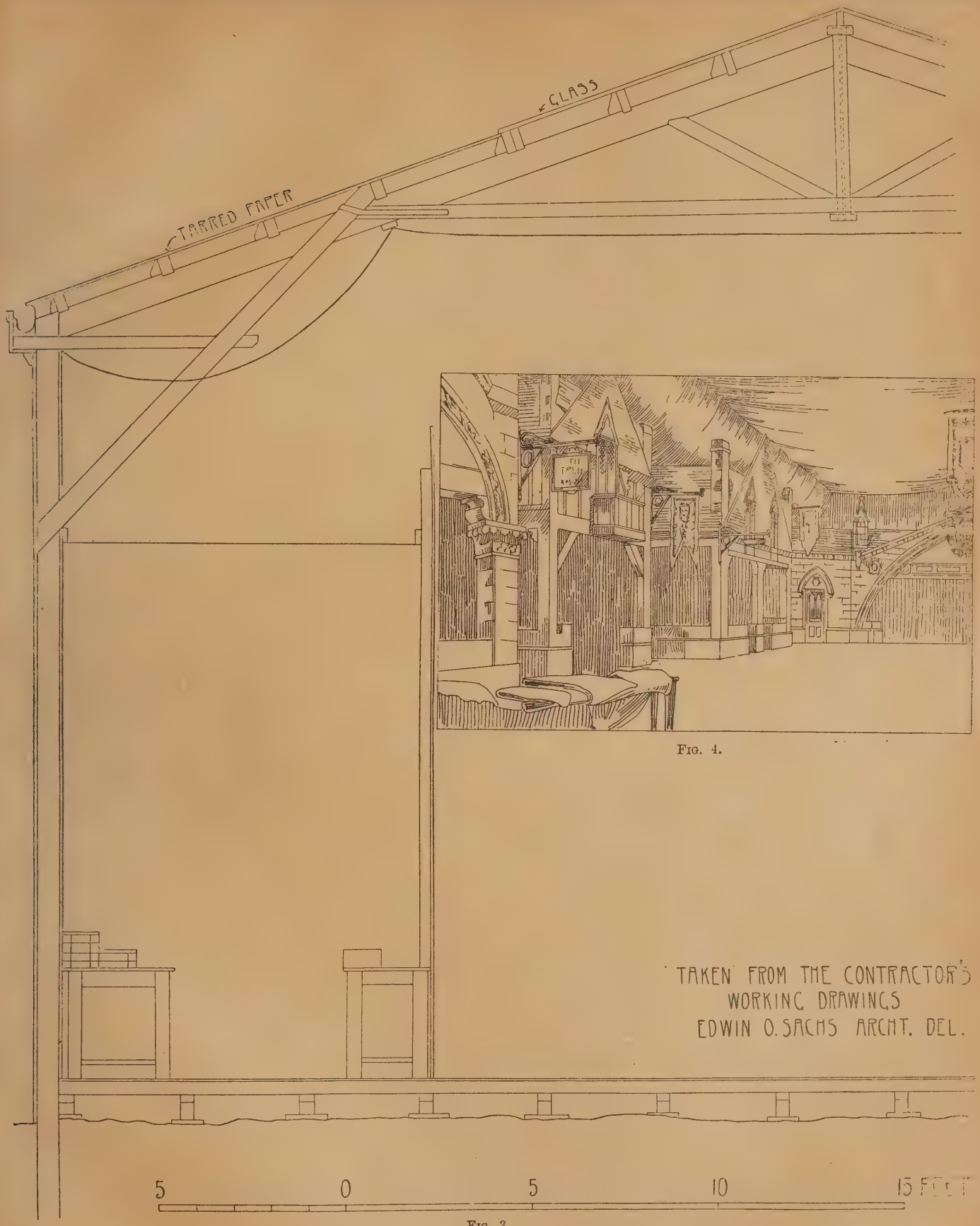

Fig. 4.

Fig. 3.

structures are encouraged the better, and this, no matter what their character or purpose. But, when erected, let the same importance as to planning and watching be accorded to the provisional building as is essential for a permanent structure. Gentlemen, let us also remember the Charity Bazaar fire, and let us consistently avoid the flimsy and dangerous materials used for its construction. Why, we can even have temporary iron buildings at a very reasonable expense. But, above all, gentlemen, planning and watching should be kept strictly in mind.

DANGEROUS DECORATIONS.

If I may be allowed to call attention to any one thing, it is, however, to the fact that whatever the architect may do in any class of building used for entertainment, his efforts can so easily be annulled by flimsy decorations, appointments, equipment, &c.; it is just this so-called decoration combined with carelessness on the part of the individual that is the actual cause of most fires. Apart from facilitating the escape of the individual, the architect's efforts are to a great extent limited, as far as the actual fire is concerned: first to avoiding the possibility of an outbreak occurring in connection with the structure proper, and secondly, seeing that should an outbreak occur his structure does not facilitate its spread. The architect cannot prevent a drawing-room, or a schoolroom being decorated with bunting, Liberty silk, or paper rosettes, and, as I have said, control in these matters would probably not be advisable in England. He cannot prevent the smoker "lighting up" at his smoking concert, or prevent the use of open lights, and official interference in such matters

would be unacceptable to the average Englishman. We can no doubt prevent many dangers in the usage of buildings erected for public entertainments. We could, and should, prohibit the wood stage of the theatre; we can prevent muslin hangings being used in the auditorium, and allow smoking only in specified rooms. But such restrictions would be intolerable and extreme if applied to rooms used for private and semi-public gatherings. It would not be practicable. Thus, again remember, we have to deal with certain well-known possibilities of fire with certain given facts, and for these facts you have to provide. The actual disuse of those Liberty silks, open lights, muslin, paper roses, in our private and semi-public entertainments, rests entirely with the good sense of the general public. Until the general public boycott them, you will, gentlemen, have to take them into account when you are at your drawing-board, or superintending your jobs.

CONCLUSION.

The first and principal remedy, to my mind, as I have already indicated, lies in your hands, as representatives of the architectural profession. It will be the architect mainly to whom we shall have to look for safety—we have to rely on the spirit with which he designs his structure, no matter what the regulations may be. Secondly, we must depend largely for improved protection on the general public, who will to a great extent, sooner or later, have to take upon themselves the *rôle* of being their own guardians. At present there is not the slightest interest in this country in the question of protection from fire, whether it be in connection with our entertainments or with the fire losses generally. That interest will have to be awakened. Thirdly, architects and public opinion will have to be supported, their hands strengthened or governed, as the case may be, by further legislation. But how are these remedies to be brought about? How are we to get the architect in practice to take a little interest in fire protection, not only in its general aspect, but specially in connection with our entertainments? How is the student to be encouraged to take the matter up? How, again, is the general public not only to be interested, but educated? How are our authorities to be assisted in arriving at practical conclusions and regulations, and our officials kept in touch with what is going on in these matters? It is a big question, gentlemen, for I go so far as to say that in regard to the general public, we should even let the Board School "standard reader" have pretty fables dealing with the dangers of fire, rather than some of the useless stories that appear to-day. I go farther still, and say that the public press, that great educational factor of to-day, might be induced to give us something more instructive about fires than mere reports of conflagrations, the efforts of our gallant firemen, and the exact number of feet of hose that are taken to a large fire. We might hear more of the origin of fires and the possibilities of prevention.

A COMMITTEE OF PUBLIC SAFETY WANTED.

How are we to attain these improvements? Well, gentlemen, to my mind, the right note has been struck at Paris. It has said: "Call together your leading architects and surveyors, your civil and mechanical engineers, your experts in chemical and other sciences. Call together your leading officials, the leading Government and municipal workers, and others seriously and scientifically interested in the technical and economical problems of to-day. Don't forget the leading fire brigade officers nor the owners of warehouses, theatres, and other dangerous property. Combine the many conflicting interests. Don't be afraid of compromise. Avoid one-sidedness. Examine what has so far been done at home and elsewhere. Find out what proposals are stowed away in men's minds. Confer. Then act, and act soon. But mind, no one-sidedness or petty prejudices." That is the advice from Paris, where it is being acted upon. Other countries will act on it too, and I hope Great Britain will be foremost among them. A small start has, in fact, already been made. At the initiative from Paris a small committee has been formed, which is taking up this matter of fire prevention. This is scarcely the place to mention names; but perhaps I may say there are among the members men whom you know and admire. That committee, made up of representatives of the different interests, will soon find a way to help the architect, to see that he general public does not forget the lessons of the Paris fire, and that our legislators have sound independent assistance when required. Well, gentlemen, I hope some of the prominent members of the Association will be among the first to join and help this committee, and thus show that the opposition I first spoke of is not favoured by its leaders of our profession. It is fire prevention, mind you—preventing fires—that we have most to-day to think of—not putting the fire out when it is there. Let our gallant firemen look after the fire-fighting when the fire fiend is actually among us; but let us see that our firemen have as little work to do as possible, and that they are not handicapped to the extent they are at present.

THE ARCHITECTURAL ASSOCIATION.

THE first ordinary fortnightly meeting for the present session of the Architectural Association took place at 9, Conduit-street, W., on Friday evening, the president, Mr. Hampden W. Pratt, F.R.I.B.A., in the chair.

Fourteen nominations for membership having been read, the following 46 architects were elected as members:—C. E. Abercrombie, S. J. Tatchell, H. W. Fitchett, H. M. Nisbett, J. H. Cammach, G. Trotman, C. H. B. Pinchard, W. H. Collin, P. B. Dannatt, A. S. Dorrell, L. de Senna Fernandez, E. M. Thomas, H. C. Fread, S. H. Goodwin, O. O. Harrison, H. J. Ingram, C. M. Inman, B. J. McAdam, C. E. Okely, A. W. Papworth, F. E. Ravenscroft, A. H. Rowe, H. Y. Smallwood, W. F. Wilkie, E. L. Wratten, M. D. Barton, A. R. Conder, R. G. Ell, A. Foxley, C. J. F. Hookway, Max Judge, A. R. Keighley, A. V. Kislingbury, W. M. Settle, W. A. Jeckells, P. J. Westwood, L. I. Wood, E. M. Joseph, R. Hosking, H. Mackintosh, C. H. Reilly, G. Church, H. E. Rider, D. T. Fyfe, J. A. Swan, and H. S. de B. Lopez.

The President announced that during the afternoon of November 2nd (next Tuesday) the first workshop demonstration in Stoneworking would take place at Regent-street Polytechnic. These demonstrations were being arranged by the Technical Education Board, and would be free to all members of the School of Design. The elementary and advanced classes in that School of Design were about to be started, the former section having opened the previous evening, Oct. 22nd, and the latter would open on November 9th, and he earnestly appealed to students to endeavour to make them highly successful and useful. The subject of the elementary class was a draper's shop at the corner of two streets.

The President also notified that the opening concert of the A.A. Lyric Club would take place at the Swatton-street Assembly Rooms, Piccadilly, on Friday, October 29th (to-night) at 8 p.m. This entertainment would be open to every member of the Association, and he cordially invited all to attend.

LESSONS FROM THE PARIS CHARITY BAZAAR FIRE.

Mr. Ernest O. Sachs read a paper on this subject, which, with the plans and designs exhibited on the walls, is reproduced on p. 606 *ante*.

Mr. Richard Roberts, vice-chairman of the L.C.C., who was invited by the President to open the discussion, remarked that the County Council and the public generally were greatly indebted to Mr. Sachs for the continued interest he had taken in the subject of the safety of audiences in large buildings, and especially in temporary structures. It was admittedly impossible to eliminate every risk; but much might be done to increase the safety of assemblies of people. He thought, however, Mr. Sachs went a little too far in proposing that the children should be taught in board schools the risks of panics and of fires. He claimed that the London County Council had done a great work in regard to this matter, under the able advice of their permanent officials—indeed, the Metropolis was greatly indebted to Mr. Blashill, the Council's architect, for his labours for the safety of the public. In this disastrous bazaar fire at Paris, the velarium proved a source of great danger, and the County Council had recently been asked to sanction the plans for a very large show, in which a velarium was proposed to be employed. The county council objected to this feature, on account of the risk, and the promotors decided to abandon it. The council were obliged to insist, in the public interests, in this and in all cases, on the prohibition of all flimsy decorations, and on the provision of a sufficiency of exits. He had heard it suggested that certain entertainments of the A.A. had not been altogether free from danger, and if gentlemen possessed of all technical and practical knowledge admittedly ran risks, they could not expect the public to be more careful. In all these matters, a local authority could not go in advance of public opinion—they had to take public opinion with them. The L.C.C. officials made their requirements on a wide basis, and if in the actual buildings they were occasionally minimised, it was due to the lay mind on the committee, who strove to make the conditions less onerous, and he, therefore, felt that they owed a great debt of gratitude to Mr. Blashill and his officials for reducing the danger of fire and panic in London places of entertainment. They had an eminent theatre architect, now no more, who always took care that his buildings were safe, but was essentially of a militant turn of mind, and delighted in fighting committees and officials on their requirements. The question of the safeguarding of temporary structures was a very serious one in London. They were not, of course, used for so long a period as permanent buildings, but they were necessarily built of less substantial and less fireproof materials, and while in use, the risk to the public was the same as in a permanent structure. There was a general notion that payment was necessary to constitute a building a place of public entertainment; this was a mistake, for the fact that the public could enter a building made a "place of entertainment," and as such, subject to regulations for safety. The building committee of the L.C.C. never granted licenses for temporary buildings for commercial or trade purposes, only relaxing this rule for religious and philanthropic gatherings, and he applied to all architects present to set their faces against all temporary structures. Mr. Sachs had put his finger on the point of danger in these temporary buildings, and he agreed with the lecturer as to the necessity for good planning and constant watching in such structures. As to the suburban theatres which were now rising on every hand, he was pleased to bear testimony that they were as perfect in planning and in site as they could well be; but he would not go so far as to say that they were equally perfect from an architectural or decorative standpoint; but as a public body the committee for whom he was speaking that evening had only to deal with the public safety.

Mr. Sidney Gambrill, of the Metropolitan Fire Brigade, held that it was the duty of the architect to make every public building as slow-burning as possible. At the recent disastrous fire at Oporto, all the people, with two exceptions, safely got out of the hall itself, but they were caught in corridors, with the result that over 100 lives were lost. His experience during the 20 years he had been a public official was that architects pressed public authorities very hard to relax their regulations in favour of their clients; but they had never got anything out of the speaker, although, unfortunately, committees were often amenable to persuasion. The death roll in London from actual structural fires was not great: the bulk of fatalities resulted from clothing catching fire or from the bursting or throwing of mineral lamps. It should be remembered that panic rather than fire was the chief cause of loss of life, and one hysterical woman might at any moment be the source of great danger to a crowded assembly. Notwithstanding what Mr. Sachs had said, he doubted very much whether glass in a roof would speedily fall even in the fiercest fire. If no water played on it the glass would stand a long time, and even if it fell it would be in most cases beneficial, as it would afford an exit for the smoke. It was a painful fact that a person was soon burnt to death in a fierce fire, it being only a question of seconds before life was extinguished. He feared that no amount of inspection would prevent a badly-planned building from becoming a death-trap if a panic or fire occurred, but something might be done. In Oporto, since the disastrous fire, a certificate had to be given, each evening a place of entertainment was open, that the gangways and approaches had been personally inspected and were free from obstruction, and he thought it would be well if a similar regulation were enforced in England. One great source of risk was allowing theatre firemen to be utilised for odd jobs, and as cab-runners; this too common practice in London should be absolutely prohibited. One of the greatest difficulties was that

buildings were so often altered after the architect had left them, and often the professional adviser got the blame for disasters of which he was quite innocent; in like manner the authorities, and even the owners of property, were entirely ignorant of the dangerous structural alterations made by the occupier. Again, every country, and even every large town, had different regulations, and he found that even in England they could not hope that any general code of regulations would be passed by the Legislature and uniformly enforced.

Major Fox, chief officer of the Metropolitan Salvage Corps, endorsed many of Mr. Sach's views. He had inspected the ruins of the burnt bazaar at Paris within 24 hours of the outbreak, when not enough *débris* remained to fill a Pickford's van. He concurred with previous speakers that panic was the chief cause of fatalities. Churches were far less risky places of entertainment, but it would only be right that the places of worship should be periodically examined to see that a sufficiency of exits were provided. Great credit was due to the officials and building committee of the L.C.C. for the efforts made to minimise the danger of fire. He agreed with Mr. Gambrill that glass in skylights was not easily broken by fire, and that it would have been better had those in the Paris bazaar fallen at first. The great cause of fatality was the velarium which fell in burning fragments on to the people and set alight many dresses.

Mr. Thomas Blashill, superintending architect L.C.C., observed that in dealing with plans of public entertainment he felt it a duty to see personally to everything that could be a possible source of danger, and to be stringent in insisting on compliance with each regulation. His report went before a committee of laymen, and he was bound to say that most laymen, as a body, did not take the slightest interest in protection from fire. The proprietors of theatres were not by any means the worst offenders against regulations; their money was locked up in these ventures, and they had had long experience of the pecuniary results of panic. The persons whom he feared were those who wished to erect temporary buildings—clergymen and schoolmasters—who were absolutely reckless and unimpressionable as to fire risks, and therefore he was more and more stringent in requirements as time went on. As to theatres, it was rare indeed that a thoroughly bad plan was sent in for approval, or that he had to argue with the architects to amend them. As to the lessons the practical man could draw from the Paris fire, he held that that fire conveyed no lessons whatever; everyone knew what a building so planned, in which improper and inflammable materials were so recklessly used, and which was so filled with combustible goods would be like if a fire broke out. He had seen some reckless combinations of materials, but never one so bad as this charity bazaar. Some time since his staff and he were engaged with a very large building for an entertainment, and at last passed it as fit to be opened. Just before the opening he made a visit of inspection, as it contained many thousands of seats. He found that, after it was completed, thousands of strings had been let down from the roof, and from each depended a mass of loose folded papers as large as a tablecloth. Then there were coloured wreaths with paper flowers, and, of course, a velarium, and with a single taper he could have burned the place to the ground. At another time he found that all the exit doors were locked on an opening day, and on sending for the manager, he assured him that he had the keys in his pocket, and that as soon as the performance was over they should be unlocked. Of course, the speaker insisted on compliance with the requirements. Sometimes men not too highly paid would stack all manner of inflammable goods in the cleared spaces near exit doors. Those who required occasional licenses did not often employ an architect, and it was difficult to persuade the promoters that there was a risk of fire or panic. He did not see why audiences at entertainments should be specially protected; every church and large gathering should be equally safeguarded. He would give just one word to young architects: Let them suppose they came before the London County Council and over-persuaded the speaker or a lay committee that certain regulations might in their particular case be relaxed. If afterwards a panic should arise, or an accident should occur, let them reflect on the position that would be occupied by the architect to the promoters. The whole responsibility would undoubtedly be thrown, not on the proprietor, but upon his professional adviser.

Mr. William Archer remarked that, as a theatrical critic out every weeknight, he was conscious of running terrible risks in the discharge of his duties, and was interested in anything that tended to minimise the danger. The construction and planning of many West-end theatres did not inspire the habitual playgoer with much confidence, especially as to the sufficiency of exits and their surroundings. He thought it would be well if the public were more nervous as to theatres, and so brought more moral pressure to bear on proprietors. He must say that in certain theatres the regulations for safety were exceedingly bad. A great deal might be done by such a committee as Mr. Sachs was organising in directing public attention to this question. He observed everywhere directions concerning extra doors in case of emergency, but never saw any signs that such exits could be opened when necessity arose. Perhaps, on the whole, it was well that the public were unimpressionable and apathetic; but that was no reason why every possible means should not be taken to protect an audience from risk.

Captain Dyson, superintendent of the Windsor Fire Brigade, said he had been over most of the Continental theatres with Mr. Sachs, examining their fire appliances. From the professional fireman's point of view, it seemed that every possible want of precaution existed in the Charity Bazaar at Paris; but if they had had a chemical fire-engine in the cineomatograph room, the outbreak might have been quenched at once. If country corporations were to enforce regulations as to fire, they would first have to put their own town halls in order. In Windsor, the brigade always hoped that if fire did break out, it would occur in an old house with huge wooden beams, and not in a modern so-called fireproof building.

Mr. Henry Lovegrove proposed a vote of thanks to Mr. Sachs for his excellent and instructive paper on a subject to which the lecturer had devoted much time, and had travelled all over the Continent collecting facts. He wished they could have retrospective legislation as to the old temporary buildings which existed all over London. There were numerous old wooden buildings which were a grave source of danger, and with which the district surveyors had no power to deal. Protection ought to be extended to all schools and churches.

Mr. Max Clarke seconded the vote of thanks, remarking that he entirely disagreed with the lecturer as to the responsibility of architects. Hitherto the architect who had given the theatre speculator the largest value for his outlay had been the most successful. He held that it was of the utmost importance that the theatre architect should use fire-resisting materials. It was true that firemen held that when once alight an iron and concrete building was more dangerous than one of timber; but unless crowded with inflammable goods the iron and concrete building would not catch fire. He asked, was the velarium to be universally condemned, and would they remove the one at the Albert Hall? Was it not possible to render velaria uninflammable by chemical solutions? Too often the proscenium was of fibrous plaster backed up with wood. The greatest requirement in a theatre, in his opinion, was a fireproof and smokeproof partition between the stage and auditorium. He had the misfortune to make for the late Mr. Phipps the drawings for the theatre at Exeter, afterwards destroyed by fire, and suggested to Mr. Phipps that a window might be provided on the stairs, opening on to a concrete flat, for use in case of emergency. The suggestion was adopted, but when the outbreak occurred the window was not utilised. The late Mr. Phipps was not a militant architect; he hated a controversy, but he was strictly conservative, and had a dislike for iron, stone, and concrete as materials for a theatre.

The President, in closing the discussion, remarked that efficient watching was the best precaution to be taken for the protection of theatre audiences. Mr. Sachs had done good service in calling the attention of architects to the urgent necessity that existed for good planning, especially in staircases and exits, to the importance of guarding against panic as well as fire, and to the desirability of using fire-resisting materials. He held that plan should come before materials in the architect's mind.

Mr. Sachs, in replying to the vote of thanks, which was carried by acclamation, explained that the skylights in the roof of the Paris bazaar were filled with glass of the poorest quality—thin, brittle, and indeed rotten, and it was a matter of evidence that glass fragments, as well as burnt portions of the velarium, fell upon and injured the victims. He was not an opponent of fire-resisting materials, but held that a stone staircase was of little value if its route was tortuous, and in such a case a short two-legged staircase of wood was preferable. There was great difficulty in getting independent testimony as to the non-inflammability of preservative solutions and of so-called fire-resisting materials.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

At a special general meeting of the donors and subscribers, held at the offices of the Institution, 21, New Bridge-street, Blackfriars, E.C., on Tuesday, October 26, a resolution was passed, increasing the annual pensions to males from £25 to £30, and the annual pensions to widows from £20 to £24, and at the same time extending the limit of income (apart from the pensions) from £25 to £35 to per annum, in both cases. Mr. Thomas Hall, the president, occupied the chair, and at the close of the proceedings was warmly thanked for his services. The Institution is enjoying a very prosperous year under Mr. Hall's able presidency.

NEW BRIDGE ACROSS THE SEINE.

The Alexander III. Bridge being now constructed over the Seine in Paris, in connection with the Exposition of 1900, will be a remarkable structure of considerable boldness of design. The preliminary stage of the work is now progressing in the large abutments to provide the reactions for the thrust of the flat cast-steel arched members. The foundations are being prepared by the pneumatic caisson process. There is no channel or centre pier; but the span of the arch will give a clear waterway of 358ft., with a breadth between parapets of 141ft., a roadway of 65½ft., and two side-walks of 33ft. wide each. According to *Engineering*, the main platform is carried on 15 solid webbed arch ribs of 352ft. 8in. span, of 20ft. 7¼in. rise, and 37·4in. depth at the crown, spaced about 9ft. 4½in. apart. The roadway is carried on solid steel plates nearly level with the extrados of arch ribs. Over the haunches it rests on columns about 12ft. apart, diagonally braced in longitudinal and transverse planes. The writer says: "The astonishing feature of the whole construction is that these long-span arch-ribs are made in large sections of cast metal—cast steel, it is true, but still primitive cast girders, not unlike the earliest examples of iron bridges, although the remainder of the framework is made of riveted rolled steel. The arch sections, about 15ft. long, have in the intermediate ribs solid heavy webs, with thick flanges extending continuously around both sides and both ends. This flange is 2ft. wide, and is reinforced by two intermediate vertical web stiffening ribs, and by top and bottom bracket braces on both sides in the centre of each panel." Each rib is of I section, and the sections are connected by approximately horizontal bolts parallel to the plane of the web through the abutting end flanges. Each arch-rib is hinged at the crown and skewbacks. The outside ribs are of unbalanced sections, with web wholly on one side of the flanges in section, thus ⊏. The web is open in some of the panels, and will have an ornamental treatment. The bridge is under the supervision of M. Résal, chief engineer, and M. Alby, resident engineer. The extreme flatness of the arch gives a rather weak look to the structure, which may be regarded as rather a girder of slight curvature.

ELECTRIC LIGHTING NOTES FOR ARCHITECTS.—VII.

By an Assoc. Inst. Elect. Engs.

STORAGE BATTERIES OR ACCUMULATORS.

A valuable adjunct to the dynamo in a generating station, and often forming, in a secondary sense, an element of the source of electrical supply is the storage battery, or accumulator, which, although closely allied (in so far as forming part of the source in a private plant) to the subject of generation, must not, in any sense of the term, be considered a generator. A storage battery is purely and simply a convenient means of storing energy. As we shall

have frequent occasion to refer to the application of accumulators, we shall here give a simple outline of the theory, construction, and use of these valuable additions to generating station equipment. To understand the theory and construction of accumulators, it will be best to consider the earliest devised form of voltaic accumulator, of which Grove's gas battery is a good example. As every student of electricity knows, electrolytic decomposition takes place whenever electricity passes through a bath containing an electrolyte, which may be defined as a compound chemical body capable of undergoing a chemical dissolution by an electrical current. Thus, if we interpose in a circuit a vessel, called a voltameter, such as is shown in Fig. 14, in which two platinum plates called electrodes are fixed in two separate glass tubes, A and B, by means of platinum wire hermetically sealed in the tubes closed at the top, so that the electrodes are suspended in water acidulated with sulphuric acid and filling the tubes A and B, it is found that the water is decomposed into its two component elements, hydrogen and oxygen, whenever electricity passes through the electrolyte, and that the oxygen accumulates on the positive pole of the voltameter, whilst the hydrogen is carried forward with the current. As indicated in the figure, connection is made with the source of electricity by means of terminals at the ends of the platinum wires. As the electrolysis continues, the gases, in collecting as stated, displace the acidulated water until the platinum plates are completely surrounded with the two gases, and in passing it may be mentioned that the volume of the hydrogen at the negative electrode is twice that of the oxygen at the positive electrode. If, whilst the electrodes dip into the electrolyte so as to form a complete circuit, the voltameter be detached from the source and connected to a galvanometer or other current indicator, it will be found that the converse process results, and that the charged voltameter now acts as a battery—in other words, a current in the opposite direction to the current producing the electrolysis traverses the circuit, and at the same time the two gases in the tubes A and B combine through the medium of the acidulated water, and thus gradually disappear, refilling the tubes with the electrolyte. This process only takes place so long as the gases are in contact with the electrodes, and it is immaterial whether the gases have been produced by electrolysis or by the ordinary chemical methods, and any arrangement which permits the accumulation of the products of electrolysis by means of a current from an external source, so that an inverse current may result, is called a *secondary cell*, or *accumulator*, and a combination of such cells form a battery.

The following is a simple explanation of the above actions:—"It is fully recognised now that there is a large class of liquids whose dissociated radicles are charged with electricity, half of them with positive electricity, and hence called electro-positive, and the other half with negative, and hence called electro-negative. Moreover, Faraday proved that each monad radicle, of what kind soever, is charged with exactly the same quantity, although the sign may differ. The existence of these charges is certain from the facts of electro-chemistry, and the electrical charge appears to be the essential condition for even the momentary existence of a free radicle. It further appears that when two opposite radicles combine, their charges are either lost or masked by proximity; and that before two radicles of the same kind can unite into a molecule, their charges must be given up to the same third body. All electrolytes are capable of being decomposed, by electrical means, into such dissociated and oppositely-charged radicles. In the case under consideration, the hydrogen and oxygen are dissociated radicles, the former being electro-positive, and oxygen electro-negative. During the process of electrolysis, the two electrodes are charged electrically from an external source, and the electrified radicals are mutually affected by the electrified electrodes with the result that the oxygen atoms adjacent to the positive electrode are attracted by it; they deliver up their charges to it, and uniting into molecules, rise as gas. Their places are taken by others from the slightly more remote region, and so on, a virtual procession of oxygen atoms continually taking place towards the positive plate, each carrying its charge with it. The same thing happens on the hydrogen side, only that twice as many hydrogen atoms take part in the action, the charge of each being half that of an oxygen atom."

Whilst the gas battery is an extremely interesting form of voltaic accumulator, it is altogether unsuitable as a secondary generator for commercial purposes. It is defective in so far as only a limited proportion of the gases, hydrogen and oxygen, liberated during the charging is available and effective in recombining to set up an electrical current, the remaining proportion either being lost or not in the immediate vicinity of the plates. To utilise the principle underlying the action of a gas battery for a storage of chemical

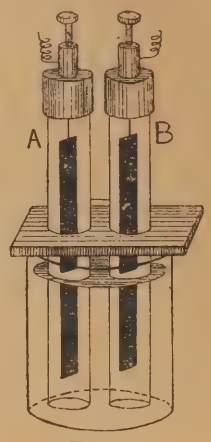

Fig. 14.

energy—for it must be remembered that a voltaic accumulator does not store electricity, but chemical energy, which may be used as and when desired—it is obviously necessary to prevent the escape of the liberated gases, and this may be done by producing by means of a secondary chemical action, a substance, or substances, so disposed that the converse process may readily take place with little loss. A solid, not soluble in water, satisfies these conditions, and at an early date lead plates displaced the platinum plates, for by sending an electric current between lead plates immersed in dilute sulphuric acid, an oxide of lead is formed on the surface of the plates immersed, which in a marked degree is particularly adapted for storing the energy given up by the current and giving it out as required. Sir W. Groves, in his experiments with gas batteries, proved that the efficiency of these batteries was materially increased by coating the platinum plates with a kind of spongy platinum, known as platinum black. By this means the products of electrolysis are accumulated in close proximity to the plates. The resistance of a cell is also diminished by fixing the plates near together, and by using large plates the requisite amount of exposed surface to give sufficient capacity for commercial purposes is secured, and the internal resistance is reduced to a minimum.

To Gaston Planté we owe the discovery that lead plates lend themselves readily for storage purposes. As the result of his researches he found that by taking two large sheets of lead and separating them with strips of non-conducting material and rolling the whole together, so as to form a double spiral, the cumulative effect was produced when the two plates were immersed in dilute sulphuric acid and a continuous current sent from one to the other. What really takes place is that the water is decomposed, and the oxygen as produced combines with the positive plate to form peroxide of lead (PbO_2), whilst the liberated hydrogen forms a film of gas on the negative plate. On discharging the cell through an external resistance, the peroxide of lead is reduced to spongy lead and the other plate is oxidised. This action is continued by sending a current through the cell in the opposite direction to that of the first charging current, and by continuing this process of charging, discharging, and reverse charging for a considerable time, a properly-formed Planté cell is produced. At this stage one plate has a good coating of peroxide of lead, and the surface of the other is in the spongy condition. The converse processes of charging and discharging (except so far as the energy is utilised) is now discontinued. The potential difference between the plates when charged is from 2 to 2·5 volts.

It is obvious that the objection to this method of making accumulator plates is the length of time, the attention and expense required to form the plates. Planté himself found that forming could be assisted by chemical means, for by simply treating the plates with dilute nitric acid, the formation of the plates is accelerated. The most important improvement, however, was that of Faure, who coated the plates with a paste of lead oxide and acid, by which means the amount of energy required to form the plates was diminished and a larger amount of active surface was produced. The paste employed was a mixture of sulphuric acid and red lead (minium $= Pb_3O_4$), forming a paste of lead sulphate ($PbSO_4$). Both plates received a good coating of this paste, and when a current was sent between the plates, one—the positive electrode—absorbed the oxygen, resulting in the conversion of the paste into peroxide of lead, whilst the plate connected to the negative terminal of the source was readily reduced to a spongy condition, and thus a satisfactory active surface was produced with less trouble than with Planté's method. The difficulty, however, with pasted plates is that the paste does not adhere persistently to the plates, and many improvements have been introduced to form permanent plates, and to prevent the paste from being detached from the plates, and the usual method is to perforate ordinary lead plates, or to cast them in form of grids, the spaces being filled with paste.

There are thus, generally speaking, two types of accumulators—the Planté or plate form, and the Faure or pasted form. The original Planté plate has given place to improved forms, the best of which is probably Epstein's. In this case, each plate consists of a single corrugated lead casting, so as to present a much-increased surface to the solution without increasing the external dimensions. The castings, previous to being formed electrically, are boiled in a weak nitric-acid solution, and, as was remarked in connection with Planté's experiments, the surface is then in a suitable condition for subsequent electrical treatment. It will be obvious, therefore, that this form of plate possesses decided advantages. The solid character of the plates, for instance, gives durability—a very essential property. Furthermore, there is no possibility of the active material being disintegrated, whilst the solid nature of the plates is conducive to low and uniform resistance.

The chemical actions explained above may be expressed as follows:—

(1) *Planté's Plate.*—Before *forming* has been produced—

(Positive) Pb (Lead.) $2H_2O + 2H_2SO_4$ (Water and sulphuric acid.) Pb (Negative) (Lead.)

When *formed*—

(Positive) PbO_2 (Peroxide of lead.) $+ 2H_2SO_4$ (Sulphuric acid.) $+ 2H_2Pb$ (Negative) (Lead)

(2) *Faure's Plates.*—When *forming* has taken place.

(Positive) $PbSO_4$ (Lead sulphate.) $2H_2O + 2H_2SO_4$ (Water and sulphuric acid.) $PbSO_4$ (Negative) (Lead sulphate.)

When *formed*—

(Positive) PbO_2 (Peroxide of lead.) $2H_2O + 2H_2SO_4$ (Water and sulphuric acid.) Pb (Negative) (Lead.)

(*To be continued.*)

NOTES ON SURVEYING AND LEVELLING.—IV.

By Walter Tester.

Fig. 2 shows the state of affairs when the surveyor has to commence setting out for the brickwork. The excavator has still got his railroads in and his waggons at work, and there are heaps of loose rock and sand lying about, in addition to many other obstacles, such as heaps of bricks tipped ready for use, and, in spite of these difficulties, he must now set out with considerable accuracy. Suppose he has to commence with levelling the wall A B, Fig. 2. Then—

$$\text{The angle A R B} = \frac{360^\circ}{8} = 45^\circ.$$

$$\text{The angles A R U and B R U} = \frac{45^\circ}{2} = 22\tfrac{1}{2}^\circ.$$

He can place his theodolite over the centre point R, and set on the axis S T, placing the vernier at 0, and clamping the circles, and then setting the vernier round to read $22\tfrac{1}{2}^\circ$ or 360°

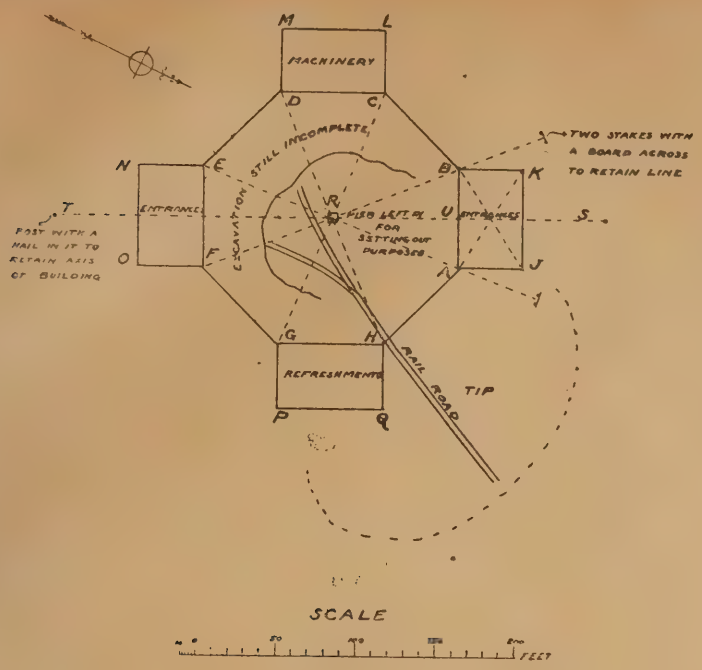

Fig. 2.

$-22\frac{1}{2}°$, as the case may be, he can set out the angles B R U, A R U. These angles being marked out carefully in this manner, the lines R A and R B should be retained, and a convenient way to do so is to drive two posts firmly into the ground clear of the excavations, and nail a board across them at the level of the centre pier, the point where the line cuts across the board being fixed exactly coincident with the vertical hair of the telescope; a saw-cut may be made at this point, and will be very useful, as a string-line can easily be fixed into it. The centre point of the octagon should be marked with a nail, as it is very convenient for fixing the end of a line or the ring of the tape on to, and will often save a man.

In measuring out the lengths from the centre point along the lines R A and R B, the tape must, of course, be kept horizontal, and the points carefully plumbed down with a good heavy plumb-bob, as they are often considerably below the formation level—as, for instance, for the wall A B, the points being plumbed down in the trench, and marked on the rock with a nail or a chisel-mark. Of course, the rock must be properly stepped and levelled-off to receive the brickwork. Once the wall A B is built, the building is absolutely fixed in position, and we will suppose that the bricklayer works round the octagon in each direction, then in succession the walls B C, A H, C D, H G, D E, &c., will require to be set out. They should all be dealt with in a similar manner to the wall A B, always, in setting out the angles, starting off the axis-line S T.

Angles U R B, U R A $=22\frac{1}{2}°$
" U R C, U R H $=22\frac{1}{2}° + 45° = 67\frac{1}{2}°$
" U R D, U R G $=67\frac{1}{2}° + 45° = 112\frac{1}{2}°$, and so on

When the line R E is reached, the telescope of the theodolite should be turned over, to see if it is in line with R A, and also, if the angles are set out correctly, the length of the sides of the octagon should be exact. So far as the wings are concerned, they present no difficulty once the sides of the octagon are set out, as they can be measured out in the ordinary way, care being taken to check the position of the line square off the sides of the octagon with the diagonal dimensions A K and J B. Also, any internal walls can easily be filled in.

As it will probably fall to the lot of the surveyor to square up the measurement of excavation, having taken the sections for same, it will be as well to make a few remarks in reference to one or two points which require noting. Of course, the sections must be plotted down to scale, both the original ground and the rock levels being shown (Fig. 3), the rock line being indicated, say, in red. The position of the building and the working level must be shown

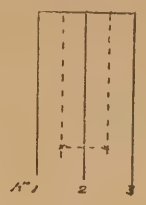

Fig. 4.

on; the area of sand and rock moved may be coloured or scored. It is a common practice to plot these sections to two different scales, the horizontal scale being generally less than the vertical, levels being of more consequence, especially, for instance, in drainage works; but where the sections are solely for the purpose of taking the quantity of excavation, it is more convenient to plot them to a natural scale, as the irregular areas of excavation can be taken out with a planimeter

Where the horizontal and vertical scales are

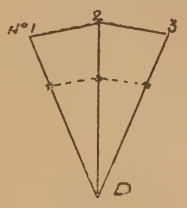

Fig. 5.

different—say 40ft. to the inch and 10ft. to the inch respectively—no oblique dimensions should be scaled off the sections, as they are neither one thing nor the other, but only measurements along either horizontal or vertical lines, using their respective scales.

Each section is supposed to apply to a strip of ground half-way to the next line on each side of it, and the area taken from the section must be multiplied by this width for the cubical contents.

This is on the assumption that any rise on the right-hand side of the section-line is counter-balanced by a fall on the left. This causes a slight variation to occur at the outside of a series of parallel sections. (See sketch, Fig. 4.)

Section No. 2 is multiplied by the width, as already mentioned, of the strip shown in dotted lines. Now, there is only a piece left next section

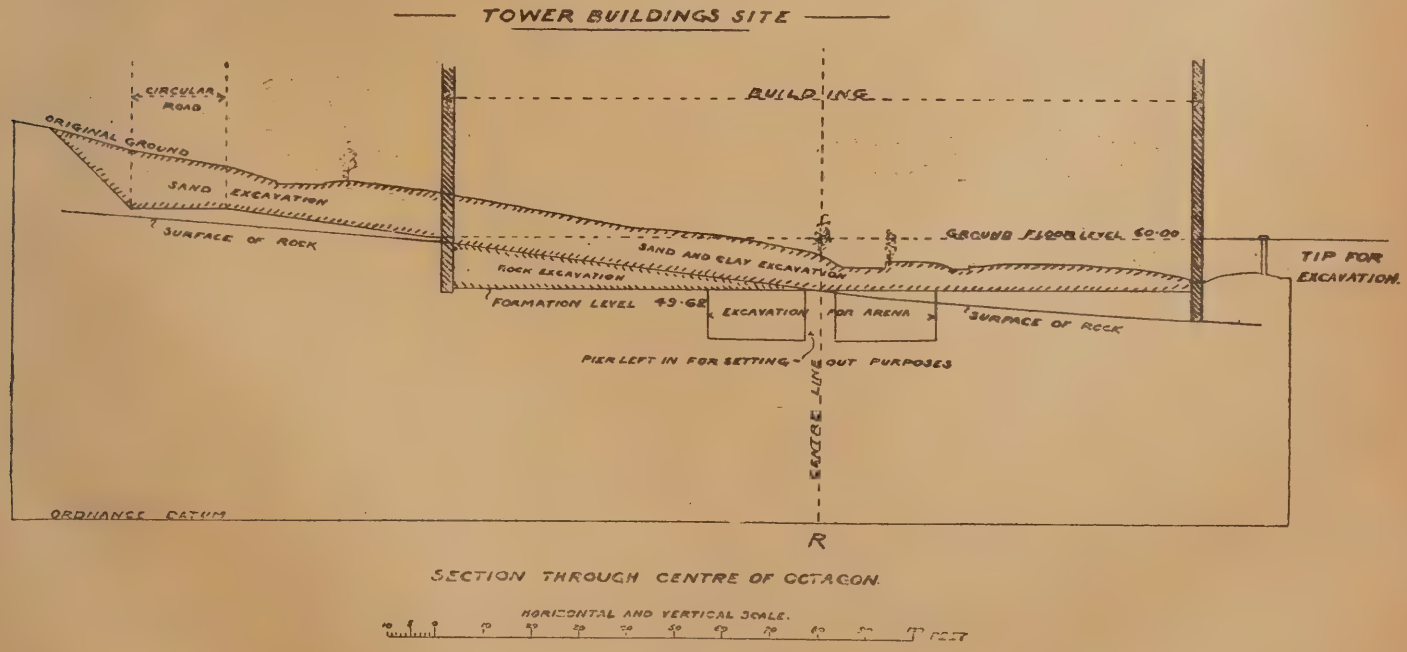

Fig. 3.

No. 1 about half the width, to which each of the other sections applies, and section No. 1 is at the extreme end of it. The best way to deal with this is to add Nos. 1 and 2 together, divide by 2, then add the result to No. 1, and again divide by 2. For example, suppose section No. 1 is 520sq.ft. and section No. 2 is 1,200sq.ft., then—

520
1,200
2)1,720
860sq.ft. section half-way between the two lines Nos. 1 and 2.
860
520
2)1,380
690sq.ft.

This is equivalent to a section in the centre of the half strip at the end, and must be multiplied by the width of the half strip.

The only other portions that present any difficulty are the triangular pieces outside the octagon corners, and they can be taken in the following manner (see sketch, Fig. No. 5). Calling the sections Nos. 1, 2, and 3, and octagonal corner D, add together Nos. 1 and 2 and divide by 2 for an average section, which will apply to the triangle D 1 2. Find the centre of gravity of the area of excavations in each section, and put the position of these two points on the plan, then use their distance apart for multiplying the area of excavation for the cubical contents. Deal in a similar way with the other triangle D 2 3.

Any excavation beyond the main lines, as for areas, &c., must be measured on the ground, or they may be taken from the general building drawings, a height being obtained from the sections; but they cannot be taken from the sections in the method described above, which only applies to general bulks of excavations bounded by regular lines. Also trenching, for walls below basement formation level, and excavation for arena, and tower-pillar foundations must be arrived at independently, as they cannot be taken from the sections.

Nothing has been said about setting-out the base of the steel tower, as it is proposed to devote the next article to that subject.

THE EMPIRE PALACE OF VARIETIES, MIDDLESBROUGH.

THE site selected for the building covers an area of upwards of 11,000sq.ft., having frontages on three sides to Corporation-road, Pine and Dunning-streets, and a frontage to a right-of-way in the rear, thus being practically isolated. The main approach is from Corporation-road through a handsome hall, 34ft. by 19ft. and 18ft. in height, having a large recessed fireplace and wainscotted walls; at the left-hand side upon entering is the box-office, adjoining which is the staircase to the stalls, whilst on the right is a broad staircase leading to the grand circle; in addition there are two emergency exits from the stalls into Dunning and Pine-streets, and an emergency exit staircase from the grand circle into the former thoroughfare. The pit entrance is from, and on a level with, Dunning-street, with an emergency exit opposite directly into Pine-street, whilst the gallery entrance is from the latter street, with an emergency exit into Dunning-street. The auditorium is nearly square, being 60ft. in width, 63ft. deep, and the average height to false ceiling 45ft. The area comprises 120 orchestra stalls, 120 stalls, and a pit with seating accommodation for about 450. Spacious saloon accommodation is provided. The grand circle has seating accommodation for 150 persons, with ample lounges; immediately in the rear over the entrance hall is the principal saloon, 34ft. by 27ft., approached by two short flights of steps, thus enabling a clear view of the stage to be obtained. A further saloon is also provided on the Dunning-street frontage. Both the entrance and exit staircases terminate in roomy lobbies, and there are communication staircases directly into the stalls from either side. Four private boxes flank the proscenium, and on the gallery level are two private boxes. The gallery itself has seating accommodation for 750 persons, and a suitable saloon is provided in the rear. The ceiling, proscenium, circle, and box fronts will be in specially-designed and modelled plastic work, following, in a degree, the Spanish Renaissance treatment of the exterior. The ceiling will be painted with allegorical subjects. The principal seats will be of the tip-up pattern and upholstered in velvet, and the pit seats upholstered in leather. The stage and its accessories are roomy, and will permit of spectacular productions of all kinds. Its dimensions are as follow:—Width from wall to wall, 70ft.; average depth, 35ft.; height to flies, 25ft; height to grid, 55ft.; proscenium opening, 30ft. square. Six spacious dressing-rooms are provided, entirely distinct from the stage and in a separate block, each room being fitted up in the most approved manner; the stage entrance is from Dunning-street, and the scenery entrance in the rear of the building. Mr. Ernest Runtz is the architect, and our illustration is taken from the drawing shown at the Royal Academy this year.

THE BIRMINGHAM MEAT MARKET.

THE new meat market and slaughter-houses were formally opened by the Lord Mayor of Birmingham on Wednesday. The establishment, when completed, will occupy two acres and a half; the total cost will be about £110,000. The site, including compensation to leaseholders, has cost £40,120. The remaining expenditure has been estimated as follows:—Buildings, £48,000; general fittings, £10,533; lifts, boilers, tanks, butchers' offices, &c., £2,611; electric lighting installation, £10,144. To this must be added the expenditure—probably about £10,000—which the Linde Refrigerating Company, the lessees of a large portion of the basement, are undertaking. The style of architecture, a modification of that of the Spanish Renaissance, has been chosen, says the *Birmingham Post*, because low walls and overhanging eaves are desirable in order to keep off the direct rays of the sun. At the same time, it is displayed to real advantage by the material found most cheap and durable for buildings in Birmingham—namely, red brick and buff terracotta. The site has been laid out in three sections, each extending across between the almost parallel thoroughfares, Bradford-street and Cheapside. The middle section is occupied by the wholesale meat market. On each of the other two sections, divided from the market by a wide cart-road, are slaughter-houses, with lairs and other auxiliary accommodation. The rest of the site is taken up on the northern boundary, fronting Sherlock-street East, by an administrative block, and at the opposite end by triperies and the quarantine department, while at the Bradford-street end of this section is a tower. Under the market is a basement containing, on the Bradford-street side, the electric-light engines and dynamos and the pumping machinery, and running under the market a long range of cold store and chill-rooms, with a wide cartway between them. The low bastion-like tower, which, with its mouldings and animals' heads in terracotta, form a feature at the corner of Sherlock-street East and Bradford-street, contains the market superintendent's and inspectors' offices. In the adjoining range of buildings are the caretakers' rooms, the slaughtermen's mess-room, stable, and van-yard, and stores for hides, fat, &c. The Cheapside corner is not yet built, the leases of the old buildings having about thirty years to run. In Sherlock-street East is the main cattle entrance, and the lairs for cattle and sheep are on the upper floor. There are two inclined roadways, with men's way between, so arranged that animals coming down for slaughter will not meet those coming up to the lairs. For lamed or unmanageable beasts a hydraulic lift is provided. Water-troughs, supplied by pipes, run alongside the pens, and the fodder racks are underneath. There are twenty slaughterhouses in this department. Powerful arc lights are provided for the yard, while in the lighting of the slaughterhouses 119 lamps of 32c.p. and 97 of 50c.p. will be employed. From the concrete floors of the lairs the drainage flows into open iron troughs running along the outside wall. From these it descends by iron shoots into shallow open channels in the pavement of the yard. The slaughterhouse floors are arranged so that the swillings flow directly into open gutters, and so into the channels outside. At the boundary wall a catchpit is provided. This has three levels, with meshed screens successively increasing in fineness, so that practically all solid matter is removed before the drainage reaches the sewer, which it enters at the street boundary through a pipe fitted with a trap and manhole. Nowhere in the place is there any pipe connected with the public sewer. The solid refuse must peforce be removed promptly by hand. To facilitate the systematic cleansing of the floors and channels and the removal of refuse a small trolley runs along rails in the yard adjoining the slaughter-houses. On the farther side of the market the slaughtering accommodation has been arranged on the Continental principle—two large halls, one for pigs and the other for cattle and sheep, taking the place of the separate slaughter-houses. The slaughter-halls have a width of 40ft. That for beasts and sheep is 240ft. long, and that for pigs 96ft. long. Adjoining the slaughterhouses, as in the other yard, are pens for animals awaiting slaughter. Covered lairs for pigs are provided on the ground floor, while over the large slaughter-hall are lairs for cattle and sheep. The total lairage is for about four hundred beasts, about a thousand sheep and calves, and over two hundred pigs. The tower, which rises 100ft. above the street, has gilt cupola and grille-work, mouldings and quoins of buff terracotta, and will contain three large tanks. The central and most imposing portion of the establishment, the wholesale meat market, has a length — from Bradford-street to Cheapside—of 365ft., and a width of 90ft. The roof is in one span, whose ridge will be 64ft. from the pavement, and has hipped ends. The floor is divided into 73 market spaces, and has two longitudinal and three cross avenues. Over the central group of stalls is a range of wood and glass cubicles, approached by spiral staircases. These will be the offices of the wholesale butchers. Each stall or stand is surrounded by iron rails with roller hooks for suspending carcases. Hanging room is thus provided in the market alone for 3,000 sides of beef. Above these rails is another set, which forms a system running throughout the market, and out across the roadways on either side to the slaughter-houses. Two hydraulic lifts in the centre of the market, which communicate with the basement, will have similar rails rising to the level of this system, and connecting with it. The Linde Company's premises occupy about two-thirds of the available space in the basement. The storage accommodation consists of fifteen rooms, each insulated by 12in. of vegetable silica packed in the walls and the floor. The cold stores, kept at a temperature 18° below freezing point, will hold 25,000 sheep, and the chill-rooms, kept at 36° Fahr., three hundred sides of beef. At the Bradford-street end are the engine and dynamo-rooms. The electric-lighting installation, probably the largest private gas-engine installation in the city, has been carried out under the superintendence of Messrs. Henry Lea and Thornbery.

The new market and slaughterhouses have been built to the designs of Messrs. Essex, Nicol, and Goodman, Mr. J. Coulson Nicol, A.R.I.B.A., having taken the personal superintendence of the work. The contractor for the building was Mr. John Bowen, also of Birmingham.

The trustees of the Friendly Societies' Home have appointed Mr. A. Saxon Snell, F.R.I.B.A., architect for the erection of a home at Herne Bay for 50 patients. The entire cost of the building will be defrayed by Mr. J. Passmore Edwards, who will lay the foundation-stone on Saturday, November 6, at 3.30 p.m.

A new reredos, which has been erected in the parish church of St. Mark, Shelton, was unveiled on Friday. The reredos contains a panel in terra-cotta modelled by Mr. George Tinworth, and produced by Messrs. Doulton and Co. The scene portrayed in the panel is that on Calvary, at the moment when the Redeemer speaks to his Mother and the Beloved Disciple. The frame of the reredos is in carved oak, by Messrs. Edwards and Sons, of Newcastle-under-Lyme. The holy table is in carved oak, executed by Messrs. Edwards and Sons, and contains three panels in mosaic work by Salviati, of Venice. Messrs. Scrivener and Sons have designed the whole of the work, and the builder is Mr. Thomas Godwin, of Hanley.

At Christchurch Mansion, Ipswich, the subscription portrait of the present mayor of the borough, Mr. Felix T. Cobbold, by the Hon. John Collier, was formally presented to the corporation by Lord John Hervey. The portrait, a three-quarter length, represents Mr. Cobbold seated in an armchair in his drawing-room at Felixstowe Lodge. Christchurch Park was purchased some years since as a public recreation ground for the townsfolk, and Mr. Cobbold then came forward and presented the inhabitants with the Elizabethan Hall in its centre, which has since been converted into an art gallery and technical schools. At the same meeting, the gift of an old painting of Ipswich and its river from a local banker was also announced. Both canvases will be permanently hung at Christchurch.

OBITUARY.

Mr. Francis Turner Palgrave, late Professor of Poetry in the University of Oxford, died on Sunday, at his London residence, 15, Cranley-place, South Kensington, from paralysis of the brain, at the age of seventy-three. The eldest son of the late Sir Francis Palgrave, the well-known historian and antiquarian, by his marriage with Elizabeth, second daughter of Mr. Dawson Turner, of Great Yarmouth, he was born at Yarmouth on September 28, 1824, and was educated at the Charterhouse, and at Balliol College, Oxford. While a skilled versifier, he will be longest remembered as the editor of poetical selections, his best work being his selection of the masterpieces of English verse gathered in his "Golden Treasury of Songs and Lyrics." He was also an art critic of some acumen and judgment. So far back as 1855 he wrote an "Essay on the First Century of Italian Engraving" to Kügler's "Handbook of Painting." In 1862 he compiled a "Handbook of the Fine Art Collections" in the International Exhibition, and in 1866 appeared a volume of "Essays on Art," containing criticisms of the Academy of 1863-4-5 and the Mulready Exhibition at South Kensington, papers on Holman Hunt and Ford Madox Brown, criticism of the Albert Memorial and of Marochetti's bust of Thackeray in Westminster Abbey.

CHIPS.

Mr. W. B. Chancellor has been appointed assistant surveyor to the urban district council of Leek.

At a meeting of Glasgow citizens, on Wednesday in last week, the proposal to hold an International Exhibition in that city in 1901 was discussed and formally adopted. The Lord Provost said that the guarantee fund now almost reached £200,000, and the success of the exhibition was assured.

The Leeds Streets and Sewerage Committee have recommended the city council to construct a new street, 36ft. in width, through the Shambles, which are in course of demolition, and thus provide another means of access to Vicar-lane and the Markets from Briggate.

The extensive cabinet-making factory and stores of Messrs. Cumming and Smith, Limited, Glasgow, were destroyed by fire on Friday, damage being caused to the extent of between £6,000 and £7,000. The works and woodyard occupy the greater part of a large square bounded by North Wallace-street on the east, Couper-street on the west, and Kyle-street and Couper-place on the north and south respectively.

On Wednesday week, a musical service was given in the Congregational church at Crewe on the occasion of the opening of the new organ. The instrument, which cost £600, is inclosed in a Gothic case of pitch-pine timber, varnished, with decorated front pipes, and is situate in a chamber provided for it at the back of the rostrum. The organ has been built by Messrs. Nicholson and Lord, of Walsall.

On Saturday a suite of new halls and classrooms erected in Church-street, Dumbarton, in connection with the Dumbarton Parish Church, were opened The suite, which include a hall accommodating 750 persons, also two lesser halls, committee-rooms, and other conveniences, will cost about £3,000, and are from plans by Mr. J. M. Crawford, architect, Dumbarton.

The decoration of St. Paul's School, Kensington, was completed on Monday by the unveiling of mosaic figures of St Paul and of Dean Colet on either side of the apse. In the apse itself is the Jowett memorial organ; at the sides there have hitherto been rather painfully bare spaces of wall. These have now been filled by the mosaic figures, a smaller place over the arch of the apse being still left for a figure of Jesus in pueritia. The cost has been £1,200. The mosaics were designed by Mr. Spence.

Colonel A. G. Durnford, R.E., Local Government Board Inspector, held an inquiry at the Town Hall, Gravesend, on Wednesday in last week, relative to the application of the town council for sanction to borrow £2,650 for purposes of public walks and pleasure grounds at Windmill Hill. There was no opposition.

A lectern has been placed in St. Paul's Church, Burton, in memory of the founder, Mr. M. T. Bass (father of Lord Burton) and his wife. It has been designed by Messrs. Bodley and Garner, in the style of the 15th century. The eagle stands on a ball, which revolves in a battlemented socket at the top of the pedestal, and holds in its claws a dragon. The pedestal is strengthened with crocketed buttresses, together with flying buttreses ornamented with tracery. At the foot of the pedestal are three lions couchant, and round the base is an inscription.

Building Intelligence.

Bangor.—The opening of the County School for Girls and of the University Hall for Women Students attending the University College of North Wales took place the other day. The girls' school occupies a prominent site overlooking the Snowdonian range and the sea, the cost of erection and equipment being £3,187. Accommodation is provided for 100 girls. An assembly-hall accommodating all the pupils occupies a central position, and opening into it are four class-rooms, one of which can be thrown into the hall by means of folding partitions. One wing is devoted to the technical department, comprising a cookery classroom and laundry. A music-room is also provided. Under the buildings is a covered playground. The heating is by means of Shorland's ventilating grates to all classrooms, and hot-water radiators to the assembly-rooms, corridors, and cloak-rooms. Externally the schools are faced with Ruabon pressed bricks, with dressings of Cefn stone. The architect was Mr. J. H. Phillips, St. John's Chambers, Cardiff, whose designs were selected in open competition, Mr. W. D. Caröe, M.A., being the assessor. The builders were Messrs. R. and J. Williams, Bangor, Mr. W. P. Williams being the clerk of the works.——In the afternoon Miss Helen Gladstone opened the University Hall for Women, which stands in close proximity to the girls' school. The building, which is in the Queen Anne style, is built of red brick and terra-cotta, Mr. Frank Bellis, of the firm of Messrs. Grierson and Bellis, Bangor, being the architect, Mr. Evan Williams the contractor, and Mr. Pierce Williams the clerk of works. It consists of a basement and four stories, the main block being flanked at either end by a wing placed at right angles, there being in the north wing the kitchens and servants' offices. Through the building there runs a main corridor, with stair-cases at either end. Accommodation is provided for 50 students. A special feature in the internal arrangements is the fireplaces, from the special designs of the architect, carried out by Mr. J. E. Edwards, Ruabon. The grounds, which have been laid out by Mr. Wm. Davies, Upper Bangor, include two lawn-tennis courts and a croquet-green. The cost of the building was £5,000.

Edinburgh.—The plans for the North British Railway Company's hotel and offices, prepared by Mr. Hamilton-Beattie, architect, of Edinburgh, and recently selected in competition, came before the Dean of Guild Court on Friday on an application for warrant to proceed with the erection of the buildings. The application for warrant was granted. The hotel and offices will occupy the site between the North Bridge and the Waverley Market, and are estimated to cost £221,000. The style is described as a free treatment of Renaissance, which has given the architect ample scope in the picturesque grouping of windows, gables, turrets, and chimneys. The main elevation is to Princes-street, where there is a frontage of nearly 200ft., rising six stories from the street level to a height of over 100ft. at the crown of the roof. One of the distinguishing features of this elevation will be the great tower occupying the centre of the façade, and rising to a height of 160ft. There are four stories below the level of Princes-street. The building has a central court about 70ft. square, which has simplified the problems of lighting, access, and ventilation. The principal public rooms of the hotel occupy the west and north fronts on the level of Princes-street. Public restaurants and bars occupy the north-east corner. The North Bridge front at the ground level will be mainly taken up with shops, and the south front is to be occupied by the railway offices. The topmost stories of the entire block will form part of the hotel bedroom accommodation. The main entrance is under the central tower in Princes-street. On the south side of the building has been provided the accommodation for the railway offices, the entrance being from Bridge-street. The four stories below the street level will be utilised in connection with the conduct of the hotel. In all, the accommodation will be as follows:—Public apartments, 21; private parlours, 14; bedrooms and dressing-rooms, 295; sitting-rooms and bedrooms for hotel officers and servants, 146; stock-rooms, 10; and administrative apartments, 262—in all, 748, not including the shops and offices.

Glasgow.—The question of the decoration of the new art galleries at Kelvingrove Park is at present under the consideration of a committee of Glasgow Town Council. In their plans and estimates the architects of the galleries set down a sum of £5,000 for sculpture work, in order to keep within the total amount laid down by the Art Galleries Committee. A report has now been prepared by Mr. George Frampton, A.R.A., the special adviser of the committee, suggesting the adoption of a scheme which is estimated to cost about £16,000. The scheme suggests a group of three figures under the central arch of the entrance, to represent "St. Mungo as the Patron of Art and Music," the keystone of the great arch to bear the arms of the city of Glasgow. The tympana of thirty arches over the windows of the ground floor will contain decorative carving, with a scroll bearing the names of the great artists of the Renaissance period, surmounted by the arms of their native city or country. The thirty-six piers dividing these windows will bear clan names; the centre of each of the eight pavilions is terminated by a seated figure symbolical of Music, Architecture, Painting, Sculpture, Science, Literature, Religion, and Commerce; the two north towers each have terminal winged figures in bronze, the one of Fame and the other of Immortality; there will be groups of figures with attributes of the various arts, crafts, and trades of Glasgow; the spandrels of the arches will bear the names of great musicians, and also of historically famous men of Scotland, with the dates of their birth and death. The report has been remitted to Mr. Alfred Waterhouse, R.A., who was the assessor when the competitive plans for the erection of the art galleries were considered.

Goose Green, Wigan.—Foundation-stones of a new United Methodist Free Church were laid at Goose Green near Wigan last week. The new buildings are erected on the old site in Northumberland-street and an additional piece of land. On each side of the main building are two class-rooms, divided from the chapel by patent movable partitions. The heating chamber is placed under one of the class-rooms. The whole of the interior woodwork is pitch-pine varnished. The heating is by hot water, and the ventilation will be effected by Tobin's inlets, with patent roof extractors. The chapel will seat 270, and with the addition of the class-rooms 330. The front of the chapel is faced with Ruabon bricks and terracotta, with Cefn stone dressings, the sides of the same and the front of the class-rooms with local pressed bricks, and the base course with blue Staffordshire bricks. The work is being executed by Mr. Alfred Bywater, of Pemberton, from plans by and under the supervision of Mr. R. Pennington, architect, Clarence-chambers, Wigan.

Hornsey.—The Campsbourne school, erected for the Hornsey U.D. School Board, was opened by Mr. H. C. Stephens, M.P., on Saturday. It comprises a site of 2¼ acres, with frontages to four roads, accommodates over 1,400 children, and is arranged in two blocks, one containing a two-story building for the girls' and boys' departments, and the other a single story building for the infants. Beyond the above two blocks a caretaker's house has been erected at the entrance from Boyton-road, and separate buildings have been built for manual instruction and for cookery teaching. Each of the three departments is provided with a separate hall. The girls' department is situated on the ground floor of the two-story building, and contains accommodation for 450 scholars in eight classrooms, grouped round the central hall. This hall is 86ft. long by 28ft. wide, and 15ft. high in the clear. At the south end of the hall is cloakroom accommodation, and at the north end head mistress's room and lavatory. The boys' department on the first floor is a duplicate of the girls' department, and will contain the same number of scholars. The roof to the large hall on the boys' floor has been constructed as an open-timbered one. The infants' block provides accommodation for 510 scholars, in seven classrooms, and an assembly-hall measuring 50ft. by 25ft. is also provided. A feature is a babies' room fitted with circular galleries, on the lines of a theatre. The manual instruction room contains accommodation for 24 scholars, and the cookery kitchen for 40 scholars. The whole of the classrooms throughout are heated with hot-air stoves, and the halls and corridors by a low-pressure hot-water apparatus. The buildings externally have been carried out in stock brickwork, with red brick

dressings and red material finishings. Internally the walls are built to a dado height in brown salt-glazed dipped bricks, and above such dadoes are finished with buff bricks. The closets and lavatories used are those manufactured by Messrs. Adams and Co., of Old Queen-street, Westminster. The amount of the contract for the works was £20,467, including accessory buildings and playground walls and finishings, equal to £14 10s. 3d. per scholar, and including site to £15 18s. 8d. The works have been executed by Messrs. Kirk and Randall, of Woolwich, from designs prepared by Mr. Howard Chatfeild Clarke, of 63, Bishopsgate-street Within, E.C., under whose personal direction the works have been carried out. Mr. W. White, the clerk of works to the Hornsey School Board, was employed throughout the time of erection, and the general foreman of works was Mr. Fishenden.

Leeds.—A new board school in Harehills-road, Roundhay, which will be known as the Gipton School, was opened a short time since. It stands on a site measuring 7,000 square yards, and has a frontage to the main road of 290ft. There are two departments—infants and mixed. Accommodation is provided for 1,600 scholars, exclusive of special accommodation for cookery and manual instruction, and two central halls. The infants' department is on the ground floor, and consists of a central hall and eight classrooms, two being specially arranged for babies. The mixed department is on the upper floor, where the accommodation consists of a central hall and eighteen classrooms. The elevation is in the Elizabethan style, with two central gables in front. The cost of the building, including fittings, has been £17,000, to which £2,100, the cost of the site, has to be added. It has been erected from designs by Mr. W. S. Braithwaite, of Leeds, architect to the city school board.

St. Blazey.—The parish church of St. B'azey, East Cornwall, was recently reopened after restoration. The fine 15th-century building had been blocked up with high pews and galleries, and all trace of anything beautiful effectually obliterated, while so recently as 1839 a huge gallery was fixed in the west end, completely blocking the tower arch. One thing that made the restoration imperatively necessary was the state of the nave roof, which the deformation of 1839 had divided up into panels by sham plaster ribs. The old Cornish roof with ribs of oak has now been replaced in the nave, and what was left of the old ribs of the aisle roofs has been carefully restored. The galleries and staircases have been entirely demolished. The high pews, some of which were square with seats facing north, south, east, and west, have been removed, and the old floors relaid, blocks being used for the seating part and slate for the gangways. The walls throughout the church have been pointed. The church, though small, is well-proportioned, there being five bays in each arcade, with well-moulded arches and carved capitals, all different in pattern. Mr. Edmund Sedding, of Plymouth, is the architect, and the builders were Messrs. Hobbs and Bartlett, of Rilla Mill, Callington. The outlay has been about £900.

The Metropolitan Asylums Board.—This authority considered, on Saturday, a letter received from the Local Government Board stating that they had had under consideration the application of the managers for an order authorising the further expenditure of £100,000 upon the erection of the Brook Hospital, and that before arriving at a decision on the matter they wished to be informed, having regard to the great difference between the estimate and the total cost of the works, upon whose recommendation the work was passed, what supervision the managers exercised in the matter, and what steps were taken by them to require a full explanation from the architect as soon as it was found that the estimate was being exceeded. The Board suggested to the managers the desirability of placing the whole of the accounts of the hospital in the hands of a competent surveyor for examination item by item. After a long discussion it was resolved "That the whole question of the Brook Hospital, together with the letter of the Local Government Board, be referred to a special committee for consideration and report, and with instructions to employ a competent surveyor for the purpose suggested by the Local Government Board." It was resolved to apply to the London County Council for the loan of £131,273 for works in connection with the Grove Hospital and the South-Western Ambulance Station, and the purchase of sites for the Southern Convalescent Hospital and the chief office.

Tisbury.—The ceremony of laying the foundation stone of the new R.C. Church of the Sacred Heart, Tisbury, was performed on the Feast of St. Edward, Confessor, by the Bishop of Clifton. The church, which is being built on the road leading from the railway station into High-street, will consist of a nave 55ft. long by 22ft. broad, with a sanctuary 18ft. square, a Lady-chapel with two bays of an aisle, and a sacristy, with heating-chamber attached. The entrance to the church is to be on the south side through a narthex porch, which will also give access to the staircase leading to the organ-chamber above. The church is in the Early English style, and will be built of Tisbury stone, the interior stonework being of Bath stone. The cost of the whole of the proposed building will be about £1,750, without altars, furniture, and fittings. The site was given by Lady Arundell of Wardour, the Tisbury stone and sand and other building materials being given by Lord Arundell of Wardour. The church is being erected from the designs of the Very Rev. Canon Scoles, of Yeovil; and Mr. J. H. Kitch, of Bridgwater, is the builder.

CHIPS.

Mr. Frederick H. Tulloch, M.Inst.C.E., one of the Local Government Board inspectors, held an inquiry at the Audit House, Southampton, on Wednesday week, as to an application by the Southampton Corporation to borrow £10,076 for the purposes of a new road, quay, and wharf, and £1,260 for works of street improvement at Shirley and Freemantle.

Mr. E. W. Leshmore, Assoc.M.I.C.E., of the borough surveyor's department at Southampton, has been appointed a district surveyor in the engineer's departmect of the city of Bristol. There were 60 applicants for the post.

There has been a brisk demand for building sites on the land at Keyham Barton, Devonport, which was recently purchased from the manor authorities by a syndicate. Something like 450 sites for houses have already been applied for, and of these 250 have been allotted, representing the first of four sections into which it is proposed to divide the land.

The church of St. Paul, Northwich, was, owing to the salt subsidences, closed on Sunday. In August a portion of the sanctuary floor collapsed. Since then, however, service has been regularly held in the church; but an architect has now condemned the building, as fresh cracks have developed in many parts of the structure. It has been found that the chancel is built upon arches, which are regarded as insecure, and it has, therefore, been deemed advisable to discontinue all gatherings in the church. The roof, main walls, and porch have suffered severely, and entire reconstruction is imperative.

Mr. F. H. Tulloch, Local Government Board inspector, held an inquiry at Bournemouth on Friday with reference to an application of the Bournemouth Town Council to borrow £12,375 in respect of the acquisition of land known as the Dean Park Horse Shoe as a site for new municipal buildings and for other purposes; £10,000 for the erection of a pavilion on the pier; and £2,262 for works of private street improvement. The town clerk (Mr. J. Druitt, jun.), and the borough surveyor (Mr. F. W. Lacey) represented the corporation.

The town hall and municipal buildings at Reading, built 15 years ago, have just been enlarged by the extension of the Free Library and Museum upon the corner site, which has only recently come into the possession of the corporation. The extension, which was opened last week, was illustrated by a double-page sketch in our issue of March 13, 1896, from the designs of the architects. Messrs. Cooper and Howell, of Reading. The works have been carried out at a cost of about £8,000, by Mr. McCarthy E. Fitt, of the same town.

The members of the gas committee visited the Bury Corporation Gasworks on Wednesday week to inspect the installation of pressed-air stoking machinery recently laid down by West's Gas Improvement Co., Ltd, Manchester. The improvements consist in the addition of retort benches on the regenerator principle, an additional stage floor, the raising of the overhead conveyors and hoppers to suit machinery, the fixing of a new coal-breaker, together with an elevator, to act as a duplicate to the existing machinery, and a conveyor from the overhead coal conveyor filling the coal-store. West's compressed-air system of charging and drawing retorts has been applied to the new retort benches, the apparatus including charging machines, drawing machines, air compressor, air receiver, and air-pipes and hose-gear.

Engineering Notes.

Institution of Junior Engineers.—The annual general meeting of this institution was held at the Westminster Palace Hotel, Victoria-street, on Friday night, Mr. H. B. Vorley, the chairman, presiding. The council stated in their report that at the end of the 16th session the number of names on the register was 480, as compared with 454 at the end of the previous session—an increase of 26. The receipts for the year amounted to £531 10s. 8d., and the expenditure to £543 5s. 1d. The chairman, in moving the adoption of the report, said the institution was primarily an educational body. It endeavoured to give instruction in every form of engineering, to cover the whole field of engineering work. This it accomplished by means of lectures, &c., and by organising visits to engineering works. Eleven visits of that kind had been paid during the past session. The institution possessed a library of works on engineering subjects, and a number of additions had been made to it during the past session. Mr. Basil Joy seconded the motion, and the report was adopted. The officers for the ensuing year were afterwards elected, Mr. J. A. F. Aspinall, chief mechanical engineer of the Lancashire and Yorkshire Railway, being elected president in succession to Sir A. R. Binnie.

At Tuesday's meeting of the London County Council amended plans for the alterations at Olympia in connection with Messrs. Barnum and Bailey's show were approved. An estimate of £207,400 for the widening of Long-lane, Southwark, and the continuation of Tabard-street through St. George's Churchyard into Borough Aigh-street was approved.

A group of municipal buildings, including a free library and public offices, are about to be built for the Worksop Urban District Council, from plans prepared by Mr. T. Kidd, their surveyor and engineer. The site is at the corner of Newcastle-street and Watson-road, and the buildings will be of local brickwork, with stone dressings.

On Sunday the Rev. Dr. Norman Macleod, Inverness, opened the new parish church in Tobermory, which has been built at a cost of £2,000. It has been seated to accommodate 300.

Earl Jersey and General Boughey, Light Railway Commissioners, held an inquiry at Salisbury on Tuesday into the proposals of the Great Western Railway Company to construct a light railway through the Avon Valley from Salisbury to Pewsey, a distance of about 21 miles, at an estimated cost of £116,000. Evidence in support of the scheme was given by Sir Michael Hicks-Beach, Lord Edmond Fitzmaurice, the Mayor of Salisbury, and the manager and chief engineer of the company. Opposition was offered by the War Office, and Sir Redvers Buller, late Adjutant-General, and General Sir Robert Grant both stated that the special military purposes for which the Government bought the extensive land on Salisbury Plain would be nullified if the proposed railway were allowed to run through it.

The great east window of Heckington Church, Lincolnshire, which ranks in magnitude as some fourth or fifth among the Flamboyant specimens in the country, has, through the munificence of Mrs. Little, of Heckington Hall, been filled with stained glass. The seven main lights are divided into a centre triplet and two side couplets, and in them is illustrated the *Te Deum*, and in the tracery the *Benedicite*.

On Saturday, a commemoration-stone was laid in the building now in the course of erection for a parochial mission-hall and clergy-house for St. Silas, Pentonville, from the designs of Mr. William White, F.S.A. The total cost is estimated at £5,500, of which £1,500 goes for the purchase of the site.

Alderman William Collinge, J.P., of Burnley, died on Thursday night in last week at his residence in Southport. Mr. Collinge, who was a cabinet-maker and upholsterer, had long been associated with the town council, and was mayor two years ago.

The Local Government Board have recommended the Public Works Loan Commissioners to lend to the council of Enfield the sums of £6,500 for works of water-supply, and £14,944 for works of sewerage.

Colonel C. H. Luard, R.E., on behalf of the Local Government Board, held an inquiry at the town hall, Wolverhampton, on Tuesday, with regard to the applications which the town council have made for permission to borrow £9,000 for electric-lighting purposes, and £1,000 for laying out St. George's Churchyard as an open space.

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ILLUSTRATIONS.

THE EMPIRE PALACE OF VARIETIES, MIDDLESBROUGH.—NEW POLICE STATION AND COURT HOUSE, HALIFAX.—WESLEYAN CHAPEL, CROSBY, NEAR LIVERPOOL.—FIREPLACE UNDER STAIRS IN A HOUSE AT BRUSSELS.—"BEMERTON," PARK LANE, CROYDON.—CREWE SANATORIUM.—A SPANISH ARMCHAIR (MDL.)—A JACOBEAN CABINET.—A SEVENTEENTH CENTURY ITALIAN CHAIR.—PRACTICAL LESSONS FROM THE PARIS BAZAAR FIRE.

Our Illustrations.

THE EMPIRE PALACE OF VARIETIES, MIDDLESBROUGH.

(See description on page 614.)

NEW POLICE STATION AND COURT HOUSE, HALIFAX.

The design which we illustrate to-day was awarded the first premium of £50. Its authors are Messrs. J. H. James and Sweet-Escott, of Cardiff. The following is taken from the architects' report:—The design has been composed with regard to economy, and treated with dignity. The style is Free Renaissance. It is intended to face the fronts with ashlar, and to use, so far as possible, the old materials in Ferguson-street and Carlton-street. The whole of the back elevations will be quite plain. The roofs will be covered with green slates. The floors will be fireproof, laid with narrow oak boards. The cells, sanitary departments, and the areas to be faced with glazed bricks; the other interior walls will be finished in adamant plaster. Fire hydrants and hose to be fixed in handy positions in the halls, landings, and corridors. The necessity of keeping the frequenters of the police-court away from the principal fronts of the building has been considered. The main entrance is towards Harrison-road, as well as the warrant entrance. In addition to this, it is decidedly necessary that those persons who have constant business in the Court, such as magistrates, solicitors, clerks, and also the better class of witnesses, should have free and convenient access to it without the interference likely to arise from their entering or leaving by means of, or even in the vicinity of, a public entrance; such a means of communication is to be had from Blackwall. The Court itself has been placed in a good position on the site, and light obtained from the roof only: the inconvenience produced by side windows is avoided. The magistrates' and solicitors' rooms and clerk's office flank it on the east towards Harrison-road; a situation is thus secured for the Court which effectually guards it against street noises. A spacious lobby is provided for the public and another for the witnesses, also for the magistrates and solicitors, with necessary conveniences; all are well ventilated. Communicating with the yard of the public station is an entrance for the use of the constables and officials, and a staircase leads directly from the prisoners' dock in the centre of the Court-house to the cells' corridor, which is reached by an inclined plane. The police-station is entered from Harrison-road; a charge-room and the superintendent's offices, as well as other officials' offices lead off from the hall on entering by the main entrance. The cells are entered through an archway from the hall of the main entrance, which leads into the corridor, from which the cells open. The cells are carefully planned in accordance with the Government regulations. The first floor of the building contains solicitors' and clients' rooms, witnesses' and clerks' rooms, &c., with all necessary conveniences; also gaolers' quarters, and accommodation for constables' sleeping-rooms could be easily obtained by the addition of attics in the roof. Ample cellarage is given under the building, which includes police recreation-room and mess-room, bathrooms and lavatories for police and prisoners, a chamber for lighting and heating apparatus, &c. The portion of the ground at the back left unbuilt upon would be used as a parade ground. The price is thus arrived at:—Cubical contents: 531,965ft. at 6d. per foot cube, £13,299 2s. 6d.; allow for old materials, £700; estimated total cost, £12,599 2s. 6d.—The second premiated design was submitted, we understand, by Messrs. Leeming and Leeming. Eventually the town council adopted another set of plans, marked by the motto "Victorona," by Messrs. George Buckley and Son, of Halifax, and this is being carried out. The borough engineer also prepared a plan, and, if we remember rightly, another abortive competition for the same building was held two or three years ago, when Mr. Cheers was placed first. The report given in the *Halifax Evening Courier* of September 9 last shows that some rather strong language was used when the matter of these late competitive plans were discussed. One speaker remarked upon the doings of the watch committee, saying they resembled the "fratching" of boys playing at marbles struggling to win the most. Retorts about "shady" conduct and sucking other people's brains were indulged in. We pass no opinion on the conduct thus described; but architects should assure themselves of the *bona fides* of the promoters of competitions before sending in their designs. Once submitted, their authors are, to a large extent, at the mercy of a lot of people who know nothing about the merit of their plans, and those who sometimes have their own turn to serve.

WESLEYAN CHAPEL, CROSBY, NEAR LIVERPOOL.

This building is designed to accommodate about 700 worshippers, and has considerable convenience in vestries and classrooms, besides a small gallery at the end over the narthex or main entrance. The work is externally of Yorkshire stone shoddies, with dressed ashlar quoins and dressings. The construction of the walls gives deep reveals to all window and door openings. The whole of the woodwork is of selected pitch pine, the roof and principals being all from the tool, and not stained or varnished. The chancel, with Caen stone dressings, is finished with an arcade and reredos, carved by Mr. Joseph Rogerson. The windows of the chancel are of grisaille work, with a centre subject window by Mr. J. Aldam Heaton. The general contractor was Mr. Samuel Webster, and the clerk of works Mr. S. Gunning. The architect is Mr. J. Francis Doyle, Liverpool, under whose direction the work was carried out. The drawing was exhibited in the Architectural Room at the Royal Academy this year.

FIREPLACE UNDER STAIRS: HOUSE AT BRUSSELS.

This drawing shows the fireplace and staircase, and part of the hall in a proposed house at Brussels. The woodwork will be in oak, fumigated, and the fireplace hood in copper repoussé, with Dutch tiles and red brick hearth. The exterior of the house is half-timbered, with red tile roof, and the principal room in the house, the studio, about 30ft. square, with open timber roof.

M. H. Baillie Smith.

"BEMERTON," CROYDON.

This house is built on a narrow plot of ground with a 40ft. frontage. Owing to the position of the adjoining house the south side enjoys nearly the full advantage of the sun, and is well-seen down the road. The owner has since bought the ground on the north side. The principal idea aimed at in the planning was to get a square, well-lighted hall. The dining-room, though wrong in aspect, has a better outlook than if placed at the back of the house. The exterior is faced with red Wrotham bricks, and front portion is tile-hung. The house was built by Messrs. J. Nicks and Co., 92, Falcon-road, Battersea, with plumbing work by Messrs. Freeman Bros., of Battersea, from the designs and under the superintendence of Mr. A. W. Field, Architect, London.

BOROUGH SANATORIUM, CREWE.

This sanatorium was opened on October 16 by the Earl of Crewe. The buildings, which occupy a site of five acres, accommodate 28 patients for the treatment of infectious disease, divided over three blocks—16 beds for scarlet fever, 10 beds for typhoid fever, and two isolation wards for one bed each. The administrative building provides accommodation for a matron and the requisite number of nurses and staff. The pavilions are warmed by means of Messrs. Shorland's stoves; the laundry fittings have been supplied by Messrs. Bradford and Co., and the steam-boiler and disinfector have been supplied by Messrs. Manlove, Alliott, and Co. Mr. John Matthews, of Nantwich, has been the general contractor by whom the work has been carried out at a cost of about £7,000, from designs and under the supervision of Mr. George E. Bolshaw, architect.

A JACOBEAN CABINET, AND SPANISH AND ITALIAN CHAIRS.

The Cabinet illustrated herewith is of unusual size, it being 6ft. wide, 7ft. high, and 1ft. 10in. deep. The two plain drawers at the base are somewhat remarkable, such adjuncts, in this position, to this type of furniture being seldom met with; otherwise, the general features are those of our old English Buffets or Court Cupboards. There are three doors in upper part, which is recessed, leaving 7in. shelf. This shelf is 5ft. from ground. Below are two drawers with carved fronts. Then the two main cupboards occur; and, finally, the two plain, deep drawers before mentioned. The whole piece is of oak, elaborately carved in front, and with plain sinkings in the framing. It is a recent acquisition by the Bethnal Green Museum. The Spanish Arm-chair is of carved walnut-wood, with crimson velvet seat and back, quilted; its date is about the middle of the 16th century. The sizes are 4ft. to top of back posts, 1ft. 9in. to seat, and 1ft. 10in. wide between front posts, which are 2in. by 1¾in. The little Italian walnut Chair belongs to the 17th century. The two top rails are prettily shaped, and, in addition, are slightly curved for the back of a sitter; they are connected by five turned balusters. The total height is 3ft. 7in.; width of back, 1ft. 3¼in.; width in front, 1ft. 6in.; and height to seat, 1ft. 7in. Both these chairs are at the South Kensington Museum.

CHIPS.

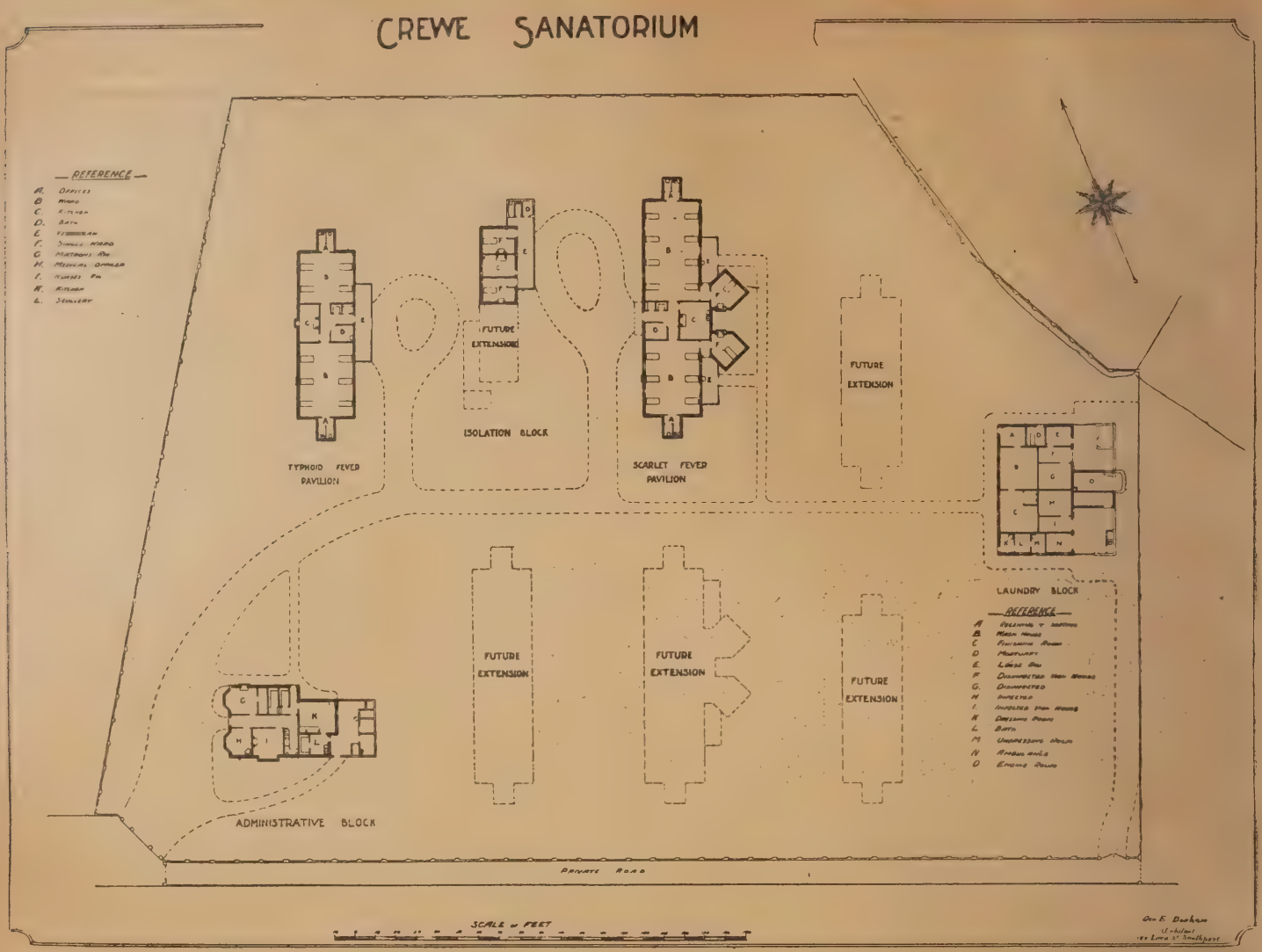
An alms-box carved in oak, inclosed in ornamental wrought ironwork, has been placed in the parish church of Snaith. It has been executed by Messrs. Harry Hems and Sons, of Exeter.

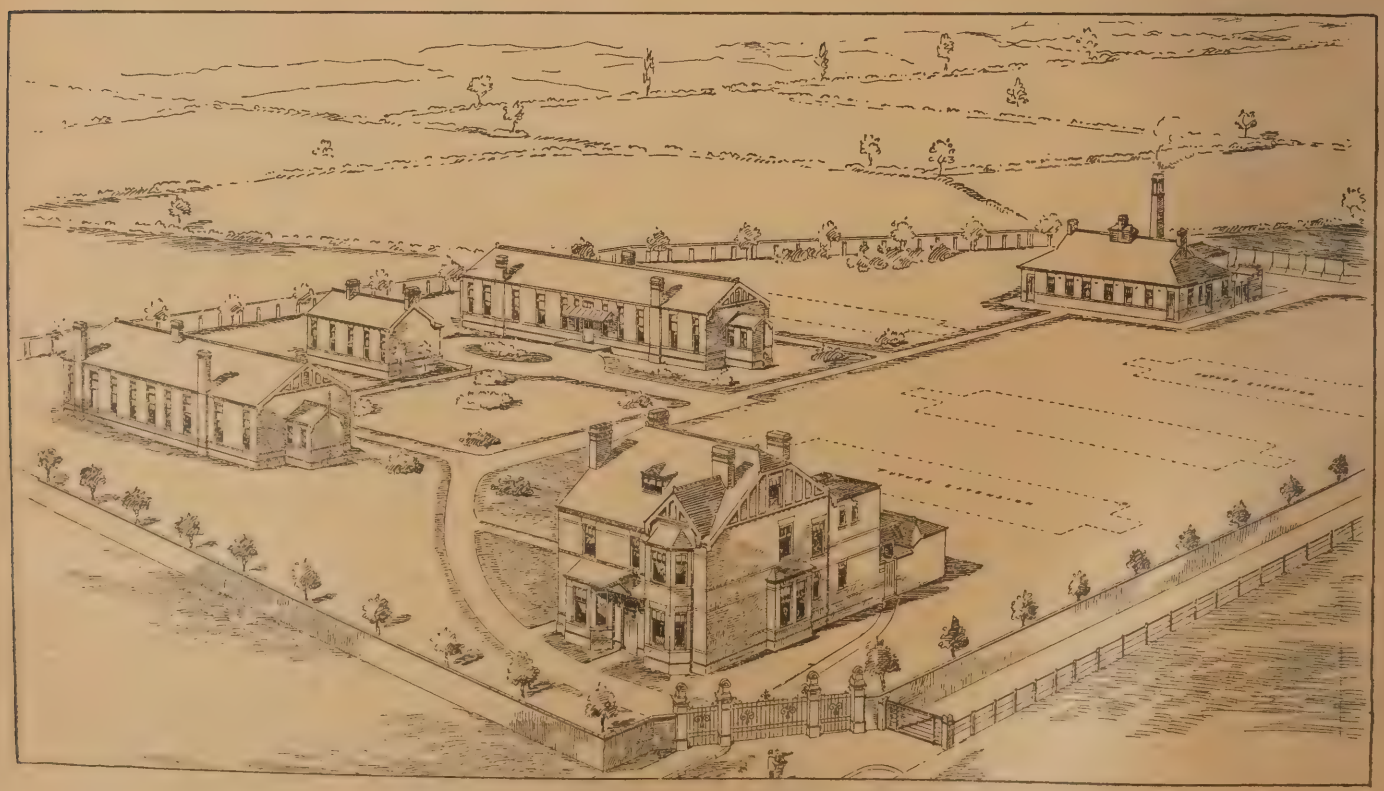
At the Town Hall, Maidstone, on Thursday in last week, Colonel Durnford, R.E., Local Government Board Inspector, held an inquiry with reference to an application by the Corporation of Maidstone for permission to borrow £2,000 in connection with the proposed Victoria Free Library and for rebuilding the Museum curator's house.

H.M. Board of Works have accepted the estimate of Messrs. Mackenzie and Moncur, Limited, for the erection of a large new temperate house in the Royal Gardens at Kew. The erection is to be constructed with iron girders, and teak sashes and sash bars. It is expected the work will be completed in twelve months.

A new schoolroom was opened on Friday at Ellesmere College, which flourishing branch of the Woodard Schools was established in 1884. The school is situated in a charming position in the beautiful Ellesmere Lake district, and educates about 200 students as present. The new great schoolroom is 130ft. long and 36ft. wide, built of brick, with stone dressings, like the rest of the building. Its cost has been £5,002.

At the Cornwall Quarter Sessions last week 20 men were charged with wilful damage to building property belonging to the Headlands Hotel Company, New Quay. The company had erected an office in connection with the projected new hotel. The defendants, with many others, proceeded to the spot, and threw the office into the sea. For the defence it was alleged that the site was common lands, and that the company had no right to build thereon. After a lengthy hearing, the jury returned a verdict of guilty, and the Bench imposed a fine of 40s. each, and bound them over upon their own recognisances, both to be conditional on the finding of the High Court as to the question of right.



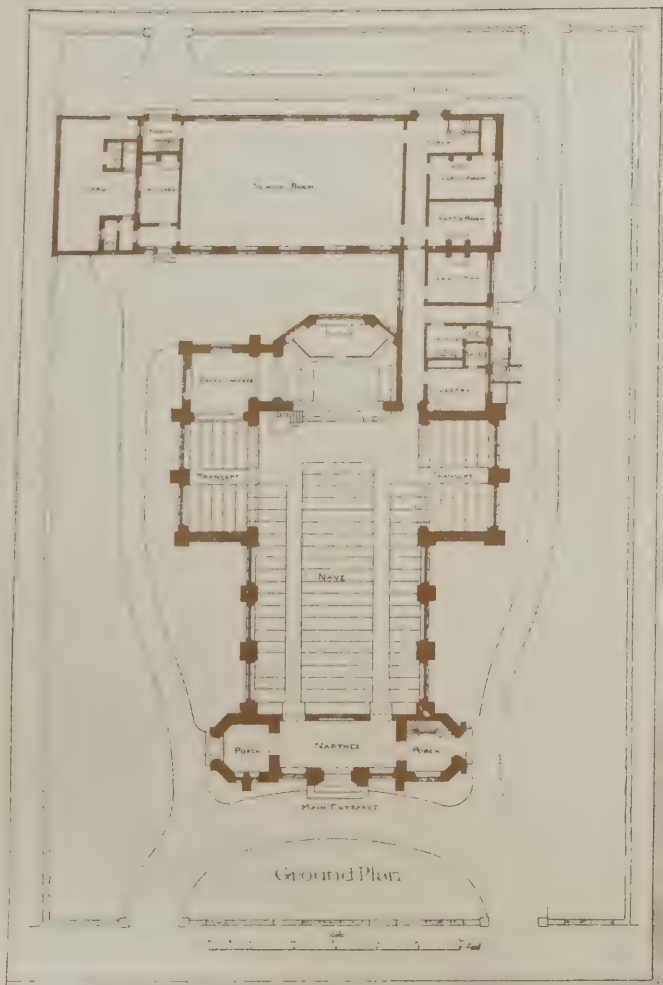


BOROUGH SANATORIUM, CREWE.

G. E. Bolshaw, *Architect.*

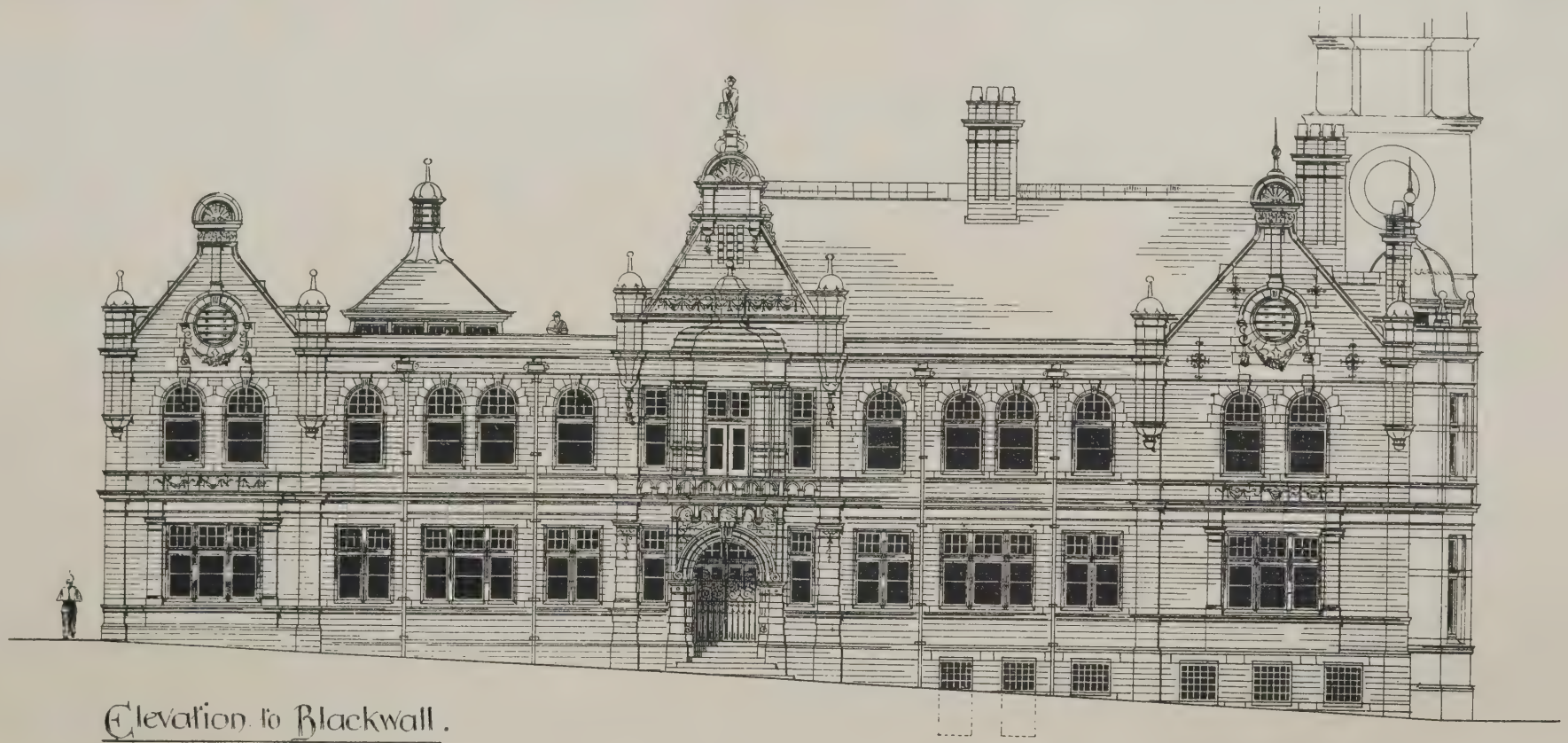
"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.

FIREPLACE UNDER STAIRS HOUSE AT BRUSSELS M.H. BAILLIE SCOTT ARCHT.

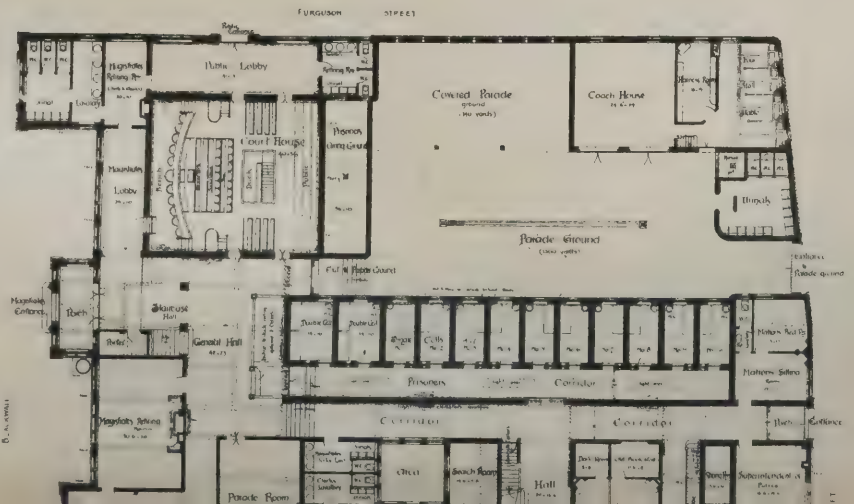

Nave
Narthex
Porch
Porch
Main Entrance
Ground Plan

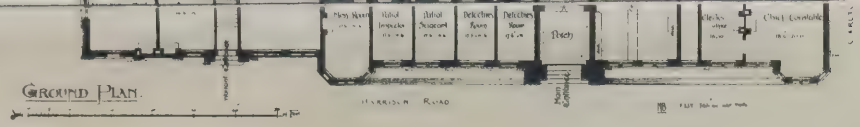
"PHOTO-TINT" by James Akerman

WESLEYAN · CHAPEL · CROSBY NEAR LIVERPOOL J FRANCIS DOYLE ARCH^T



Elevation to Blackwall.

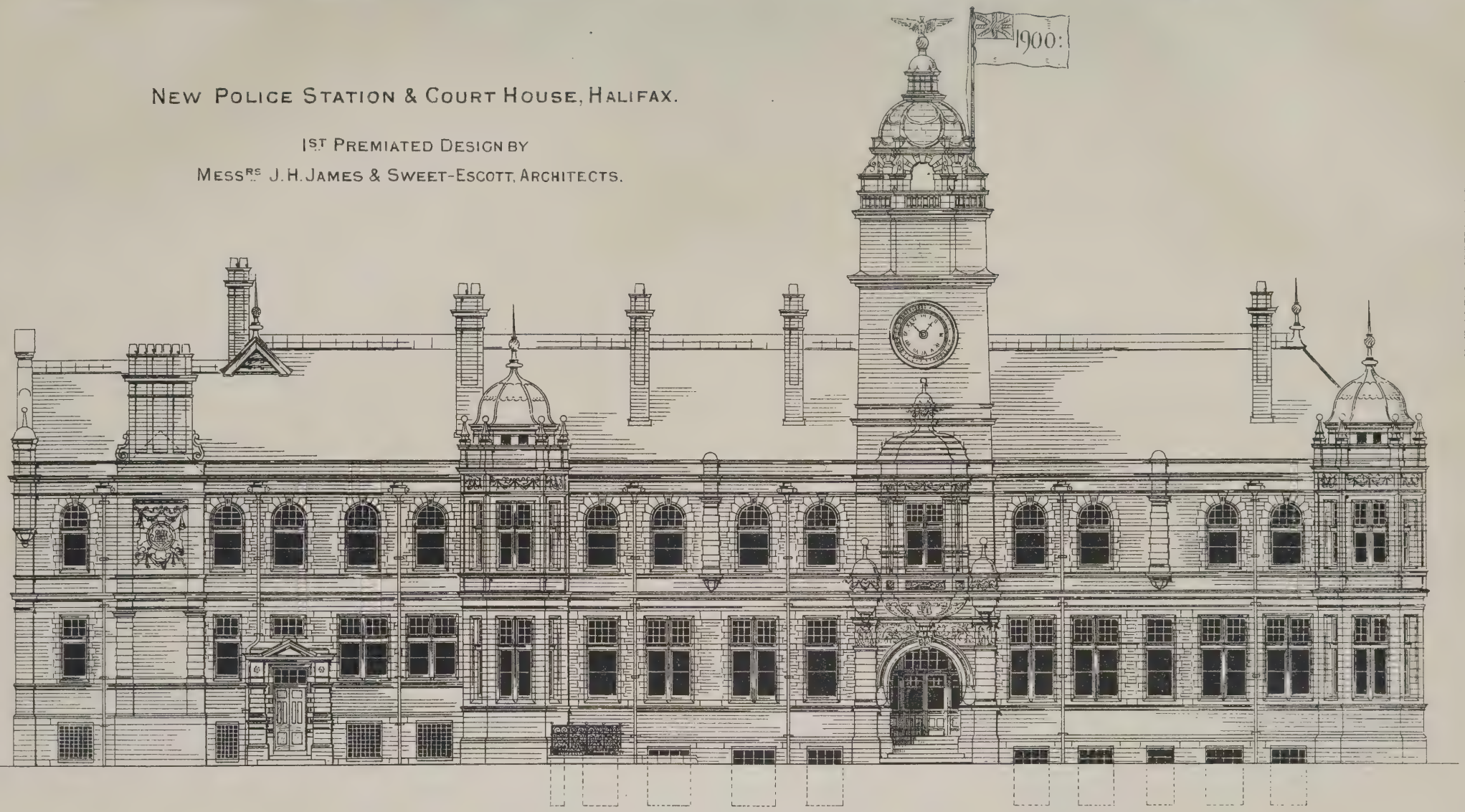




New Police Station & Court House, Halifax.

1st Premiated Design by

Messrs. J. H. James & Sweet-Escott, Architects.



Scale of 10 5 0 10 20 30 40 50 Feet.

Elevation to Harrison Road.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

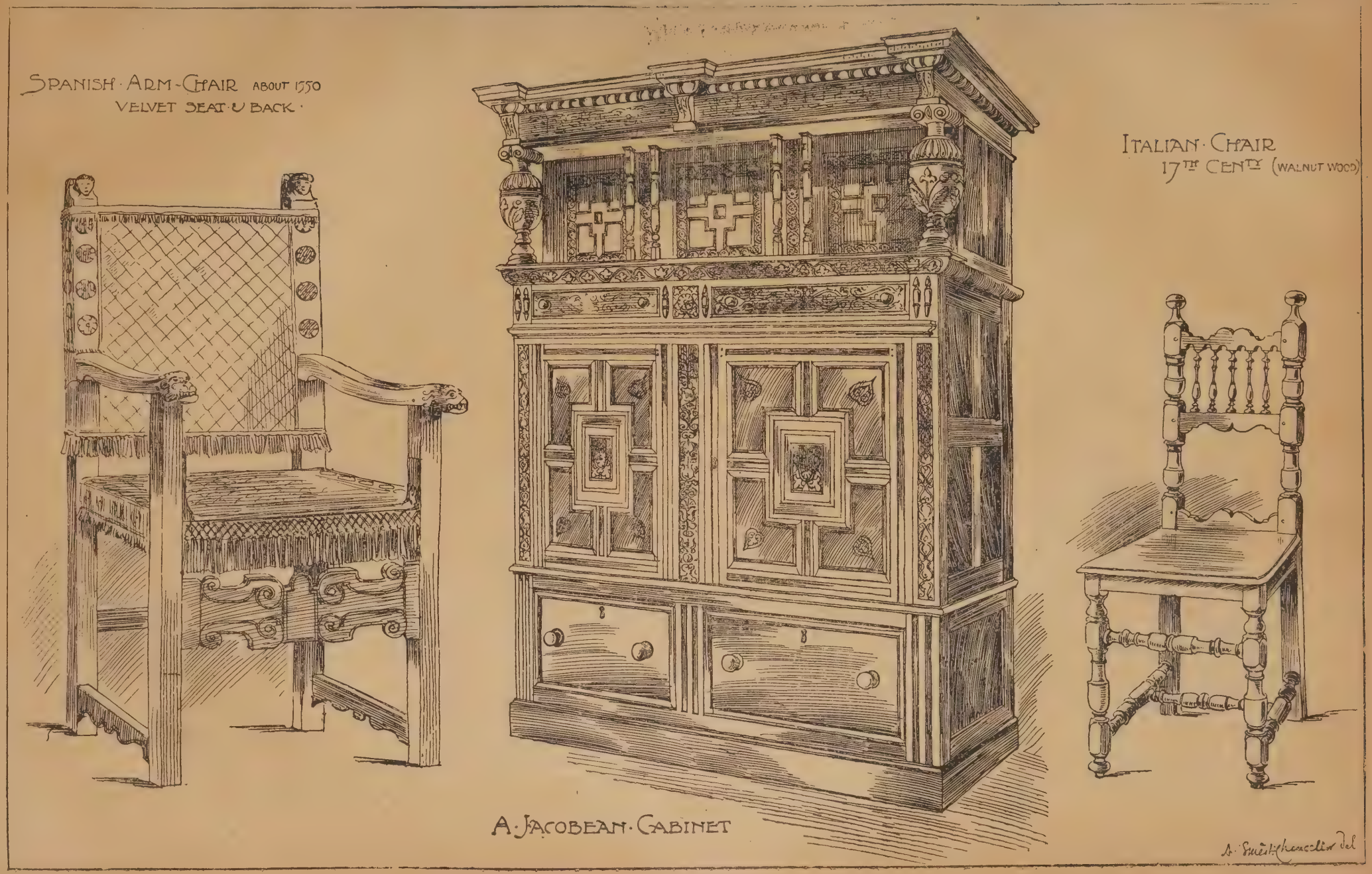
THE · EMPIRE · PALACE · OF · VARIETIES · MIDDLESBROUGH · ERNEST · RUNTZ · ARCHT

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

"BEMERTON"
PARK LANE, CROYDON.

A.W. FIELD Architect.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.


SPANISH · ARM-CHAIR ABOUT 1550
VELVET SEAT & BACK ·
ITALIAN · CHAIR
17TH CENTY (WALNUT WOOD)
A · JACOBEAN · CABINET

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Architectural Association of Ireland.—The opening meeting of the winter session of the above association was held in the Grosvenor Hotel, Westland-row, on the 19th inst. Mr. R. Caulfield Orpen presided, and amongst those present were:—Messrs. Thos. Drew, R.H.A., President R.I.A.; W. M. Mitchell, R.H.A.; George Rose, M.A.; J. Howard Pentland, R.H.A.; J. J. O'Callaghan, F.R.I.B.A.; C. J. M'Carthy (city architect); T. Slevin, C.E.; G. M. Ross; M. J. Buckley; T. R. Scott; George Sheridan, A.R.I.B.A.; R. Butler (hon. secretary); A. E. Murray, R.H.A. (hon. secretary R.I.A.); Chas. Geohegan, &c. The chairman announced that the Maguire Prize of £10 for a drawing of a building of a style prior to the 18th century had been awarded to Mr. J. Delany, the judges being Messrs. G. C. Ashlin, R.H.A., and T. M. Deane, M.A. Three sets of designs for a suburban villa had been sent in competition for the Ashlin Prize of £10; but the prize had not been awarded, on the ground that the plans received could not be carried into effect for the sum mentioned in the terms of the competition, which amounted to £2,000. Mr. R. Butler, 12 Dawson-street, had been awarded the prize for the best essay on "The Influence of Climate on National Domestic Architecture."—Mr. Pentland delivered a lecture on "Open Roofs," in the course of which he gave an outline of the history of house construction in ancient times, dealing in a concise manner with the various styles adopted by the Pelasgians, Etruscans, Romans, and others, explaining the difference between each and their analogy, in some instances, to modern buildings. The expression, open roof, he said, was not an euphemism, but meant that houses and other structures were made with roofs which were not covered by a ceiling. He gave particulars concerning Italian architecture, dealing shortly with the construction of the domes on ancient buildings and modern European cathedrals. He referred to the flat-roofed houses of the Syrians, and their resemblance to those of modern structures, as also the climatic effects on architecture. Mr. J. J. O'Callaghan, in proposing a vote of thanks to the lecturer, said he had come there in anticipation of receiving great pleasure in listening to the lecture of Mr. Pentland, and he had not been disappointed. He thought that the lecturer might have treated more fully with ecclesiastical architecture, and criticised his remarks on Roman architecture. Mr. Geoghegan seconded the motion, and Mr. Drew having spoken to it, it was carried unanimously. The lecturer briefly replied to the remarks of the previous speakers. With regard to the Romanesque style, he had no doubt that the Romans were better engineers than architects. It was announced that the Saturday afternoon visits to buildings in course of construction would commence on the following Saturday at 2.30 o'clock, the destination being the works in course of progress at the Star Theatre. The visit was being made by kind permission of Mr. Adam S. Findlater, and it was intended that similar visits would be made to various places during the winter season. Mr. Butler proposed a vote of thanks to Mr. Noblett, Cork, for the series of views taken by him during the visit to Lancaster and neighbourhood of the Architectural Association, and also to Mr. T. E. Hudman, for presenting photographs of the groups taken by him on the occasion of the annual excursion of the Architectural Association of Ireland to Mellifont. Mr. Drew seconded the motion, which was passed.

Auctioneers' Institute.—The new session of this body will be opened on Tuesday evening next, when the inaugural address will be delived at the Institute's rooms, 57, Chancery-lane, W.C., at 8 p.m., by the President, Mr. James F. Field, F.S.I. The succeeding meetings during the session will be as follows, all being held on Tuesday evenings at 8 p.m.:—Nov. 30, "The Practical Application of the Principles and Law of Dilapidations," by Henry Bushell, F.S.I., Professor of Surveying at the Birkbeck Institute; Jan. 4, 1898, "House and Estate Agents' Commission," by J. B. Matthews, Barrister-at-Law; Jan. 25, Conversazione; Feb. 22, "Furniture, Past and Present," by W. Roland Peck, F.S.I., vice-president of council; and March 29, "London Traffic Problems and their solution," by Douglas Young, F.S.I., member of council and surveyor to the City and South London Electric Railway.

Edinburgh Architectural Society.—The 11th meeting of the session was held on the 20th inst., Mr. J. A. Williamson, A.R.I.B.A., President, in the chair. Mr. W. A. Mellon read a paper entitled "Half-Timber Work." Mr. Mellon gave an historical description of characteristic examples of the style, both Gothic and Renaissance, and then gave a short comparison between British and Continental work, and concluded by stating how far, in his opinion, half-timber work was applicable to present-day building in Scotland. The paper was largely illustrated by pen-and-ink cartoons by the author.

Liverpool Architectural Society.—A special meeting of the members of this society has been held at the Law Library, Union-court, Liverpool, to hear a paper by Mr. Joseph H. M'Govern, a Fellow of the society, on "Valuations and Compensations." Mr. J. Woolfall, vice-president, occupied the chair. Mr. M'Govern, in the course of his paper, said that there were many important differences of opinion concerning the method of preparing valuations, and he dealt with these points under the following heads:—(1) Whether a ground rent should be deducted as an annual leakage, like rates, taxes, tithes, repairs, &c., or should it be capitalised separately? He was of opinion that it should be capitalised separately. (2) Should those property tables be used which gave the same rate of interest for a sinking fund as the interest required on the capital invested, or those which provide a lower rate of interest for a sinking fund than for the capital? He thought Hurst's tables should be used, which gave the interest required on the capital, and 3 per cent. compound interest as a sinking fund to replace the capital. (3) Should the same tables be used for a freehold interest as for a leasehold, or should different ones be used? His contention was that different tables should be used, generally 5 per cent. tables for freeholds, and 6 per cent. for leaseholds. (4) Is the difference in value about 5 per cent. between 75 years' lease and a freehold, or does it not reach about 18½ per cent.? He believed that it reached the latter figure. Proceeding, Mr. M'Govern treated of various matters for which compensation was claimed, such as the lowering of street pavements, cutting off of main sewers, railway improvements, subsidences, &c. At the close he was thanked on the motion of the chairman, seconded by Mr. Dodd, and supported by Mr. Bradbury.

A new hotel is to be built at Torquay from the designs of Messrs. E. Appleton and Son, architects, of Torquay and Paignton.

The 200th anniversary of the reopening of St. Paul's Cathedral, which occurs on Thursday, Dec. 2, will be commemorated at that cathedral by a great Masonic service, the tradition being that Sir Christopher Wren was Master of the Lodge of Antiquities, the oldest Masonic lodge in England, which used to meet at an hostelry in the churchyard during the building of the cathedral. It is alleged also that most of the workmen were Freemasons.

Princess Christian laid the foundation-stone of the new parish hall and institute of St. Mary's, Bryanston-square, on the 20th inst. In the basement of the building there will be a boys' club, and in the hall above, which will seat 400 people, entertainments will be had, and it will be fitted up as a gymnasium. There will also be a men's club in the building, and the youth's institute will also be housed there. The contract has been let at about £4,000. Sir A. W. Blomfield, A.R.A., is the architect.

Norwich Town Council have adopted a scheme for enlarging the provision market at a cost of £2,375. They have also ordered a committee to inquire into the question of lighting and paving courts and alleys, of which quite a number exist, the approaches to which are in some instances tunnels 20ft. or more long, about 3ft. broad, and from 5ft. 9in. to 6ft. high.

On Thursday evening in last week at Caldecote, near Nuneaton, Bishop Mitchinson dedicated the reredos erected by the late Captain Townshend. The carving, which has been done in Ghent, is all executed in oak and walnut panelling, with gold pointing. The central subject is the Ascension, whilst at either side appear the patron saints, St. Theobald and St. Chad. In nine smaller niches are represented the orders of the angels, and on the wings of the reredos are the emblems of the Passion. The Bishop also dedicated the sedilia within the altar inclosure, and also a stained-glass south window, erected to the memory of the father of the present rector, and representing St. James, in the garb of a pilgrim, and St. John the Evangelist.

COMPETITIONS.

Blaenau Festiniog, North Wales.—In an open competition for the new county police buildings, the design of Mr. T. Taliesin Rees, A.R.I.B.A., has been selected. The accommodation will include charge-room, cells, magistrates' room, court-room, solicitors' room, witnesses' room, superintendent's office, &c., together with residence for inspector. There were 18 sets of plans sent in.

Leeds.—The Sub-Markets Committee of the Leeds Corporation held an adjourned meeting on Monday, and further inspected the seventeen sets of plans received for the dead-meat market and abattoir which it is proposed to erect in the city. They selected five sets of plans, which will be submitted to the full committee, and from these a final choice will be made. Just as we are going to press we hear that the committee have selected the plans prepared by Mr. Walter Hanstock, architect, of Batley, who will receive the first premium of £100. The second premium of £50 goes to Mr. Percy Robinson, architect, of Albion-street, Leeds; and the third of £25 to Mr. Fred Musto, of Rawdon. Mr. Hanstock is the architect of the new Corporation Baths in Leeds.

Students' Designs.—The Technical Education Board reported to the London County Council on Tuesday that Mr. T. Walter L. Emden, a member of the Council (who was last night elected as President of the Society of Architects), had offered a prize of £5, to be awarded next May, for the design of a building, or important part of a building, by a student of architecture attending a school assisted by the board.

CHIPS.

The Lords of the Treasury have sanctioned a grant by the Commissioners of Crown Lands of £100 towards the cost of rebuilding the south porch of the ancient abbey church of Sempringham, near Billingborough, of which benefice the Queen is chief patron and lay impropriator.

The Commissioners of Light Railways held a public inquiry at Helston on Friday, and decided to recommend the Board of Trade to sanction the construction of a light railway from Helston to the Lizard, a distance of 11 miles.

Major-General H. D. Crozier, R.E., held an inquiry in Bradford, on Tuesday, into the application to the Local Government Board for sanction to borrow £50,000 for the purpose of extending the machinery, plant, mains, and effecting improvements in connection with their electricity works. This will bring the corporation's borrowing powers on their electricity works up to £120,000.

The aggregate returns from the Auction Mart last week amounted to £272,989, the highest total recorded for any week this year, with one exception. But this high figure cannot be taken as affording any real test of the condition of the property market, as two large breweries and other securities of a special character were responsible for the bulk of it. Indeed, the general run of business was duller than usual, the most satisfactory feature being the disposal of several town houses and parcels of building land.

Mr. Gerald Buxton, Master of the Brewers' Company, unveiled, on Friday, a life-size statue to memory of Dame Alice Owen, at Owen School, Islington. The monument, which was a leading feature of the Sculpture Room at the Academy this season, is the work of Mr. George Frampton, A.R.A., and it represents the foundress of the school in Elizabethan costume. The head and hands are of white and stained marble, and the rest of the figure is of bronze.

Portman Chapel was reopened on Sunday, having been closed for a year for renovation after fire. Considerable alterations and improvements have been made. A new roof, the gift of Viscount Portman, will afford much better ventilation, while the electric lighting and other additions made by the congregation will be of great service. The total cost of the work has been about £5,000.

The Bradford Building Trades and Stone Exchange was formally opened on Tuesday in last week by a dinner, to which nearly 200 representative persons sat down. Mr. Ellis Robinson, first president of the exchange, presided. Ald. Holdsworth formally declared the exchange open. He explained that for a quarter of a century the quarrymen had met the buyers in the stone trade at public-houses. The growth of the trade in recent years had, however, left them in the position that no public-house was large enough for them, and that had led them to establish these rooms. In conclusion, he coupled with the toast of "The Building Trades and Stone Exchange" the names of the Chairman and Ald. Moulson. Both these gentlemen replied.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and Sixpence for every eight words after. *All Situation Advertisements must be prepaid.*

NOTICE.

Bound copies of Vol. LXXII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

RECEIVED.—B. P.—E. A. C.—F. J. M. and Co.—T. O. C.—P. G. J. and Son.—C. A. B.—R. H. M. Co.

Correspondence.

IRISH AND ENGLISH ARCHITECTS.

To the Editor of the BUILDING NEWS.

SIR,—My attention has just been called to a letter appearing in your columns of the 8th inst. in which reference is made to a communication of mine to a daily journal. Will you permit me to make a few remarks in reply to your correspondent "Goth's" rather severe criticisms? At the outset I am confident that the tone of his letter is not one which will commend itself to your readers. "Goth" appears in some way to resent my letter; why, I don't know. I am not aware that I have said anything personally offensive to anyone. If my remarks have in any way hurt the professional feeling of any English architect carrying out work in Ireland, no one regrets it more sincerely than I do. I think, had my letter been published in full in your columns, there would not have been any likelihood of that.

My object in calling attention to the subject was not, as "Goth" appears to think, to criticise English architects who only act with common sense in accepting any commission which they can honourably fulfil. I have never suggested that Sir A. Blomfield, Mr. Caröe, and the other gentlemen referred to will not carry out their works in Ireland in a manner entirely worthy of their deservedly high professional position.

"Goth" is not satisfied with making a criticism on my letter, but, taking it as a text, proceeds to make an onslaught on the profession in Ireland. He says that some of the work done "could be improved upon by a one-year's pupil." Unfortunately for art, this is a condition of things often common to both England and Ireland.

I am not sufficiently in the confidence of others to be able to say accurately to what extent "ghosts" are had recourse to; but I am reliably informed that they are not entirely a myth in England. Some colour is lent to this view by the fact that nearly all the leading Irish architects have done their term in the London offices.

It hardly needs a reference to the executed works of such men as Sir Thomas Deane and Son, Mr. W. H. Lynn, Mr. Thomas Drew, and many others equally well-known outside their own country, to refute "Goth's" rather ungracious sneer at the work of modern Irish architects, whether in Ireland itself or in England and the Colonies. Impartial men have always held that, as regards the beauty and extent of its modern buildings, Dublin does not suffer by comparison with any city of its size in Europe. The remarks of Mr. Drew which "Goth" quotes, have, I submit, no bearing on the question he raises.

The reviving of a stale slander in the shape of an anonymous advertisement of two years ago speaks for itself. I happen to have more than a suspicion of the identity of the office pointed at, and I can only say that, whether referring to it or speaking generally, I believe the advertisement to be a slander and dictated by ill-temper.

In no community is there better fellowship amongst architects, or greater good feeling between principal and assistant, than in Dublin; of course, there are "black sheep" everywhere.

As regards "raising a shout whenever anything English is imported," I say, by all means import a thing if it be better and cheaper than you can get it in Ireland; but, as I understood the Dublin bellfounders' case (who, by the way, have a reputation not confined to Ireland), they had no opportunity of tendering for the bells of St. Patrick's, but I did not write in their interests: they are, doubtless, able to take care of themselves. Apologising for the length of this letter, I am, &c., R. M. BUTLER.

Dublin, October 15.

CHIPS.

Contracts have been signed, and the work started, for the erection and completion of a new brewery to cost £16,000, for Messrs. Isherwood, Foster, and Stacey, Ltd., Maidstone, Kent, from the plans and under the superintendence of Messrs. G. T. Harrap, A.M.I.C.E., and W. H. Duffield, A.R.I.B.A., engineer and architect, Messrs. G. E. Wallis and Sons, of Maidstone, having secured the contract for the building work.

St. Peter's Church, at St. Leonard's-on-Sea, which was built a dozen years since from designs by Mr. James Brooks, of London, has just been enriched by several screens carved in Kentish oak. They were designed by Mr. Mark J. Lansdell, F.R.I.B.A., of Cambridge-row, Hastings, and executed by Messrs. Harry Hems and Sons, of Exeter, by whom the reredos in the same church was carried out two years ago.

The British Electro Traction Company, Limited, has given notice of its intention to apply next month to the Light Railway Commissioners for an order authorising light railways in the suburban districts of Acton, Ealing, and Hanwell. It is proposed to construct a railway, with a 4ft. 8½in. gauge, from the tramway terminus at Acton Hill, through Ealing, and terminating at Hanwell Broadway.

Mr. Robert H. Bicknall held an inquiry at Colwyn Bay, on Tuesday, *re* the application of the Colwyn Bay and Colwyn Urban District Council for sanction to borrow £4,936 for sewerage works, £4,000 for promenade works, and £500 for water supply. The application for £4,936 for sewerage works was opposed on behalf of the ratepayers of Old Colwyn. The surveyor explained the details of the works for which the loan was required.

The work of widening Parliament-street has been begun this week. The houses at the northern or Whitehall end of the block which have to be cleared away between the present line of Parliament-street and King-street have been inclosed in hoardings, and already exhibit signs of the professional house-wrecker. The buildings and shops at the southern or Parliament-square end of the block remain tenanted, and are not to be disturbed for the present.

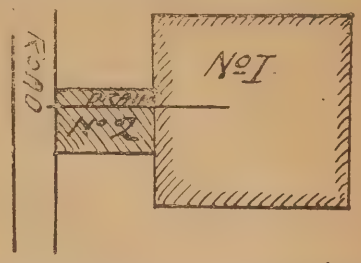
The committee appointed to promote the memorial to the late Bishop of Wakefield (Dr. Walsham How) have unanimously decided that some addition to the Wakefield Cathedral be recommended, and that a recumbent effigy be part of the scheme, the latter to be first undertaken. The committee will consult Mr. J. L. Pearson, R.A., on the subject, and will report back to the subscribers as soon as they have received his reply and suggestions.

Intercommunication.

QUESTIONS.

[11820.]—**Mahogany or Veneer.**—I am on the committee of a co-operative society, which is having fitted up a shop by contract. A portion of the work consists of a number of shelves specified to be made with mahogany fronts, and Californian pine to be used for the shelves. In addition to the above, and in the same contract, the firm agrees to make and fix a mahogany screen. In the course of fixing, it is found that on a foundation of 2in. thick yellow pine there is only a facing of mahogany from ¼in. to ⅜in. thick; the mouldings are all mahogany planted on. When their attention is called to the matter, the contractors say it is the custom of the trade to execute such work in this manner. Can you please tell me in your next issue if such is the fact, and if so why is it necessary to specify in the case of the shelves, which are easily seen, that the material used shall be mixed, while in the case of the screen, where a large portion can be hidden, no such specification is made? Ought the screen when specified mahogany, and we think being paid for as such, to be of mahogany throughout, or does the alleged custom of the trade outweigh a specific contract?—IN DOUBT.

[11821.]—**Right of Drainage.**—In the year 1882 A. buys an estate (No. 1), and to drain it buys a second (No. 2). He afterwards sells No. 2 to B. B. sells to C., who now wants to erect new offices, but is prevented by



local authorities on account of the sewer running under proposed new buildings. Can C. cut off the drain, or claim damages, or what is his best remedy? No mention is made of the drain running through the land in conveyance from A. to B. or B. to C.—QUERY.

[11822.]—**Substantial Repairs.**—Although this expression is so constantly used in connection with dilapidations, I cannot find a definition in any book on the subject. Is the term "structural repairs" synonymous? Could the term "substantial repairs" be properly applied to such things as doors and sashes, or would it be confined to the main parts of the structure, such as walls, floors, and roofs? In a case where a tenant is distinctly not liable for substantial repairs, might he, nevertheless, be called upon to repair roof-slating?—DUBIOUS.

[11823.]—**Farm Building.**—Can anyone recommend a good handbook on the planning of modern farm-buildings?—ONSTEAD.

[11824.]—**Man-hole Channels for Drains.**—In a large institution I have to destroy the old cement channels, and put in glazed open-pipe channel bottoms. The work must be done hurriedly at night, as I can have the flow of drainage stopped for a few hours only. What material can I best bed the channels in and joint them with? I am afraid Portland cement is too slow in setting, and would get washed away as soon as the flow of sewage is resumed, and the quicker the cement is in setting, the more likely is it to "blow" afterwards, on account of its being too fresh. If I temporarily divert the drain round the side of the man-hole, I am in the same fix as to making good where the temporary diversion joins the permanent drain. The only other alternative is pumping to surface, and diverting by means of above-ground temporary wood troughs; but there are obvious sanitary objections to this course.—SANITARY.

[11825.]—**Breeze Concrete.**—In description of the Rowton dwellings last week, the floors are stated to be nailed down to breeze concrete. Will some of your readers describe components of this and thickness? Is there anything between the floor-boards and the concrete, such as a mixture of pitch? To floors on ground level should breeze concrete be laid on top of ordinary Portland cement concrete?—W. M.

[11826.]—**Measuring Lead Work.**—How is the lead to flats and gutters measured? How much allowance must be made for turning-up the lead to walls and roof? How are the rolls and drips to be taken, and the flashings? Shall be obliged for a reply.—A LEARNER.

[11827.]—**Quantities.**—Which is the book generally recommended for those who are studying quantities? How are items such as joinery classified? Is there any order prescribed in the bill? I am told there is not.—J. R.

[11828.]—**Church Roofs.**—Which is the best kind of deals to specify for a boarded roof, which are to be left unpainted? I shall be also glad to be informed how the boarding is finished.—A SUBSCRIBER.

[11829.]—**Fire-Resisting Curtains.**—Can any reader tell me how these are constructed and worked?—AJAX.

[11830.]—**Carvers' and Carpenters' Workshops.**—May I ask your various readers whether they can give me any advice in the following matter? It is desired to build workshops for (1) carvers and (2) carpenters and joiners, and to erect same on the best principles as to dimensions and "light." What is the correct "aspect"? And can any of your readers refer me to a really model workshop of recent erection? Or is there any special book published on the subject?—PROVINCIAL ARCHITECT.

REPLIES.

[11814.]—**Concrete Floors.**—The corrugated sheets between the rolled girders might be strutted from a

temporary platform, though it is hardly necessary with the corrugations. The concrete should be about thick enough to cover the upper flange about an inch or two. The upper surface could be either cemented, as proposed, or floored with boarding by the aid of wooden fillets let into the concrete wood-block flooring would be the best kind to adopt.—TECHNIC.

[11814.]—**Concrete Floors.**—We have constructed concrete floors as your correspondent sketches with cross-girders up to 4ft. 6in. apart. No strutting is required, the struts being self-supporting. Thickness of concrete and size of girders depend on span of latter and load on floor.—PEIRSON AND CO.

[11815.]—**Emigration.**—It is not easy or safe to recommend "A Young Surveyor" as to where he should go. The Colonies are pretty full, and some of them (like New South Wales) overcrowded. South Australia offers a good field for an enterprising surveyor, as there are some parts opening up resources. Adelaide is a thriving city, and is, of course, the chief town, with the exception of Palmerston in the north. Canada affords an opportunity, and Ottawa, Montreal, Toronto, Halifax are important cities. South Africa is developing her railways, and therefore may be named as a place for surveying enterprise, to say nothing of British India. Climate, too, is a consideration that must not be overlooked in making choice. Get a situation first if you can, unless you have means.—G. H. N. G.

[11815.]—**Emigration.**—(1) Why should "W.B.E." not try South Africa? As a land of opportunities, though Johannesburg and Rhodesia have been much disturbed of late, there can be no doubt South Africa is a popular centre for emigration. A surveyor who can turn his hand to manual work if necessary is likely to get on, and in the direction of mining enterprises a surveyor is a necessity. A writer on the subject lately said, referring to South Africa, that engineers, surveyors, and miners of ability are wanted for positions of trust; but those of only second-rate qualifications had better remain at home. Anyone who has a handicraft may succeed if he has only the energy. South Africa, he predicts, will be a great empire one day. The climate does not, however, suit all Englishmen. (2) Advertise in leading newspapers here and abroad; also in professional papers like "B.N." (3) An introduction of some kind is essential if you have no employment in view.—ADVICE.

[11817.]—**Hospital Construction.**—Though I am not aware of any cheap work, I can recommend "Hospital" to Mr. Saxon Snell's work on "Hospital Construction and their Management"; to the larger and more expensive volumes, full of plans and details, of Sir Burdett; to Sir D. Galton's "Principles of the Construction of Hospitals," a book of moderate size and cost. Many useful suggestions will be found in Sir Douglas Galton's work. But for general purposes, the series of articles which have appeared in the BUILDING NEWS and in other casual papers, will be found sufficient for "Hospital's" purpose. The subject is one which in its general principles can soon be acquired; but better than any books is a knowledge of actual buildings like that of the large fever hospital in construction at Tooting by Mr. H. Hessell Tiltman, which we lately illustrated and described, or the other large Metropolitan establishment we lately described at Hither Green. The details can only be learned by personal inspection.—G. H. G.

CHIPS.

At Strathbungo, N.B., a new police and fire station, built at a cost of £17,000, was opened last week. The architect is Mr. A. B. McDonald, of Kelvinbridge, Glasgow.

A handsome oak reredos has just been erected in the parish church of Kirkheaton, near Huddersfield. It is given in commemoration of the completion of the 60th year of Queen Victoria's reign, and in remembrance of William Edwards Hirst, of Lascelles Hall, by members of his family. The work was intrusted to Messrs. Jones and Willis, of Birmingham, London, and Liverpool.

The North Riding Infirmary, Middlesbrough, is being warmed and ventilated by means of Shorland's patent Manchester stoves with ornamental tiled sides, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

At the Central Criminal Court, on Tuesday, William Thos. Hooker, 53, builder, of Shirley, near Southampton, pleaded guilty to publishing false and defamatory libels of and concerning Sir Walter Prideaux, the clerk and solicitor to the Goldsmiths' Company, and was sentenced to twelve months' imprisonment.

An adjudication in bankruptcy is announced in the case of Edward Vigers, Elgin-avenue, Notting Hill, W., and Palace Chambers, Bridge-street, Westminster, S.W., late Parliament-street, Westminster, S.W., architect and surveyor.

The town council of Warrington received on Tuesday a report from a committee recommending that the borough surveyor be instructed to prepare instructions and particulars upon which to invite competitive designs for the proposed police premises. It was, however, resolved to postpone the matter until fuller information could be obtained.

The final meeting of the health committee of the Liverpool Corporation for the municipal year which closes to-morrow was held on Friday in last week, Alderman Cookson, the chairman, presiding, when an illuminated and framed address was presented to Mr. H. Percy Boulnois, who is retiring from the office of city engineer after eight years' service, expressing the unanimous regret of the committee at his severance from the official life of the municipality. The presentation was suitably acknowledged by Mr. Boulnois.

LEGAL INTELLIGENCE.

GUTTING A PARISH CHURCH WITHOUT A FACULTY: CURIOUS CASE.—On Tuesday week, at Derby, Mr. A. Bray Kempe, Chancellor of the Diocese, heard an application for a faculty. The Rev. G. A. Tindall, the rector of Heage, caused the parish church to be closed at Easter for renovation, and proceeded upon a plan he had prepared, to make alterations in the interior of the church. He now applied for the sanction of the court. The alterations in question did not meet with general approval, and objections were made by various parishioners. Mr. Snape, who appeared for the rector and churchwardens, applied for a faculty with regard to Heage parish church, the interior of which it was proposed to reseat and decorate. However, the plans originally put forward by the rector and his churchwardens were disapproved of by a section of the parishioners. The objectors were represented by Mr. Attwood. Mr. Snape said the chief objection was to the proposal to remove the altar from the east end to the middle of the west wall. The objectors had prepared a plan, and the petitioners were willing to accept it in place of the original plan. After hearing what had been done in the church, and that the church had not been used for six months, the Chancellor remarked that the church had been literally gutted without the sanction of the court. Mr. Snape explained that when the painting was begun it was found that the structure was in such a fearful state that parts of it had to be removed. The Chancellor said that for such an interference with the fabric the consent of the court should have been obtained. This had not been done. Mr. Snape said that what was done was done in ignorance. Mr. Attwood pointed out that the church had now been dismantled for six months. The funds supposed to be available for renovating the church were £70 or £80, representing the proceeds of a bazaar, and £100 representing subscriptions promised. After Easter, the church was dismantled, and the work had proceeded some time, when the rector requested Mr. Morrell to sign a receipt in order that money might be drawn from the Restoration Fund. Mr. Morrell declined to do so, and represented to Mr. Tindall that unless a faculty were applied for immediately, proceedings would be taken to restrain him from proceeding with the execution of the proposed alterations. The result was the present application to the court. Mr. Percy H. Currey, architect and surveyor for the diocese, called by Mr. Attwood, said he visited Heage parish church on the 21st September last. The church consisted really of two parts, an old and a more modern portion. The only portion of interest was the eastern end. He thought it was very improper to remove the altar from the east end to the west wall, both from a religious and architectural standpoint, and submitted an alternative scheme. In reply to the Chancellor, Mr. Currey said it would be very undesirable to remove the pulpit. The Chancellor suggested that Mr. Tindall should withdraw the original plan, apply for a fresh citation, and become petitioner in respect of the revised plan, which he was now prepared to accept. Mr. Tindall declined to do so. The Chancellor refused to confirm the application for faculty made by Mr. Snape on behalf of Mr. Tindall as rector of Heage. He ordered Mr. Tindall to pay the costs. Mr. Attwood said his clients could not consent to an adjournment, as they felt it to be a scandal that the church had been allowed to be unused for six months. The Chancellor thought the revised plan was a reasonable one, as well as being the best plan, and thought the vestry might accept it. The instance brought under their notice was a very striking instance of the extreme folly of meddling with a church without first obtaining proper authority. The church did not belong either to the clergyman or parishioners, but was held by the clergyman for the use of the parishioners. Very often irreparable injury might be done to a church, and it was very important that the consent of that Court should be obtained before any alterations were made. He must order the costs to be paid by the petitioners. With regard to the application for the fresh citation by Mr. Tindall, the petitioner would also have to pay the costs.

PROCEDURE AS TO OWNERLESS DANGEROUS STRUCTURES.—THE QUEEN V. MEAD.—Before Mr. Justice Wright and Mr. Justice Kennedy, on Tuesday, Mr. Avory moved on behalf of the London County Council for a rule *nisi* for a *mandamus* calling on Mr. Mead, the metropolitan magistrate, to show cause why he should not hear a summons under the "dangerous buildings" clauses of the London Building Act, 1894, although it had only been served by being affixed to the premises. The County Council had not been able to ascertain who was the owner of the buildings in question, and accordingly statutory notice had been served by affixing it to the premises. There was no question that the affixing such a notice was sufficient under section 106 of the Act, but the owner must be served personally, or by being left at his residence, as required by the Summary Jurisdiction Act. Mr. Avory referred to section 188 of the Act, and to the case of "R. v. Mead," and he pointed out that the matter was of great importance, as, if the magistrate's view were right, it would be impossible to carry out the Act in all cases of dangerous structures where the owners could not be ascertained. The Court granted the rule, and made it returnable this day week.

UNSUCCESSFUL ACTION BY AN ARCHITECT.—BROWN V. PONTING.—The plaintiff in this case, heard by Mr. Justice Bigham on Wednesday, was an architect, and the defendant was the owner of a draper's shop in High-street, Kensington. The plaintiff sought to recover £400 for drawing plans for the extension of the defendant's premises; £100 for plans for rebuilding the defendant's premises; £105 for work done for the defendant in respect of negotiations for the purchase of certain vacant land belonging to the Midland Railway Company in Wright's lane, at the back of the defendant's premises; £105 for work done on behalf of the defendant in connection with the promotion of a company which was to be formed for the purpose of acquiring the defendant's business and the adjacent vacant land. The plaintiff's evidence was to the effect that he was introduced to the defendant by a Mr. Slattery, now dead. The defendant told him that he wanted to buy the vacant land in Wright's-lane from the Midland Railway Company for the purpose of extending his premises. The defendant also asked him to introduce him to a financial firm or to some solicitors who could promote a company to take over the defendant's business. The plaintiff accordingly commenced negotiations with the solicitor to the Midland Railway Company, and eventually the company offered to sell the land for £45,000. The plaintiff introduced the matter of the proposed company to Messrs. Ashurst, Morris, Crisp, and Co. and to the City of London Contract Corporation, and a scheme was prepared for the formation of a company to take over the defendant's business and to build flats on the vacant land, with an extension of the defendant's premises on the ground floor. The defendant then instructed the plaintiff to prepare plans for the erection of the new buildings and for the extension of the existing premises. The plaintiff prepared these plans. The formation of the company, after some months of negotiations, fell through when it appeared that the annual profits of the defendant's business were £6,000 and not £8,000, the figure originally given. In cross-examination the plaintiff admitted that if the company had been floated he would have received £1,000 from the promoters. Sir Arthur W. Blomfield, A.R.A., stated that the plaintiff's charges for drawing the plans were fair and reasonable. The defendant's story was that Mr. Slattery, who was a total stranger to him, walked into his shop and said that he had a friend named Brown, with plenty of money, who wanted to form a company to buy the defendant's business for a fancy price. The defendant had not been thinking of selling his business, but was willing to do so on these terms. Subsequently the plaintiff was introduced to the defendant, but the latter stated from the very outset that he would incur no liability for the expenses, and the plaintiff must not look to him for payment. He had never ordered the plaintiff to prepare any plans, and the only plan he ever saw was one of the ground floor of the new premises. Mr. Justice Bigham said that he was not surprised that when Mr. Slattery made his proposal to the defendant the latter listened to the voice of the charmer. He would have done better, however, to have told him to go away. Then the plaintiff was introduced and the negotiations commenced. The plaintiff did not intend to do all the work he had done for nothing. He, of course, expected to be paid—but how? His lordship accepted the defendant's statement that he made it clear to the plaintiff that he was not to pay. As in many other cases, the work was done by the plaintiff in the hope and expectation of obtaining his remuneration from the promoters, who, if the company had been floated, would have made a large profit. There would be judgment for the defendant.

The Mersey Docks extension scheme, brought before the Docks and Harbour Board last week, was unanimously adopted by the board on Friday. The expenditure involved, including outlay on works already in progress, will be £4,443,000.

On Sunday a new pulpit, probably the sole example of its kind within the diocese of Manchester, was dedicated for use in St. John's Church, Worsthorne, near Burnley, as a Diamond Jubilee memorial offering. The new pulpit is 5ft. in height, and, with the exception of the floor and handrail of American walnut, is entirely formed of brass. The body of the pulpit is approached by three steps, and is inclosed by wrought brasswork, consisting of a series of panelled arches, and a frieze and dado of brass panels, pierced with a suitable ornament, not so open in character as the arches. The pulpit is octagonal in form, and rests upon a base of the same size and shape, but much less open in style, the panels here, which are pierced, being filled in with solid brasswork.

WATER SUPPLY AND SANITARY MATTERS.

Worcester. — Mr. G. W. Willcocks, Local Government Board inspector, recentlyheld an inquiry, at the Guildhall, concerning the application of the city council for sanction to borrow £52,000 for purposes of sewage disposal. The Local Government Board has already approved a site at Digles for the sewage disposal works, and the scheme, which is to replace the approved scheme of Messrs. Hawkesley—abandoned in consequence of the excessive cost—is that of Messrs. Beesley. The scheme proposed to be carried out is estimated to cost upwards of £20,000 less than that of Messrs. Hawkesley, and was awarded first prize in the competition recently decided by Mr. Chatterton. Evidence was taken by the inspector as to details of the scheme, and it was stated that the city authorities were ready to meet any objection from the Severn Commissioners by placing the siphons laid under the bed of the river at such a depth as would enable any future deepening of the river to 16ft.

CHIPS.

At a meeting of the Kingston-on-Thames Jubilee Hospital Committee last week a tender was accepted for the erection of a building to cost £3,580. The foundation-stone will be laid by the mayor on November 6, and the Duke of Cambridge, who gave the site, will be asked to open the building when completed.

At their last meeting the town council of Huddersfield agreed to advertise for a borough surveyor at a salary of £500 per year, and not at "a commencing salary of £500 per annum," as recommended; while in reply to Mr. Barrass, the mayor said that this would not preclude any application at a lower salary.

The progress that is being made with the construction of the Central London Railway is evidenced by the fact that the contractors are now in a position to commence operations with the staircase and subway by means of which passengers will descend to the Bank station from Mappin and Webb's corner.

At the Grand Hotel, Bristol, on Saturday, the Earl of Jersey, Colonel Boughey, and Mr. G. A. R. Fitzgerald, commissioners appointed under the Light Railways Act, 1896, held an inquiry into the Bristol Tramways Company's application for permission to construct a light railway from St. George to Hanham, an extension of 1½ miles.

At Benwell, near Gateshead-on-Tyne, on Wednesday, memorial stones were laid of a new Presbyterian church. The new church, in Armstrong-road, will, when completed, provide accommodation for 650 persons. There will also be a large hall to hold 450, a small hall, minister's vestry, ladies' room, three large classrooms, caretaker's house, and church kitchen. The cost will be £6,000. Messrs. Badenoch and Bruce, of Newcastle, are the architects.

The new hall, in which Castle gatherings will be held, at the Maltland, Inveraray, has now been completed, and on Wednesday the Duke and Duchess of Argyll gave a supper and assembly. A circular granite block above the main entrance bears the inscription: "Destroyed by fire, 1817. Restored by George, 8th Duke of Argyll, 1897." The building is 120ft. long by 40ft. wide and 45ft. high, with a raised daïs at the west end and a gallery at the opposite end, which will be used as a tea-room. The illuminating power at night is derived from eight large incandescent Swan lamps of 150 candle-power each. The work has been carried out under the direct supervision of Mr. Wyllie, chamberlain of Argyll. Kitchen and supper-rooms have been erected in the rear of the main building.

The foundation-stone of a new swimming-bath at Harrogate was laid on Saturday. A private company has taken the matter in hand, and secured a site on the Dragon estate, facing Skipton-road, containing 2,775 yards. The cost of the land, buildings, and furnishings is estimated at £5,500. The bath proper is to be 75ft. long and 30ft. broad. On three sides of the room there will be galleries for the accommodation of spectators at entertainments. It is proposed to erect on the premises a recreation-room, with two billiard tables and also a refreshment room. Mr. H. E. Bown is the architect, and the contractors are:—Mason, Mr. S. Nettleton; joiner, Mr. J. W. Rhudd; plasterer, Mr. Fortune; painter, Messrs. Jessop and Cosgrove; ironfounder, Mr. Bagshaw (Batley); slater, Mr. Shepherd; heating apparatus, Mr. J. Robinson; plumber, Mr. Allan.

St. Luke's Church, Southport, has just been fitted up with elbowed stalls in English oak, and there have also been placed in the church a pulpit of oak on an alabaster base and a triptych and reredos likewise carved in oak. The work has been carried out by Messrs. Harry Hems and Sons, of Exeter, from designs by Mr. Huon A. Matear, F.R.I.B.A., of Liverpool, the architect of the church. The cost has been about £1,500.

Our Office Table.

Early in December last the London County Council determined to continue the services of Mr. Thomas Blashill, F.R.I.B.A., the superintending architect, for another year, although he had reached the age-limit, on the ground that his retirement would cause inconvenience to the public service. At Tuesday's meeting of the Council it was now again reported that the year for which Mr. Blashill's services had been continued was about to expire, and recommended that he should continue to hold his appointment for another year. Mr. Blashill was in good health, and was willing to place his services at the disposal of the Council for another year. The recommendation was unanimously adopted.

The twenty-eighth annual exhibition of specimens of turning in wood and pottery, under the auspices of the Turners' Company, was opened on Wednesday at the Mansion House. The exhibits are few in number, owing to the great activity in the turning trade; but the judges report that "the excellent quality of the work is generally maintained," and they express their satisfaction at the increase in the number of the apprentice competitors. The pottery exhibits are stated by the judges to be "probably as numerous as they have ever been"; but the opinion is expressed that "in point of merit they scarcely come up to the standard of five years ago." The judges of the exhibits in wood are Messrs. Burdett-Coutts, A. Bevan, A. Murray (the city surveyor), George W. Budd, and G. W. Taylor; and the judges in pottery are Messrs. W. Brindley, W. Rome, A. S. Murray (British Museum), and Lieutenant-Colonel A. J. Copeland. The first prize in the wood exhibits—which has been awarded to Mr. F. Powers, Eastfield-road, Andover, for a rose window, or centre flower, in oak, constructed of four pieces of turning—consists of a silver medal, the freedom of the company, and, subject to the consent of the Court of Aldermen, the freedom of the City of London, and five guineas. The first prize in the apprentices' class has been gained by L. G. Seegar, of Lynedoch-street, Kingsland-road; and in the amateurs' class, first certificates of merit have been awarded to Mr. S. A. Harding, Inglewood-road, West Hampstead, and to Mr. W. H. Lowndes, of Church-street, Aylesbury. In the pottery exhibits the first prize—which is precisely similar to the first prize given in the wood exhibits—has been gained by Mr. S. Stocks, Upper Kennington-lane, for a terracotta vase thrown in one piece. The first prizes in the apprentices' classes have been awarded to Arthur Newman, A. Kerridge, E. B. Martin, John Lovekin, and F. W. Millward. The Rev. Charles C. Ellison exhibited—but not for competition—a tobacco-box carved in ivory. The exhibition will open to-day (Friday) between 11 and 2.30, when the prizes will be handed to the successful competitors by the Lord Mayor.

Pontefract, the Roman station and city, and long afterwards celebrated as the last fort which withstood the assault of Cromwell's Ironsides, is seeking to distinguish itself in a fresh direction in civil life. Having completed two years' service, the borough engineer, who had received an increase in salary, recently applied for another rise. This has been made the keynote in the electoral addresses of candidates at the Municipal elections on Monday next. One gentleman, who says he means to go in without any mistake, says: "My first work will be to reduce the borough surveyor's salary by £80 a year, and I will use this money in giving all the working men in the employ of the corporation an advance of 2s. a week in their wages. . . . We are being robbed on all hands and sides, and that is why the rates are so high; but I'll bet my bottom dollar that if you send me into the council I'll stop all that sort of thing, and reduce the rates from 7s. to 2s. 6d. in the pound." The interesting old town abounds, says a correspondent in a neighbouring town, in blind alleys, large middens or privies, and houses of ill-fame, maintained for the garrison, and, it is alleged, most of these wretched hovels belong to councillors. The middens are emptied once a month, a heap of filth, containing about six yards cube, being wheeled out from each of the courts at or before eleven at night and fetched away after eight in the morning. Under these circumstances it is not wonderful that there was recently a severe outbreak of diarrhœa and enteric fever. The population of Pontefract is about 16,000. There are about 20 medical men in the town, all enjoying splendid practices. A large infectious diseases hospital, to cost about £6,000, is in contemplation.

In their report for the year 1896-97, the Commissioners of Public Works in Ireland review the several departments of their operations. Under the Railways (Ireland) Act, 1896, the Lord-Lieutenant has given certificates for the following schemes:—(1) Letterkenny to Burton Port, County Donegal, railway, 49½ miles; (2) Buncrana to Carndonagh, County Donegal, railway, 18½ miles; (3) Belmullet, County Mayo, to Achill Sound, County Mayo, steamer, 20 miles; (4) Killaloe, County Clare, to Dromod, County Leitrim, steamer, 105 miles; (5) Tarbert, County Kerry, to Listowel, County Kerry, coach, 12 miles; (6) Tarbert, County Kerry, to Kilrush, County Clare, steamer, 9 miles; (7) Ennistymon, County Clare, to Ballyvaughan, County Clare, coach, 16 miles. The first three deal with subjects for the development of congested districts. The fourth affects the long stretches of country between Killaloe and Dromod on both sides of the Shannon. A line of steamers, available for tourists, and for certain traffic, has, since the end of the financial year, been started by the Shannon Development Company, with a subsidy under the Act. Of the three remaining schemes, the coaching arrangements between Listowel and Tarbert and the steamer between Tarbert and Kilrush give facilities for communication between Kerry and Clare. The service from Ennistymon to Ballyvaughan, aided by steamers starting from the latter place, connects Clare with Galway. These schemes have been brought into operation since the end of the financial year. The Grand Jury of County Donegal have given their assent to the second scheme—that for a line from Buncrana to Cardonagh, and made a presentment in aid of it. The projected line from Letterkenny to Burton Port has been approved by the Grand Jury, and a presentment made in aid of the undertaking. The loans sanctioned during the year for improvements under the Labourers' Dwellings and Housing of the Working Classes Acts amounted to £83,242.

The site of the prehistoric Celtic lake village near Glastonbury has been further excavated since July last, under the superintendence of the discoverer, Mr. Arthur Bulleid. The sites of the dwellings are marked by mounds. One of these contained the greatest depth of clay yet found, no less than 9ft.; the accumulation of successive hearths which were found necessary as the weight of the clay gradually compressed the peat beneath. This mound contained 300 tons of clay, all brought in boats from the neighbouring hills. Under the mound was found the framework of a loom with brushwood and wattlework to form the foundation. In addition to other things connected with the spinning craft, no fewer than 40 horn and bone carding combs have been unearthed, and no two of these are exactly of the same pattern. The number of broken bone needles and splinters of bone found in one mound seem to indicate that it was utilised as a needle factory. Another mound was very rich in fragments of pottery and other evidences of the manufacture of hardware. Ten bronze *fibulæ* were found, these being fashioned almost exactly like the modern safety-pin. Two bronze studs, probably a part of harness or for fastening clothing, were also discovered, together with other small bronze articles. An iron file about 8in. long was found. As usual, very few human remains were discovered, part of the skeleton of a very young child being all that was brought to light this summer.

The trustees of the National Portrait Gallery, in their fortieth annual report, just issued, record sixteen donations, bequests, or loans, and thirty-one purchases during the year, making the total number of purchased exhibits 533, and of exhibits given or lent 625. The number of pictures on the walls of the gallery is given as 933, of works in sculpture 123, and miscellaneous portraits exhibited in cases 29, making a total of 1,085 portraits exhibited. The attendance of the public continues to be very satisfactory, and it is evident that the historical value and history of the collection is beginning to be very widely recognised. The total number of visitors during the twelve months ended April 3, 1897, was 254,942. The highest total of visitors previously recorded, while the gallery was at South Kensington, was 146,187, and this was in the year of the International Fisheries Exhibition. Of the total number, 226,634 were admitted free of charge, 16,684 on payment, and 11,624 were admitted on Sunday

afternoons. In pursuance of their desire to promote the educational influence of the collection of national portraits, the trustees have agreed that parties from schools wishing to visit the gallery for educational purposes can be admitted free on students' days, on notice being given to the secretary stating the number of the party.

"Mountaineer" writes, under date October 22:—"I was inspired yesterday by the present fine weather to ascend Snowdon. Upon reaching th summit I was sadly astounded to find a brick wall built across a large portion of the peak. It extends almost along the fine new hotel, and blocks its front door and is so high as to obscure the building from the Llanberis path. It also extends from the corner of the hotel for about 60 yards down the slope towards the tramroad station. Upon making inquiry the workmen informed me that it is Mr. Assheton Smith, of Vaynol, who is building the wall; but they could not assign any reason why such a wall is erected in such a public spot. Most assuredly the proprietors of the hotel will contest their right of way to the hotel, and I feel as equally certain that Sir Edward Watkin, in conjunction with the Beddgelert Parish Council, will see that the paths are not obstructed. A public protest should be instituted against the wall." "Another Mountaineer" complains that the railway and the new hotel have between them spoiled the summit for everyone but the tripper; while a kitchen midden is being formed which would make any inspector of nuisances condemn the whole place as an unsanitary area.

The National Photographic Record Association, which has for its object the establishment of a national collection of photographs, to be permanently kept at the British Museum, has now been fairly launched. Sir Benjamin Stone, M.P., has been appointed president, an influential council has been elected, and Mr. Alexander Graham, F.S.A., V.P.R.I.B.A., and Mr. George Scamell fill the offices of treasurer and hon. sec. respectively. The council have just issued an appeal to those interested in the subject to assist in bringing together a truly national photographic record of all existing objects of interest, as well as scenery, life, customs, and history of the time.

The annual general meeting of the Incorporated Society of Medical Officers of Health was held at the Holborn Restaurant on Saturday evening, Dr. E. Seaton, the president, in the chair. A vote of thanks having been passed to Dr. G. P. Bate, the retiring president, the council presented their report for the past session, from which it appeared that at the end of the session the society numbered 674 members, as compared with 678 last year, and that there were now nine branches in different parts of the kingdom. The report was adopted. The chairman afterwards delivered his presidential address, the subject of which was "Medical Societies in their Relation to the Public Health Service."

CHIPS.

During the months of February, March, and April next there will be held in the Walker Art Gallery at Liverpool the Spring Exhibition of Architectural Drawings, Arts, and Crafts. A feature is to be made of the photographic art and appliances, and of works of art in black and white, while special rooms will be allocated to architectural drawings and applied art, in celebration of the 50th year of the Liverpool Architectural Society.

The parish church of All Saints, Wragley, Lincolnshire, was reopened last week after reflooring with wood blocks and the substitution of open seats for the high-backed pews. Mr. W. Scorer was the architect, and Messrs. Halkes Brothers were the contractors.

The infants' school at Raunds was reopened last week after enlargement and improvement. The alterations and extensions were intrusted to Mr. W. H. Lovell, of Raunds, Messrs. Talbot Brown and Fisher, of Wellingboro', being the architects.

Mr. Medlicott, the engineer appointed from India, arrived at Larnaca in the island of Cyprus on Monday for the purpose of undertaking the irrigation works sanctioned by the Home Government.

The work of laying out the historical Temple Meadow at Bridgnorth as a pleasure ground has been completed by Messrs. Hewitt and Co., landscape nurserymen, of Solihull and Edgbaston; and a bandstand has also been erected to the memory of the late Mr. H. Baden Southwell. Mr. W. O. Foster, of Apley Park, generously gave the ground, which contains the oft-photographed and sketched leaning tower.

MEETINGS FOR THE ENSUING WEEK.

Monday.—Society of Engineers. 7.30 p.m.
Royal Institute of British Architects. Inaugural Address by the President, Professor Geo. Aitchison, A.R.A. 8 p.m.

Tuesday.—Auctioneers' Institute. Inaugural Address by the President, James F. Field, F.S.I. 8 p.m.
Institution of Civil Engineers. Address by Sir J. Wolfe Barry, K.C.B., President, and Presentation of Medals. 8 p.m.

Wednesday.—Carpenters' Hall Free Lectures. "Sanitary Construction," by Prof. Banister Fletcher, F.R.I.B.A. 8 p.m.
Edinburgh Architectural Society. "The Evolution of the House," by A. N. Paterson, M.A., A.R.I.B.A. 8 p.m.
St. Paul's Ecclesiological Society. "Linen Vestments in North Italy," by Dr. J. Wickham Legg, F.S.A.; and "An Early Irish Tract on the Consecration of a New Church," by the Rev. T. Olden, M.A., St. Paul's Chapter House, E.C. 8 p.m.

Friday.—Architectural Association. "A Proposal for Classifying Builders' Work," by S. Flint Clarkson; and "Some New Materials for Use in Building," by H. D. Searles-Wood, F.R.I.B.A. 7.30 p.m.

THE ARCHITECTURAL ASSOCIATION.

NOVEMBER 5th, ORDINARY GENERAL MEETING, 9, Conduit-street, W., 7.30 p.m. Mr. S. FLINT CLARKSON, "A PROPOSAL FOR CLASSIFYING BUILDER'S WORK," and Mr. H. D. SEARLES-WOOD on "SOME NEW MATERIALS FOR USE IN BUILDING."

E. HOWLEY SIM, G. B. CARVILL, } Hon Secs.

Trade News.

WAGES MOVEMENTS.

Lancaster.—The plumbers of this town struck on Tuesday for an increase of one penny per hour and the abolition of compulsory short time in winter. They are paid 7½d. per hour, which they state is under the average. Compulsory short time in winter is declared unnecessary, the innovation reducing wages by 4s. when most required.

Manchester.—The Manchester and District Builders' Labourers' Society have given the employers six months' notice of their intention to seek a readjustment of the conditions under which the men work, and an increase in the amount of wages they receive. The notice will expire at the beginning of April next. The Building Trades Federation of Manchester and Salford have promised their support to the men.

Northwich.—The Amalgamated Society of Carpenters and Joiners of Northwich and district have decided to ask the masters for an advance in their standing wages. They complain that bricksetters are receiving 9d. per hour, while they are only in receipt of 8d. Their application is to be placed on an equality with the bricksetters.

Strike of Cornwall Stonemasons.—Over 400 stonemasons are on strike in the Penryn, Constantine, and Mabe granite districts, owing to a dispute between the stonemasons engaged at the Keyham extension works and the contractor. The men living across the river ask for time lost in crossing, which is refused by the contractor. A number of labourers are also affected, and some 40 masons employed by Sir John Jackson on the Keyham extension works have struck work in sympathy.

The first of the year's series of art lectures, to be given in the Glasgow Corporation Galleries, was delivered on Saturday evening to a crowded audience by Mr. F. H. Newbery, headmaster of the School of Art. Treating art as a sojourner, the lecturer instanced her alliance with barbarism, with paganism, with Christianity, with literature, and in these later days with commercialism, treating briefly on each of these relations.

Surveys are being prepared for the construction of a deep-level electric railway connecting the London, Brighton, and South Coast main lines on the south of London with Euston, St. Pancras, and King's Cross. The proposed line will pass through the heart of the West End, and will have a station in the Strand, close to the great hotels and the theatres.

Mr. Abraham Pilling, J.P., of Roe-lane, Southport, died on Wednesday evening in last week at Lindley, near Huddersfield. He was born in Lindley rather more than 77 years ago, but removed to Bolton, where he built up an extensive business as a railway and general contractor. He entered the Bolton Town Council in 1862, and after serving six years became alderman. Nearly twenty years ago he removed to Southport, and in 1883 he entered the town council, remaining a most active member until November, 1895. He was twice mayor.

LATEST PRICES.

IRON, &c.

	Per ton.		Per ton.
Rolled-Iron Joists, Belgian	£5 15 0	to	£6 0 0
Rolled-Steel Joists, English	6 0 0	„	6 10 0
Wrought-Iron Girder Plates	5 15 0	„	6 10 0
Bar Iron, good Staffs	7 0 0	„	8 0 0
Do., Lowmoor, Flat, Round, or Square	17 0 0	„	17 0 0
Do., Welsh	5 15 0	„	5 17 6
Boiler Plates, Iron—			
South Staffs	7 17 6	„	8 5 0
Best Snedshill	10 0 0	„	10 10 0
Angles 10s., Tees 20s. per ton extra.			
Builders' Hoop Iron, for bonding, &c., £6 15s. 0d. per ton.			
Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.			
Galvanised Corrugated Sheet Iron—	No. 18 to 20.		No. 22 to 24.
6ft. to 8ft. long, inclusive	Per ton.		Per ton.
gauge	£10 15 0	...	£11 0 0
Best ditto	11 5 0	...	11 10 0
	Per ton.		Per ton.
Cast-Iron Columns	£6 0 0	to	£8 10 0
Cast-Iron Stanchions	6 0 0	„	8 10 0
Cast-Iron Sash Weights	—	„	4 2 6
Cast-Iron Socket Pipes—			
3in. diameter	5 10 0	„	5 15 0
4in. to 6in.	5 5 0	„	5 10 0
7in. to 24in. (all sizes)	4 15 0	„	5 5 0
[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]			
Pig Iron—	Per ton.		
Cold Blast, Lilleshall	105s. to 110s.		
Hot Blast, ditto	57s. 6d. to 62s. 6d.		
Wrought-Iron Tubes—Discount off Standard Lists f.o.b.			
Gas-Tubes	75p.c.	Fittings	77½p.c.
Water-Tubes	70	„	72½
Steam-Tubes	62½	„	65
Galvanised Gas-Tubes	60	„	62½
Galvanised Water-Tubes	55	„	57½
Galvanised Steam-Tubes	45	„	47½
	10cwt. casks.		5cwt. casks.
Sheet Zinc, for roofing and working up	Per ton. £20 10 0	to	Per ton. £20 15 0
Sheet Lead, 3lb. per sq. ft. super.	15 5 0	„	15 15 0
Pig Lead, in 1cwt. pigs	14 0 0	„	15 0 0
Lead Shot, in 28lb. bags	16 15 0	„	17 0 0
Copper Sheets, sheathing and rods	60 0 0	„	61 0 0
Copper, British Cake and Ingot	50 10 0	„	51 10 0
Tin, Straits	63 0 0	„	63 10 0
Do., English Ingots	65 0 0	„	65 5 0
Spelter, Silesian	17 12 6	„	18 5 0
	Per ton.		Per ton.
Cut Clasp Nails, 3in. to 6in.	£8 15 0	„	£9 15 0
Cut Floor Brads	8 10 0	„	9 10 0

Wire Nails (Points de Paris)—

0 to 7	8	9	10	11	12	13	14	15	B.W.G.
8/6	9/0	9/6	10/3	11/0	12/0	13/0	14/9	16/9	per cwt.

TIMBER.

Teak, Burmah	per load	£14 0 0	„	£15 10 0
„ Bangkok	„ ...	10 10 0	„	15 0 0
Quebec pine, pitch	„ ...	—	„	—
„ yellow	„ ...	2 0 0	„	4 0 0
„ Oak	„ ...	5 10 0	„	6 10 0
„ Birch	„ ...	4 7 6	„	6 2 6
„ Elm	„ ...	4 5 0	„	5 10 0
„ Ash	„ ...	3 10 0	„	4 15 0
Dantsic and Memel Oak	„ ...	2 10 0	„	3 10 0
Fir	„ ...	2 0 0	„	4 0 0
Wainscot, Riga p. log	„ ...	2 2 6	„	3 2 6
Lath, Dantsic, p.f.	„ ...	4 10 0	„	5 10 0
St. Petersburg	„ ...	5 0 0	„	6 10 0
Greenheart	„ ...	8 0 0	„	8 5 0
Box	„ ...	4 0 0	„	15 0 0
Sequoia, U.S.A.	per cube foot	0 1 8	„	0 1 10
Mahogany, Cuba, per super foot 1in. thick		0 0 5	„	0 0 6½
„ Honduras	„ ...	0 0 5	„	0 0 6½
„ Mexican	„ ...	0 0 4	„	0 0 5
Cedar, Cuba	„ ...	0 0 4	„	0 0 4½
„ Honduras	„ ...	0 0 4	„	0 0 4½
Satinwood	„ ...	0 0 6	„	0 1 1
Walnut, Italian	„ ...	0 0 3½	„	0 0 7
Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 11in.:—				
Quebec, Pine, 1st		£20 10 0	to	£26 10 0
„ 2nd		15 0 0	„	17 10 0
„ 3rd		7 10 0	„	11 0 0
Canada Spruce, 1st		10 10 0	„	12 0 0
„ 2nd and 3rd		8 0 0	„	9 0 0
New Brunswick		7 10 0	„	8 0 0
Riga		6 10 0	„	7 10 0
St. Petersburg		8 10 0	„	12 10 0
Swedish		9 0 0	„	15 10 0
Finland		8 0 0	„	8 10 0
White Sea		9 10 0	„	16 0 0
Battens, all sorts		5 0 0	„	20 0 0
Flooring Boards, per square of 1in.:—				
1st prepared		0 8 6	„	0 15 6
2nd ditto		0 7 0	„	0 12 0
Other qualities		0 5 0	„	0 6 6
Staves, per standard M:—				
Quebec pipe		—		—
U.S. ditto		35 0 0	„	42 10 0
Memel, cr. pipe		230 0 0	„	240 0 0
Memel, brack		200 0 0	„	210 0 0

OILS.

Linseed	per ton	£14 7 6	to	£14 17 6
Rapeseed, English pale	„ ...	27 5 0	„	27 15 0
Do., brown	„ ...	24 15 0	„	25 5 0
Cottonseed, refined	„ ...	14 15 0	„	15 15 0
Olive, Spanish	„ ...	28 0 0	„	29 0 0
Seal, pale	„ ...	23 10 0	„	24 0 0
Cocoanut, Cochin	„ ...	27 10 0	„	29 0 0
Do., Ceylon	„ ...	22 0 0	„	22 10 0
Palm, Lagos	„ ...	21 15 0	„	22 5 0
Oleine	„ ...	18 15 0	„	19 15 0
Lubricating U.S.	per gal.	0 6 3	„	0 7 6
Petroleum, refined	„ ...	0 0 4½	„	0 0 4½
Tar, Stockholm	per barrel	1 2 9	„	1 5 0
Do., Archangel	„ ...	0 12 6	„	0 15 0
Turpentine, American	per ton	21 0 0	„	23 10 0

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LEARNERS AND WORKERS.

A GREAT deal is expected from the architect in these days. He is not only to be an expert mathematician, a draughtsman, and well up in the archæology and learning of his profession, but to be in addition a good surveyor and business man, well versed in the technical branches of his profession. While one school of teachers impress on the student a long course of academical lectures and class instruction, another equally enthusiastic set of teachers advocate that the young architect should be able to put his hand to any trade, and be taught to handle the materials and tools. As it is impossible for the student to follow both these classess of teachers, he naturally looks for counsel and guidance as to the course he should pursue. His time and opportunities after he leaves school are limited; he has to serve a three years' apprenticeship, and to equip himself for the practical duties of a profession at once exacting and arduous. Strange to say, this guidance is not afforded by the responsible authorities of the profession. If we take the inaugural addresses of two of the leading bodies, we shall find very little light thrown upon the question we have mentioned. At the Association Mr. Hampden W. Pratt dealt with the question as to "What made an artist?" and his quotation from Ruskin seemed to point to the imaginative or artistic qualities as being regarded more necessary than manipulation or calculation. He dwelt on the importance of co-operation and association, of assisting others who work with the architect—fellow-designers and craftsmen. The Association in the past has done good service in encouraging the two divisions of study, the elementary and scientific or constructive, and the classes of design and colour decoraion have been exceedingly helpful; but they have still left the question unsettled for many as to which branch of the profession they should devote themselves to. It is right to provide means to assist members to supplement the training they acquire in the offices to fit themselves for their work as architects. For this end the school of design is doing, no doubt, good work; but the difficulty is to select for each individual the course for which he is best fitted. One party tells the candidate he must go through the whole curriculum of four or five years, the other that he must become expert in the workshop. Facts speak better than opinion. We hear that while in one of the divisions of the Association the attendance of members is satisfactory, in the second and advanced division it is disappointing. Is it not that young men cannot spare the time, or are indisposed to do so? We have to face such a fact. We cannot make young members what they might and ought to be: the only thing the teaching powers can do is to help and facilitate. Is it not also a fact to be recognised, and dealt with accordingly, that those who have the artistic gift and abilities, and can do the best architectural work are the least tractable workers?—aye, the least fond of sustained study? We cannot close our eyes to the fact, however we may wish to do so. The men who read well, and satisfactorily answer the questions set at the examinations, are generally deficient in design. They are made of a different stuff;—they make excellent learners, but poor designers. And is it not the duty of the teaching bodies to boldly recognise the distinction, so as to be able to meet the requirements of both these classes of men—the plodding student and the imaginative artist? Is it not possible that separate rules should be applied to these distinct classes, instead of trying to bring them under one unalterable standard? The "architect and surveyor" is a combination of talent which seems to fit in with the dual-qualified man, but we have never been able to see their real connection. Useful in co-operation they undoubtedly are, especially in the country; but the man who can make valuations and take off quantities is not likely to succeed as a designer. Each loses by a connection with the other vocation. By insisting that a student must follow the whole curriculum or programme sketched out by the modern architectural school, we only make him a crib or a second-rate architect. Design and construction stand quite apart from those qualifications which fit a man to become an expert estimator or surveyor. Many architects tack on the title of "surveyor" to make a living, whereas it would be better for them to include with buildings, furniture, decoration, or even engineering design. No doubt there may be a sort of vanity in thinking that these things are *infra dig.*; hence the combination we have named. But what has designing a building to do with valuing it or making out dilapidations, or assessing a light-and-air case?

Then there is a different attitude towards architectural design. The man trained by books of styles, examples, and dates, who has to pass an examination in sketching and describing features of ancient buildings, mouldings, and the like, thinks of his art very differently to one who is trained in crafts and the treatment of materials. The former looks upon his training as sufficient to enable him to design a town-hall or a church in correct 13th century, or Perpendicular, or Classic, as the case may be—to "design in any style." The latter looks upon such a doctrine as completely derogatory to the calling and dignity of the architect. The two views are utterly opposed, but which is the orthodox one? Are our teaching bodies pledged to the academical view? Do they not expect the examinee to be well up in all styles—the leading features and mouldings which distinguish each period; to be able to illustrate and explain by sketches each feature, such as a broach spire and a typical window of each of the four Gothic styles, with plans of jambs, &c.? If this scholastic scheme of education is the right one, it would be preposterous to expect a young architect to learn any one trade properly. What with the surveying and the scholastic, the mathematical, and the draughtmanship, his time when he leaves school would be fully occupied. Professor Aitchison, at the Institute, truly said that architecture had been in the wood since the 15th century, and could not progress till it got out of the wood; he hinted what the aim should be, but no practical suggestion was made.

Next we are confronted with those who look upon art through building and workmanship. One looks at it from the outside, the other from the inside; one studies styles and features, the other motives. It is, indeed, to this latter class we have to look for progress. They have initiated workshop demonstrations in stone and woodworking and metalwork, and by the aid of the Technical Education Board our architectural societies are now enabled to give instruction in branches of the building art which, up till lately, have been impossible. Not many years ago the young architect thought it *infra dig.* to concern himself with the trades, or anything outside his office, although a few of our leading architects had risen from the bench; but this idea was to be expected at a time when architecture was mistaken for archæology. Now, we hear lecturers actually advocating workshop experience, and even apprenticeship to a trade, such as a mason or a carpenter, before he serves his articles. This is taking the bull by the horns;—to become efficient designers one ought to know how things are made and how workmen handle their tools. To talk of design of masonry, or woodwork, or ironwork without, is like trying to learn to write without knowing anything of the meaning of words or of grammatical rules. To a certain extent it is quite true. But it is not necessary that a man should be a mason or a carpenter before he can design in stone or wood, nor is it necessary for him to be an expert in handling tools. And these wide statements have the effect of discrediting much of the teaching we hear on these topics of late. Some people say that an architect should learn the crafts and be able to work in them, forgetting altogether the calls on his time in other directions. What is required is that he should know practically the methods and means of execution which necessitates a certain time in the workshops. A more prolonged or detailed acquaintance with the crafts would very likely rather restrict his inventive powers as an artist. The architect has to create and arrange, and perhaps no exercise of a manual kind is so valuable to him as modelling. The sculptor-architects of the Italian Renaissance period knew the value of modelling, but we have too little of it now. Every accessory of architecture, sculpture, decoration, metal-work, keramics, was then allied to the mother art—now are carried on as distinct crafts; the old alliance between them has been broken. All technical facilities, unless based on an artistic sympathy, will rather tend to widen the breach between them. These are questions which we look to our art societies to answer. In the mean time there is a great deal of misdirected labour and study going on amongst architectural students. Those who would do better in the studio and the workshop are wasting their time in copying examples and studying books on the history of architecture; others, who are better scholars and collectors of information, are losing time in attendance at technical classes and workshops. In practice, too, we have men in the wrong spheres of work—men of art and feeling doing surveying and mechanical drudgery; designers of furniture and stained glass or metal-work employed in offices which crush out all that is artistic; while, on the other hand, the larger portion of our important buildings fall to the lot of scheming business men in the profession whose inclinations and training have in no sense fitted them to be architectural directors or to secure the best art. Our municipal buildings are examples of the forced alliance between art and practical conditions—how little the architect has been able to make his building anything better than an ornamental shell for the various offices of the locality. So also the improvements and buildings in our cities and towns have been deficient in the character we expect from them. County councils and muncipal corporations have spoilt their best streets by confiding them to a class of men who care little for artistic arrangements—men who have learned their professions according to the received order in offices of surveyors and engineers, and who have no special training in the other branches of their art. We need only point to the many lost opportunities shown in our London streets: how much has been left to accident, and how little has been tried to redeem our buildings from positive unsightliness.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE inaugural meeting of the sixty-third session of the Institute of Architects was held on Monday evening, the president, Professor George Aitchison, A.R.A., in the chair. In

opening the proceedings, the PRESIDENT remarked that, since the last meeting, one of their members had had conferred on him the distinction of K.C.B., and the least they could do was to congratulate him on gaining one of the very few honours that were granted to that body—he referred to Sir John Taylor.

The PRESIDENT then delivered his

OPENING ADDRESS,

in which, he said, he proposed to consider how the Institute could, with a reasonable hope of success, improve the art it had been specially created to cherish and advance. The unravelling of the great problems of humanity and the extraction of the lessons they teach are, he proceeded to remark, beset with difficulties, and some of these difficulties are apparently insuperable on account of our ignorance of the factors. We cannot suppose that among the two parties who alternately govern us, and help to mould our minds, to direct our aims, and to modify our desires, there are not on both sides upright and devoted men, whose views are as the Poles asunder; and it is only by long experience that the value of the measures carried can be judged of. At the time of the discussion of such measures the partisans of the scheme are as sure of its excellent results as their opponents are of its pernicious effects, and as the clashing of the opposing views causes heated, angry, and acrimonious debates, so I fear that suggestions of improvement may have the same effect amongst us. In considering architecture, we must take the existence of two things into account—namely, the set of the public mind and the occurrence of genius, and though we most urgently want genius in every branch of skill and knowledge, we have not the faintest notion of the causes of its production. The utmost we can do is to offer it ample opportunities of learning what it wants to learn, and to bestow our thanks and admiration upon its possessor and his works. The other cause of excellence is

THE SET OF THE PUBLIC MIND

in a certain direction; but why it sets in that direction is at present unfathomable, though we may roughly indicate that its set is always towards those pursuits that promise power, wealth, and delight. We may, however, say with certainty that in this age it does not set in the direction of architecture. If the genius of all the great architects that ever lived were combined in one, and that one had the chance of showing it, the architecture that he would produce would have little or no effect on the public, for the public now gets more in that direction than it either desires or deserves almost for nothing, and is perfectly ungrateful. The set of the public mind is so important a factor that we can hardly overestimate its importance. Men whose turn of mind is in the line of that of the public generally decry all attempts at systematic teaching, and proclaim that all schools and universities are mere shoddy-making factories that turn out a colourable imitation from waste. When in the past there has been a sudden demand by a city or a nation for some kind of knowledge or skill of which there was a deficient supply, the head of that nation or city had no better remedy to offer than the creation of schools, academies, and universities, where the requisite knowledge and skill should be taught or tested, and where it was hoped they might be learned. This was the method adopted by Constantine the Great when he chose Byzantium for the capital of the Roman Empire, and caused to be built there copies of the Senators' houses in Rome, and of their villas in other parts of Italy. So apparent was the want of competent architects and skilled workmen, that he offered a premium to those who would have their sons brought up as architects, and to skilled workmen who would bring up their sons to their own trades. May we not say that Santa Sophia, one of the masterpieces of the world, was the outcome of this teaching? After the irruption of the barbarians in the West there was a great want of both architects and skilled workmen, and the ecclesiastical authorities endeavoured to supply that want by founding schools in their abbeys and monasteries. Again, at the time of the Saracen irruption there was a dearth of architects and skilled workmen, and this want was tried to be met by schools and universities connected with the mosques: and there was again the same want in the days of Charlemagne, and the same methods were adopted. All the systems but one offered teaching to all who came, and, we presume, who showed some aptitude; but Constantine only offered his premiums for learning architecture to young men of eighteen years of age who had received a liberal education. Looking at the enormous extent of the knowledge required by an architect, and the almost antagonistic powers of mind required, would it not be

BETTER TO CONFINE ARCHITECTURAL TEACHING TO ARCHITECTURE?

As architecture is pre-eminently a constructive art, construction should certainly be its foundation—the very last thing that would be thought of now, for the æsthetic architect would leave that to the builder and the engineer. It seems ludicrous not to insist on an architect who is to build having such a knowledge of statics as to know the proper method of resisting the force of wind, of water, and of earth, and the thrusts of arches, vaults, and domes. Statics would give us, too, important lessons in æsthetics, for it gives us the proper proportions of each part of a building when we know the height, the weight to be carried, and the strength of the material to be used. When these particulars are known and provided for, we may roughly say that we have only to accentuate the important parts by mouldings, or have them adorned by the sculptor to make them into architecture. The architectural student wants also to know how to plan conveniently and beautifully, to make his building wholesome, and finally to give it the shapes and ornaments that proclaim its destination, and are appropriate to that destination. The literary, goldsmithing, painting, and modelling architects of the Renaissance left us one pernicious legacy, for their aim was to imitate Roman architecture, and from their teaching the Gothic revivalists have wanted to imitate Gothic, and the Greek revivalists have wanted to imitate Greek, though the Italian Renaissance architects gave grace and artistic perfection to their Roman models. This procedure of imitating the construction and æsthetic expression of a Pagan people who flourished 1,200 years before the Renaissance seems a mistaken one, for architecture is a progressive art, not only in the scientific part of construction, in the increase of material wants, and the introduction of new materials, but also in the æsthetic part, for no two successive generations like exactly the same forms, nor are the emotions that should be raised exactly alike. You certainly should not ignore the advances made in the architecture of the immediate past. It was not wise of the Renaissance race to ignore former advances in construction, and it was hardly possible to go back to pure Roman Paganism, however hard they tried. If we want to advance we must follow the example of the Mediævals: we must study deeply, observe accurately, reason logically, and be never deterred by failure, and endeavour to express the leading character of our time, which is the getting an insight into Nature's laws and applying them to our wants. We must, too, endeavour to discover what we and our employers love to see embodied in our works, and how that embodiment should be expressed. In England we have artificially divided the constant increase of skill and knowledge, and the fluctuation in taste of the Gothic architects, into styles which we call "Early English," "Geometric," "Decorated," and "Perpendicular." But these so-called styles were gradual developments. The first Gothic architects developed the mouldings of the Romanesque; the grouping of two or more lancet windows under an arch suggested a hole in the spandrel, afterwards cusped with the new Saracen feature, and so on; and as skill increased and taste decayed, the tracery of the enormous Perpendicular window grew mechanical and ugly. It is only by increase of æsthetical and constructive knowledge and the development of necessary features that any characteristic features of our own can be stamped on our architecture. When a race has had enough wit to invent mouldings on which the sunshine of its own country played the harmonies that it loved, how can these mouldings be transplanted into another country with a different atmosphere and a different sunshine, and produce the same effect? And if they could, are these the precise effects we want to produce now? Anyone who can appreciate the beauty of mouldings, and has seen Greek architecture at Athens, cannot fail to observe how absolutely ineffective these mouldings are in the misty atmosphere of London, particularly when there is no sunshine. The only other architects who understood the art of moulding were those of the Middle Ages, after what we call Gothic was developed; their mouldings are perfectly effective in misty weather, but are too coarse and hard when there is full sunshine, while they are at all times wanting in grace. Yet the art of moulding is as much neglected now as the science of statics. No one can give genius, nor does it seem in one man's power to turn the desires of mankind in the direction he desires. You can, however, try to drive away from the profession, by a thorough examination, all those who do not love architecture better than anything else; and though this love does not always insure the possession of genius, it mostly does. Having got the proper sort of men, you can see that they have that necessary knowledge and skill that would enable them to use the divine spark properly if they have it. Architects are not born with a knowledge of statics, nor of the strength of materials, nor of the art of planning, nor of how to express the emotions that each particular structure should evoke, though we now see ornaments from the palaces of the Cæsars, or from the boudoirs of Renaissance beauties, lavished on tailors' or oyster-shops, and on banks and insurance offices. I have seen the ghastly ornaments of Roman temples, bullocks' skulls, on a bank; but I looked on these as the monogram of the architect.

THIS INSTITUTE IS A UNIVERSITY

—*i.e.*, it does not teach, but it examines, and informs students what they should know and where some of their information can be got. Among some the idea of teaching is almost a mania, and some things must be taught: the pronunciation of foreign tongues, the use of a foil or an oar; but the art of teaching is mainly non-existent. Unfortunately no real textbook has been written on architecture, though all but how to produce the emotions proper to any structure may be picked up from various books. Those architects who can produce the proper emotions have something else to do than to explain the means they employ, even if they could explain them. And the knowledge, too, of the means used to produce emotions will not give the power to produce them, or else all the real critics of æsthetics would be poets, painters, sculptors, architects, or musical composers as well. Architects must study and paraphrase those buildings and those members of buildings that have produced the proper emotions in them. An architect must also recollect that those who are to be moved by his building are not Greeks, Romans, mediævals, nor Italians of bygone ages, but the people of his own country and his own time. Still, if you can touch the master chords of humanity, they are not so very differently attuned now from what they were in the earliest times. We can at least see that an architectural student has the knowledge that he cannot properly do without, and we shall find that this alone will have a very good effect on the profession; but it is almost impossible to divest men's minds of cant. The student is asked to know all sorts of things, some of which are interesting, some pleasant, and some dull, that have no bearing on architecture. It is only by studying Nature's works and former buildings, and deducing laws from them, that we can hope to cultivate that sense which makes us like one form and detest another. Such a study is necessary, therefore, for those who wish to become architects; for though a knowledge of statics will make our buildings safe and prevent a want of due ratio between the parts, we must trust to a cultivated eye, till the laws are discovered, to make them beautiful, majestic, or sublime. We should make our students first design in old-world materials, wood, brick, stone, and marble, so that their designs can be compared with the existing successful monuments; but we have new materials which have to be brought within the pale of architecture. We cannot do better than

MAKE STUDENTS DESIGN IN CAST IRON

when they have succeeded in designing in the old-world materials. It is too expensive a material to disregard its statical conditions. It is difficult to arrange a column or a stanchion so that its capital may securely carry a heavy superstructure with a large base. It is difficult to make the base of this column or stanchion wide enough to transmit safely the weight it bears on to a foundation of much softer material; there are difficulties in the design of mouldings and floral ornament that can be cast; and there are absolutely no examples to imitate, so that the knowledge, care, skill, and invention of the

student are called into play. We cannot believe that the ingenious Mediæval architects would have foregone the use of such valuable and powerful materials as wrought iron, cast iron, and steel on account of Mr. Ruskin's objection that they were not mentioned as building materials in the Bible. Nothing can be effected in a structural art like architecture, by talking; but when a man is lost in a wood, and you can direct him to the road out of it, you have done him most effectual service. Architecture has been in a wood since the 15th century, and it can never progress until it gets out of this wood. The intelligent architectural student wants to know the mark he is to aim at, and how he may hit it; and I am afraid the general opinion would be that he is to learn to sketch in perspective, and when he asks what he should sketch, he would be told everything that appears to him interesting, striking, or beautiful, because when he gets into practice he will find that the public may ask him to build in any style the world has known. A good instance of the ignorant instructing the wise! He should be told that he has first to learn how to construct, and that the aim of architecture is to make of each building an organism like Nature's, fitted to fulfil its duties as perfectly as possible without waste of material, and to make it properly tell the tale of its purpose or purposes, and that if sculpture and painting can be afforded, he is to use them to tell its tale more completely. When the Associate's curriculum is amended, I would

REDUCE THE EXAMINATIONS TO TWO,

a matriculation examination and a final one, for two reasons: first, because time would be saved; and, secondly, so that each student might keep up the knowledge and skill he had acquired. Professor De Morgan used to say that when an examination was passed, the students thought all the knowledge required for passing it might be forgotten, and looked on his asking again for subjects they had once passed as a fraud, as if they were asked to pay a second time when they had the receipt for the first payment. The final examination should include a certificate that the candidate has acted as clerk of the works on some building for at least six months, to familiarise him with real work, and to impress on his mind that it is building, and not drawing, that is wanted. These amendments would greatly improve the condition of architecture; but architecture would be more improved if there were an examination for Fellows as well. The complaint is that there is a dearth of Fellows, and a proposition is made like that adopted by the giver of the Scripture feast, that we should send into the highways and byways, and compel them to come in. There would surely be no need of compulsion if it were felt to be an advantage and an honour to be a Fellow. It has been said that eventually every Fellow must have been an Associate; but the present conditions of the Fellowship offer a way to escape examination. No one objects to see really distinguished architects being admitted by acclamation; but at present there are only three real qualifications for the Fellowship—that the candidate is thirty years of age, is honest, and has been seven years in practice;—though it is true that the council look at the drawings turned out of his office. The only objection to a proper examination of Fellows is that it is absurd to expect it from men of thirty years of age who have been seven years in practice. The physicians and surgeons saw the force of this, and though their examination may take place at twenty-one years of age, the title cannot be assumed until they are twenty-five. The Fellow's examination should only be more complete than that of the Associates; and the candidate should have a certificate of having acted as a clerk of the works for a year, and made out the necessary full-sized diagrams for the work on the floor. I am rather surprised that architects do not see that

DEGREES OF EXCELLENCE ARE POSSIBLE IN ARCHITECTURE;

or, if they do see it, that they do not act on their convictions. The greatest living architects are contented with the same remuneration for their work as the apprentice just out of his time, and merely seek to get into a wholesale business. This greatly helps to degrade the profession in the eyes of the public, and gives a very wrong impression of the facts, as every architect well knows. I cannot help desiring to see the pursuit of architecture followed on sound principles, nor can I forget the absence of any system in my youth; for then, after you had drawn out examples of the Greek and Roman Orders, genius was supposed to do the rest. One sees to what lengths

A PROPER ARCHITECTURAL EDUCATION

may lead from mere savagery in the architectural triumphs of the Middle Ages. If the true architectural high road could be again found all might hasten to the goal, and not be like the dragon's teeth when the stones were thrown into the middle of them. Who knows that in the case of the right road being found the public might not again take a passionate interest in the excellence of our art, as it must have done at the great epochs? Modesty is a charming virtue in all, and especially in those of great intellectual endowments; but if this modesty is only to make us idle and worthless, let us throw it off. Let us no longer say we are so inferior to the ancient Greek, Roman, Byzantine, Saracen, Mediæval, and Renaissance architects—that it is no use trying to equal them. Have we relinquished the courage, daring, and self-reliance that once distinguished our race? If we have, we must be contented to lag behind the rest of the world. If we are not equal to former races, and particularly to the Romans we so much resemble, it is because we have got into a wrong road, and I would rather see architects take up the position of our ambassador at the Court of the father of Frederick the Great than be ready to confess that the English are hopelessly inferior to the great architectural races. Frederick William had a regiment of giants, and paraded them in front of our ambassador, and asked him if he thought an equal number of Englishmen could beat them. The ambassador said he could not say that, but he would undertake that half the number would try. I firmly believe that the race has not degraded, and that if we will only again take up the right way of learning we shall astonish ourselves and the world.

Mr. H. Heathcote Statham proposed, and Mr. Alexander S. Murray, LL.D., seconded, a vote of thanks, which was carried by acclamation, and was briefly acknowled by the President.

THE SOCIETY OF ARCHITECTS.

THE thirteenth annual general meeting of the Society of Architects was held at St. James's Hall, Piccadilly, S.W., on Thursday evening in last week, the chair being occupied by Mr. Robert Walker, J.P., of Cork, the retiring President.

ELECTION OF OFFICERS AND COUNCIL.

The scrutineers reported that 84 voting papers had been returned, all of which were valid. The following was the result, all the officers having been unanimously elected:—President, Mr. T. Walter L. Emden, J.P., London; vice-presidents, Major F. Seymour Leslie, R.E., London, and Mr. Silvanus Trevail, F.R.I.B.A., Truro; hon. secretary, Mr. Ellis Marsland, London; hon. corresponding secretary, Mr. Edgar Farman, London; hon. treasurer, Mr. H. G. Quartermain, Merton; hon. auditor, Mr. W. R. Mallett, London. For the twelve seats on the council the following were elected:—Mr. C. A. Bassett-Smith, London (83 votes), Mr. George Edward Bond, Rochester (84), Mr. William Cooper, St. Leonard's-on-Sea (83), Mr. R. W. Coventry Dick, London (84), Mr. Herbert J. Jones, Bristol (80), Mr. A. J. Lacey, Norwich (82), Mr. J. R. Manning, London (84), Mr. R. Lano Pearce, London (83); Mr. George Henry Phillott, M.A., Cheltenham (82), Mr. George Gard Pye, London (83); Mr. Thomas R. Richards, London (83), and Mr. R. Frank Vallance, F.R.I.B.A., Mansfield (84).

Mr. Walker then vacated the chair in favour of the newly-elected President, Mr. Emden, who, after returning thanks for the unanimous call to the chair, proposed a hearty vote of thanks to his predecessor in office, who had, at great sacrifice of time, expense, and trouble, travelled from Cork each month to preside over their meetings, and had done so with a geniality, eloquence, and business-like tact that rendered it hard to follow him in the chair.

Major Seymour Leslie seconded the motion, which was carried by acclamation.

PRESENTATION TO THE RETIRING PRESIDENT.

The President, again rising, said he had to offer Mr. Walker, on behalf of the Council and members of the Society, a gold medal as a small recognition of the services he had rendered them during the years in which he had occupied that chair, and a testimony of the good wishes which he carried away with him on his retirement. The medal (which was executed by Messrs. Spink and Son) is of solid gold and is 2in. across. On the obverse it bears the Jubilee bust of her Majesty, as reproduced on the coinage, while the reverse contains within a wreath of laurel and olive the inscription—"Presented to Robert Walker, Esq., J.P., President of the Society of Architects 1890, 1891, 1893, and 1897."

Mr. Walker, in reply, expressed his thanks, and said that from the first the interests of the Society had ever been dear to him, and he had ever striven to the best of his ability to promote its welfare. He was one of those who took part in the conference of architects held at Freemasons' Hall nearly a dozen years ago, at which the federation of the profession was mooted, and was a member of the committee which eventually developed into the Architects' Registration Bill Committee. Although at present progress in Parliament had been blocked by the pressure of business and the indifference of the outside public, he had no doubt that ultimately they would obtain registration for architects, and he urged the members to use every means in their power to educate the profession and the public as to the desirability and utility of the movement.

Mr. G. Gard Pye moved, and Mr. B. R. Tucker seconded, a vote of thanks to the retiring members of Council. This was carried unanimously, as were similar expressions of appreciation with regard to the hon. treasurer, Mr. H. G. Quartermain, propoposed and seconded by Messrs. Sydney Marsland and William Cooper, and humorously acknowledged by that gentleman; and to the hon. secretary, Mr. Ellis Marsland, proposed from the Chair and seconded by Mr. T. R. Richards. Mr. Marsland, in replying, urged each member to do all in his power for the welfare and progress of the society, and especially by endeavouring to secure large attendances to their monthly meetings; there was yet much work for all to do. The services of the scrutineers, Messrs. David Peacock and E. W. Harvey Piper, were acknowledged in the concluding vote of thanks, proposed by Mr. Walker and seconded by Mr. J. R. Manning.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.

AN ADDRESS TO STUDENTS.

THE winter session of the Birmingham Architectural Association was opened on Friday evening last by an inaugural address from the President, Mr. Charles E. Bateman, A.R.I.B.A., of Edward-street, Birmingham, and the Sanctuary, Westminster. Remarking that he proposed to speak as a student to students, he referred to the benefits derived from association with other workers, which counteracted some of the dangers of isolated study, while the stimulus of rivalry with others, when not pushed too far, beneficially affected our capabilities, and a man who had to meet the difficulties of actual practice could not make himself too strong. The time of study might be looked upon as the sowing time for a harvest much of which would be gathered by others, and of which the best, the seed-wheat, was that reserved for future efforts. If we were, he added, to search for the true spirit of architecture, we must look deeper than at the mere arrangement of the materials, grouping, and details of a building, to obtain from it as a work of art the full degree of pleasure and interest it can afford. We must look upon it as the outcome of the characters of those who created it, influenced, as it is certain to be, by the characteristics of the owners, constructors, and designers, and by the spirit of the times in which they lived. The character of the architect stands out, perhaps, as the most evident, because in the nature of things he is more in touch with its conceptions, having to see it in his mind's eye from the earliest stage throughout to the completion. An architect's own house, with its finishings, perhaps gives us the clearest insight into his own character, although from an artistic point of view it is frequently one of the least satisfactory of his works, owing to the want of some dominating idea, such as a client often expresses by his instructions, and really requires, by the force of his special circumstances. What human characteristics are displayed in many of our modern buildings! They have all the commercial spirit of the times in which we live; business needs are held to demand that every foot of ground area

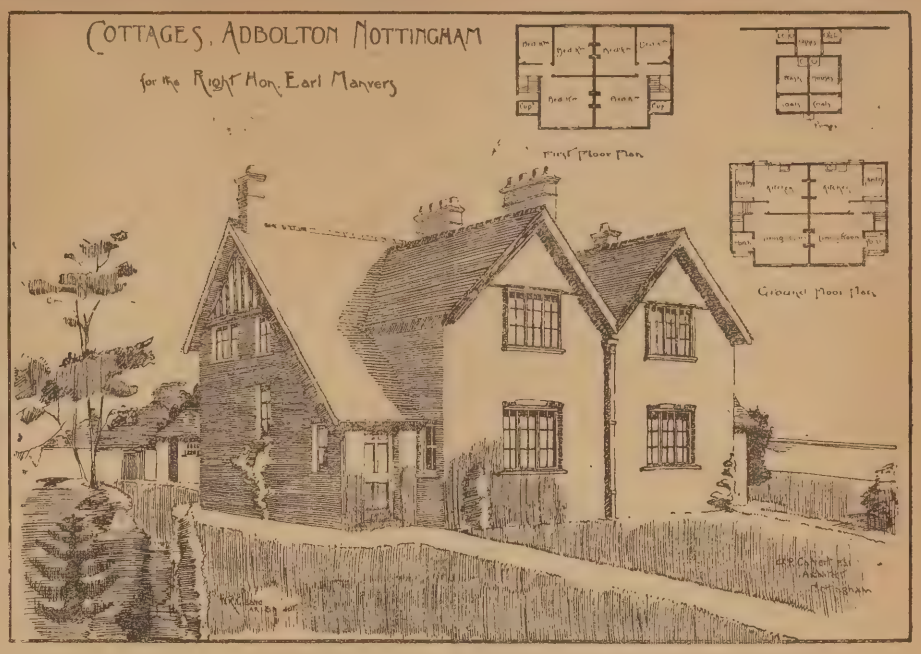
shall be utilised by careful planning, while supports are minimised by the use of iron and steel-work to the utmost degree possible. Even upon the surface this characteristic is visible: advertisement is written all over, and permeates the costly pretentiousness of its architectural treatment. Would so much money be expended upon the façades if it had no such business justification as to call public attention, backed by the desire to go one better than the tradesman opposite? We should not indulge in futile lamentations over this spirit of the age; on the contrary, it remains for us as artists to turn it to account. There is no reason why the spirit of trade competition should not prove a gain to us instead of a disgrace. Look at Belgium and see what was accomplished in its towns and cities through the agency of commerce 300 years ago. Literature has been defined as "thought expressed in words," and so may architecture be defined as "thought expressed in material." Take whatever building we will, erected for some definite purpose, and we find that purpose expressed either consciously or unconsciously. Thus a church, a Roman Catholic building, or a chapel cannot be mistaken for more than a moment, however disguised. Even a High or Low church ritual finds expression, as it has been said that churches, such as St. Alban's, Birmingham; Hoar Cross; St. Augustine's, Kilburn; and St. Augustine's, Pendlebury, will be a monument to the ecclesiastical revival. What a contrast there is between, say, Forthampton Court, which we went over at the excursion this year, and some of the other country houses!—the former the home of the squire, the latter the show-place of successful financiers. The factory, the shop, the theatre, the office block all bear upon the surface the purpose which caused their erection, and which is independent of the style adopted for the elevations, and arises from the individual requirements that have governed the plan, influenced the arrangement of door and window openings, and often dictated the materials and style of treatment employed. The architect's skill is proved by the way in which he handles these elementary conditions of the problem, which it is for him to convert into means of artistic effect. What a chance there is to be grasped in the much neglected factory! In these the ordinary materials might be disposed in large masses and surfaces so as to produce the effect that strength and industry produce upon us, such an impression as we receive in the contemplation of the outcome of the concentrated efforts of many human beings directed towards one end. It has been said that architecture is the art of pleasing, and if this is so, the question then arises, Whom are we to please—the general public, or the more limited number of educated persons of cultivated and refined taste? Let us include, to satisfy as well as to please, and then, I think, we might be able to serve both masters. In the arrangement of the building we ought to satisfy the requirements of the building owner representing the public, while by its graceful expression of construction, by the proportion and detail we must please the higher authority. I think it is not a bad plan to take some great architect as our master, and without copying too exactly his work, which we should study on paper, ask ourselves at each turn the question if he would have met the problem in this or that way, and if he would be pleased with our solution and rendering. In course of time our own capacity and individuality will make itself manifest. We must never be down-hearted when we hear our efforts run down by the uninitiated, or over-elated by their praise, because so often neither their praise nor blame is worth considering; but it is a great help to obtain and accept, without irritation, a true criticism from a higher authority than ourselves. One of the great factors of our life, and which we cannot withstand if we would, is the part which is played by mechanical contrivance. The engineer has become part of our every-day existence. In almost every department he supplies the wants and and comfort of national progress. Who can realise the outcome of the application of steam and electricity? These discoveries in themselves create new wants, and these wants dictate fresh methods of construction, that element which has been, and ever will be, the fundamental principle of real beauty in architecture. The first thing we were told in our Latin grammars, and which we all remember, was "Balbus is *building* a wall"; but in future it will be "Balbus is *fitting* a wall." Consider, for instance, the real facts of the employment of iron and terracotta. What is it but fitting? And so it will, and must, go on while present conditions last, until eventually building will be for the most part nothing but fitting. I have no doubt that, if only peace and wealth continue to be accorded to this country, and some method introduced for the avoidance of strikes, which are practically civil war, with the artistic capacity of all students fostered and drawn out, some beautiful style of building will be produced, based upon this constructive element. We are, however, now in a transitional stage, and do not know quite where we are. Thus the most extraordinary results are produced by the compelling force of new problems, while at the same time we continue to employ forms and details from buildings erected in other ages and climates, and under entirely different conditions, and are disappointed that we do not realise the unattainable atmosphere of ancient work. Our work must, of necessity, be English, fulfilling the requirements of Englishmen and an English climate, constructed by English workmen, and criticised by educated English people. We should, therefore, hold, in the first place, to English prototypes, and, I think, in this lies the great value of the summer excursion of our own and the London Association, together with the visits to old and new buildings. It is of the utmost importance to study present-day architecture, and which is facilitated to so great a degree because, who ever heard of a member of the Association refusing to grant permission for us to go over his buildings and learn how his mind was brought to bear upon the site, materials, and instructions of his clients? It is in this way, more than in any other, that we shall be able to build up a national style or method. These remarks must not be taken as a negation of the advantages of foreign travel; an architect must know from actual observation, and both by measuring and sketching, something of the great examples of his art existing in other countries. Caution is needed in such study of Continental work, because the scale is often so vast that when we try to reproduce some fine example in whole or part reducing, as we shall be compelled to do from a ¼in. or ½in. scale down to a ⅛in. or even $\frac{1}{16}$in., we shall be surprised to find that the effect produced is very different from what we expected would be the result. A great deal has recently been said about the workshop and craftsmanship influence that ought to be brought to bear upon architectural training and design, and while such influences may certainly exercise a welcome restraint in bringing us face to face with the limitations of our materials and the difficulties of execution by the workmen; still, even this is a hobby-horse which may be ridden to death. It unfortunately seems to be the general impression that the practical and artistic cannot be present at the same time; but I think that this is quite a fallacy, because who ever heard that one of Nesfield's or Norman Shaw's houses was unworkable or uncomfortable, or that a church by Bodley or Pearson was not eminently fitted for its purpose? I cannot but think the historians of the future will find much of interest when following up through the architecture of the 19th century the predominating idea of revival which has been in progress during the last hundred years in ecclesiastical matters, painting, sculpture, literature, music, book-illustration, furniture, &c. First of all came the Greek, just when the tradition of Wren and Inigo Jones was dying out; then Gothic of the different periods, followed by Renaissance of various types, some of which are still running, finishing with Spain, the last explored country. Finally, we come to the revival of Georgian types, as practised just now by Shaw, Brydon, Pite, Mountford, Blomfield, and others. The whole will be worked out with variations, according to the taste, or want of it, by individual designers, until we shall be obliged to begin the circle afresh, unless we allow our altered conditions to work themselves out in the materials that we have to hand. The cry that architecture is dead in this country I think we can most emphatically deny. A possibility of doing something occurs in every building or addition to one, if only the right brains and trouble are brought into play. The same materials can be obtained as formerly, and in many instances as much cost may be expended, the great difficulty being the time instructions — to-day sketch-plans, to-morrow working drawings, next week details perhaps, or supplied by the various sub-contractors, which are cheaper and perhaps more workable. It is this which retards us so much, but which, fortunately, affects the largest buildings least. If the Oxford municipal buildings had been 10 or 20 small separate jobs, could the same amount of time and thought have been expended upon their finishing and detail? What a joy it must be for a client to say, "Take your time over it," or, as in the case of a London bank, "Spend what you like, but make no show"! At no time have there been so many agencies at work to facilitate building operations. Men with the highest brain-power and capacity are engaged in providing materials and manufactured articles for insertion to meet the various requirements, until we sometimes are compelled to think that we are merely selectors, and not creators at all. How few of us decline to accept the services of the pattern book, and, if we would, are sometimes not permitted to do so by our clients, who carry us off to choose the latest thing in tiles, fireplaces, &c., and expect us to be pleased with what, if left to ourselves, we should prefer to know were dropped in the sea, together with their casting patterns! This is a condition which, to some extent, works against us, and hides the individual, and perhaps the most interesting thing about a building is its individuality and expression of thought, which is far greater than costliness or richness of material. We all, I think, would sooner look at a well-proportioned and carefully designed plain deal door than acres of thoughtless panelling in oak. Now, as to what steps we should take to qualify ourselves for producing works of interest, and typical of the highest phase of the age in which we live. This Association gives us the greatest opportunity for doing so, as it is run, or should be run, for this aim alone, and if we have sufficient enthusiasm to make the sacrifice required to attend the meetings and classes, we shall also be able to make it later on, so as to give additional thought and trouble to our work without which no great work has yet ever been produced. We cannot hope for all, or even one, of our efforts to be considered as a masterpiece;—for this the talent of genius is required; but whatever talent power or ability there may be provided in us by nature we may strengthen and cultivate through the working of our Association. The first duty we have in life is the provision of maintenance for ourselves and those who are dependent upon us; the second, our duty to our clients in the performance of the work for which we are paid; and then there is the *gift*—the provision of something over and above our actual duty, and it is our privilege in life to assist in making the city, town, and village more interesting and pleasing to the eye and mind of the passer-by, occupant, and visitor. If I might give a little working advice to a student, I think in the first place that we must thoroughly grasp the requirements for which the building is intended, by the study of how these requirements have been met elsewhere, and then we must so arrange the walls and openings which are the plan, so as to meet these requirements in the best possible way. Having got so far with our plan (preferably to a small scale), we should then consider our roof, because it is the walls and roof which provide the shelter—and building is but the provision of shelter—while architecture consists in that atmosphere of art or beauty which is attached to that shelter. If we are fairly satisfied with our plan, heights, and roof, a clay model might be made at this stage which will help our perception of the grouping immensely, and if this bears out our perception, we may commence the more careful drawings in pencil. Before, however, inking-in or finally deciding, it is best to commence the ½in. drawings of plan, section, and elevation of every part, endeavouring to design and show what the full-size details will be, in the ½in., making them proportionate to the space they will occupy. After this follows the full size. What hours we can spend, and are often spent, upon a single section! And during the whole process of thinking out, how many of our sketches, books, photographs, and illustrations have not been referred to! All this time you must remember that nothing has yet been inked-in, and the next step is to make the ½in. agree with the full size, and when this is satisfactory, the ⅛in. scale must be made to agree with the ½in., and, if this is satisfactory, to commence inking-in, remembering all the while that what we are doing is only a means to an end, and that it is the conversion into material that is the consummation. If we are fortunate to have a friend whom we think

more talented than ourselves (which, perhaps, is almost an impossibility), get him, during the preparation of the sketches, to tell us what he really thinks about them, and follow it. Then the actual building should have our greatest care, and the more time we can spend upon our early works, the better will be the result. Not being too conceited to listen to the advice of experienced and painstaking workmen, or too weak to stick to our own carefully-considered opinion, we should always try and bear in mind that the building is to meet some definite requirement, and that we are the persons to provide it, at the same time trying to give it that atmosphere of beauty which it would not possess if constructed simply by undirected labour. Should irritations spring up either with the builder or building owner during construction, *stick to the job*, and, if possible, pull it out of the fire, for the building will be living when the owner, builder, and architect are dead and buried, and all their jars and differences forgotten.

LEIGH HUNT MEMORIAL, HAMMERSMITH.

On Thursday, the 28th ult. (yesterday week), an exceedingly interesting ceremony was performed at the Passmore Edwards Public Library, Hammersmith, when Mr. A. E. Fletcher unveiled the bronze medallion portrait of Leigh Hunt, which has just been erected in the vestibule of that building as a companion portrait to that of Charles Keene, the famous *Punch* artist, which was put up by public subscription early in the present year. Mr. George Frampton, A.R.A., is the author of both plaques, and his work is of the highest order of merit. The Leigh Hunt portrait is based upon Lawrence's picture of the poet and Cosmo Monkhouse's description of him. The tablet is surmounted by two beautifully-posed, seated figures emblematic of "Prose" and "Poetry." Below is the inscription, "Leigh Hunt, born Oct. 19, 1784; died Aug. 28, 1859." The bronze is mounted on a shaped Siena marble slab fixed to the red brick wall. The two memorials, together with the dark green marble dedication tablet placed between them, form a triptych of uncommon interest. The cost of the Leigh Hunt plaque has been paid for by the donor of the building, Mr. Passmore Edwards. The chairman of the vestry, the Rev. Prebendary Snowden, vicar of Hammersmith, opened the proceedings by recounting some salient particulars of the life of Leigh Hunt, and the speaker warmly welcomed Mr. Passmore Edwards, who had, he said, done so much for the good of the parish over which he, as vicar, presided. Mr. Fletcher, eulogising Leigh Hunt and his works, urged that there was nothing to justify the ungenerous charges made against him. It was a very fitting circumstance that so delightful a memorial should be erected to so distinguished a journalist as Leigh Hunt by so famous a journalist as Mr. Passmore Edwards, who had also given them the beautiful building which this tablet adorns. It was not true that Leigh Hunt swerved from his loyalty to Keats, nor that his conduct to Byron was other than that of an honourable man. Both accusations had been fully disproved. The silly slander that the contemptible character of Harold Skimpole in "Bleak House" was a portrait of him, had been indignantly refuted by Dickens himself. Hammersmith might be proud that Leigh Hunt once dwelt within her borders* and communed there with some of the loftiest spirits of his time, for he was a friend of Shelley, Keats, Dickens, Thackeray, Talfourd, Macaulay, Carlyle, and Lowell. On the motion of Mr. G. A. Payne, chairman of the Library Committee, seconded by Mr. Murray, LL.D., vice-chairman, cordial votes of thanks were accorded to Mr. Fletcher for his oration, and to Mr. Passmore Edwards for his gift. The latter explained that one of his reasons for presenting the memorial was a desire to see justice done to Leigh Hunt, for Lord Rosebery had told him in that building, when he formally opened it last year, that he would not in his speech refer to Leigh Hunt, because he thought him correctly represented by a certain character in "Bleak House." Mr. Passmore Edwards felt sure that when Lord Rosebery and others who held the same view knew the facts, their minds would be disabused.—We hope at an early date to be enabled to give an illustration of both of these tablets by Mr. Frampton. That of Charles Keene was exhibited in the Royal Academy this year. The building itself, of which Mr. Maurice B. Adams is the architect, appeared among our illustrations for March 29, 1895.

* No. 16, Rowan-road, now Cornwall-road.



COTTAGES, ADBOLTON, NOTTS.

These Cottages, of which we give view and plans, are nearing completion for the Right Hon. Earl Manvers. They are built of red bricks, the two front gables above windows being in white cement; the two end-gables in half-timber work. The whole of the outside woodwork will be finished white, excepting half-timber gables and barge-boards, which are coated with carbolineum. The roofs are tiled. Mr. A. R. Calvert, F.S.I., Nottingham, is the architect.

"OWEN STONE."

Several kinds of artificial stone are known to the profession, but owing to their composition or colour have not found much favour among architects. The Owen stone is a material for building which seems to possess all the qualities necessary as a substitute for Portland stone. It is produced by a process, at once simple and economical, from silicious sand and hydraulic lime. These materials, by the agency of pressure assisted by highly-heated water chemically combine to form a compact and homogeneous stone having all the appearance and qualities of Portland stone, but without the flaws, veins, and vents which are found in the natural state. As it can be moulded to any size or shape, or worked by the tool to any design, and in blocks of considerable size, it is obvious that considerable saving will be effected by the use of this artificial stone. The sand used is chiefly quartzose, and is that known as the Bagshot, fine, clean, and sharp, containing, according to one analysis, over 97 per cent. of silica, of iron and alumina oxides 0·92, lime 0·75, and magnesia 0·34. The site on which the manufacture is carried on, near Woking, has a considerable substratum of this fine sand nearly close to the surface, and the examination of the excavation made is sufficient to show its suitability for the purpose. The lime is that known as hydraulic lime from the blue lias, so that the artificial stone is properly described as a silicious aggregate cemented together by an hydraulic cement. The analysts and consulting chemists, Messrs. Stanger and Blount, of Broadway, Westminster, have made a detailed analysis of both Portland stone and the Owen stone, from which it appears the cementing constituents of the latter form 26·73 per cent. of the composition, and from their tests it is stated that the resistance to weathering of the artificial stone is equal to that of Portland, while its resistance to damage by fire and water, as proved by experiment on test blocks, is "considerably greater." The manufacture has been carried on for some time in Scotland and near Woking. Last Tuesday a party of gentlemen went to Worplesdon, near Woking, for the purpose of inspecting the works now in operation. Mr. Owen, the patentee, explained the construction of the machinery and processes; the pressure cylinders, of which there are six in use; the feeding apparatus and hopper, the latter divided into two parts, by which the sand and hydraulic lime are severally conveyed and mixed in their due proportion, and delivered to the moulds, which are then run by a short trolly into the pressure chambers. Inspection was made of these chambers or compressors, the operation of pumping the water heated by feed-water heaters to the boiling point into the compressor, so as to expel all fixed air. A pressure of 60lb., indicated on the gauge, is maintained. The heat is further increased by steam coils round the inside of cylinders, so that every trace of air is removed from the compound, and for this purpose also the sand is heated before being mixed. The great importance of this extraction of all air is obvious in the production of a homogeneous material free from all vents, air-bubbles and cracks.

The specimens of stone produced by this process which were inspected were enough to show the capabilities of the material for architectural and decorative uses. One block, about 4ft. long, which had been worked as a mitred cornice, had particularly sharp and clean arrises, and the mouldings were much cleaner than we have seen in the natural stone. The colour is also agreeable without that bluish or greenish tinge which spoils many kinds of artificial stone, and it, too, can be varied by the kind of sand or oxide employed. In another specimen we noticed an architrave moulding returned with mitre, equally sharp in the edges. Other blocks were being chiselled — the tool in every case showing a hardness and fracture equal to the real Portland stone, though the blocks had not become thoroughly hard. When allowed five or six weeks to dry, the material compares favourably as regards hardness and texture with the best stone. The Owen stone has this advantage, however, that it can be worked immediately after coming from the mould, the point of a knife not being able to penetrate it to any depth. We are quite sure that for relief carving and ornament the Owen artificial stone possesses distinct advantages on account of its great homogeneity and evenness of grain. Several specimens of carved and turned stone are exhibited by the Owen Stone Company, which show that for friezes, panels, carved capitals, and external and internal decoration for church and other purposes, a considerable saving may be obtained, as the undercutting and relief are fine and sharp. The main object of the Owen Stone Company, however, is to supply building stone for ordinary building purposes, and we understand that considerable demand has already arisen for it. We are told that Owen stone can be supplied at half the cost of Portland stone. Be this as it may, the Owen stone has all the elements which make for a successful building material. It is not stratified, as a natural stone

is—a source of disintegration and decay; its weathering properties are found to be equal to those of Portland stone, and its behaviour when subjected to intense heat and then cooled by water proves it to be superior to any natural stone. With these physical advantages and its uniformity of texture, which allows it to be moulded and carved, it ought certainly to prove a success.

THE INSTITUTION OF CIVIL ENGINEERS.

SIR JOHN WOLFE BARRY gave the presidential address at the opening of the 79th session of this Institution on Thursday. He remarked that in his inaugural address last year he attempted to review the progress of engineering, and the history and developments of the calling during the past sixty years. On the present occasion he proposed to discuss domestic affairs, as not only touching the home of the Institution, but also embracing matters which might effect its members either as a body or individually. First, as to the Council, on which so much of necessity depended. Every member of that body was elected annually by ballot, and recently a system had been introduced by which it was recommended to the electorate that a certain proportion of the Council should be resident at various important centres outside of London, and, indeed, of the kingdom. He had not the slightest doubt that this system was well conceived and was a good one. It had been already, and would be in the future, very successful. But it must not be forgotten that on those members who were resident in London or its neighbourhood, and could consequently be assembled frequently at the council table, the main burden of government and the ultimate decision on important matters must devolve. Thus the system of local representation should not, in his opinion, be carried too far, and a large proportion of the whole council ought to be elected in the future, as in the past, from London or its suburbs. The ordinary work of the council grew, and must further increase with the numbers and importance of the Institution, now numbering 7,075 members, associate members, associates, and students on its roll. The increase in members of the council made last year had, up to now, avoided any inconvenience from the increase in the number of local representatives. In connection with the widely-spread interests of engineering, it was his individual opinion that it was for the good of the Institution and of the profession that the class of Associates should be carefully encouraged and developed, and he personally should like to see the class strengthened, not merely by an increase of numbers, but by the selection of many eminent and representative men of various other professions or of no profession, who were interested in engineering subjects. The Institution had made a new departure in the inauguration this year of its Engineering Conference in London, which occupied three days, in May. Their first Conference completely realised the expectations of the Council, while he believed it gave general satisfaction to the members. Upwards of 400 members were present at the opening meeting, and the minimum estimated number of those who attended the Conference was 850. The division of the Conference into seven sections, representing more or less distinct lines of engineering thought and practice, afforded a useful means of meeting the overlapping of ideas and treatment in the various departments of engineering activity embraced by the Institution. Another very important matter which had occupied much of the time of members was that of the examinations for admission to the class of Associate Member, the first of which examinations had already taken place. The regulations for the examination syllabus had been so made that, while insuring that every candidate should satisfy the examiners on matters of general principles of science, each person might qualify in the particular branch of engineering which he had studied or to which he desired to devote himself. While an advocate of examinations for the purpose of insuring that a man possessed the qualification of theoretical knowledge before he was classed as an engineer, he held that practical knowledge was at least as necessary as theory. Such practical training as would make a true engineer could only be secured in the old-fashioned way, by a young man seeing work done. The President concluded by alluding to the accommodation for the ordinary work of the institution afforded by the new premises, and to the advantage that might be enjoyed in the possession of a great hall, with the adjunct of a museum of engineering materials and models. Whilst, having regard to the expenditure already incurred in rebuilding, the institution itself might not be justified in entertaining such an idea, he hoped that it might some day possess a hall not inferior to those which had in late years been erected by the munificence of the donors of the Bute, the McEwan, and the Usher Halls at Glasgow and Edinburgh. He threw out this suggestion for the contemplation of some benevolent millionaire.

On the motion of Sir Frederick Bramwell, seconded by Mr. Edward Woods, a cordial vote of thanks was passed to the President for his address.

The President afterwards presented the medals and prizes awarded by the Council for the last Session.

ST. PATRICK'S CATHEDRAL, MELBOURNE, AUSTRALIA.

THIS church was opened by a solemn ceremonial on Sunday last, Oct. 31. In 1858 Mr. W. W. Wardell, F.R.I.B.A., was commissioned to prepare a design for a cathedral church, suitable for a diocese which promised to be so important and populous. It was, however, stipulated that the materials of the existing building should be used again, and that the part of the then existing aisle in use should be incorporated in the new building. These were unfortunate conditions, as they necessitated the use of bluestone for the walls, and governed the floor level of the new building, with the result that the part of it east of the transepts is below the level of an adjacent street, and they also account for some of the minor details in the present nave. Under these conditions the design was prepared, and the first stone of the new edifice was laid by Bishop Goold, on Dec. 8, 1858, since which time the works have steadily continued, almost without interruption, until now. The design, in addition to the cathedral, comprised a remodelling of the present archiepiscopal residence for the purposes of a diocesan seminary, and the erection of another house for the archbishop to replace it. But neither of these works have yet been commenced. The full design for the cathedral is completed, except only the three towers and spires. One of the western towers is, however, ready for the spire, and contains a peal of bells; and the other is up to the bell-chamber for the second peal. The central tower extends at present to about 10ft. only above the intersection of the nave and transept roofs.

The architecture of the building is English Gothic of the style of the 14th century, and may be described as an adaptation of the Geometrical Decorated. The building is constructed in bluestone, with freestone dressings. It comprises nave, transepts, and sanctuary, with aisles to each on both sides, and three spacious sacristies. The sanctuary has an aspidal end and is surrounded by the aisles, from which open out five semi-octagonal chapels. One of these, much longer than the rest, is the Lady Chapel. There is also one larger chapel, opening from the transept aisle, to receive the altar of the Holy Sacrament, and a corresponding one from the opposite transept aisle intended for the organ and choir, as the present unsightly structure at the west end, forming an organ loft, was only improvised as a rough and temporary measure until the proper chamber was built. The main roofs of the cathedral are in open timber work, except the sanctuary, which has an elaborately-panelled and ornamented ceiling under the roof timbers, springing from a very richly-carved cornice. All the chapels and aisles have groined ceilings in New Zealand stone, with carved bosses at the intersection of the ribs. The dimensions of the building are as follows:—

Nave, sanctuary, and Lady Chapel, clear internal length	320ft.
Nave and aisles and transepts and aisles, internal width each	76ft.
Transepts, internal length	162ft.
Height of main roofs to ridges	98ft.
Height of western towers and spires to be	203ft.
Height of central tower and spires to be	260ft.

There are three sacristies attached to the cathedral, each 30ft. by 20ft. internal dimensions—one is for the archbishop, and the two others for the clergy and acolytes respectively. The two principal ones have a strong-room each for church registers, plate, &c. Several of the cathedral windows are filled with stained-glass, by Messrs. Hardman, Powell, and Co., of Birmingham, and it is not too much to say that the large window at the western end is one of the finest modern productions in stained glass; but its effect, and, indeed, that of the whole internal western end of the church, is cruelly interfered with by the misplaced organ gallery, much against the wishes and intentions of the architect. In the chapel of the Holy Sacrament a stone frame in compartments, forming a reredos over the altar, is fixed ready to receive mosaics from the atelier of the Murano Company (late Salviati) of Venice. At present only one of these compartments is filled, and contains an exquisite mosaic representing the Crucifixion of Our Saviour, with Mary and John. The stained glass in this chapel is from Munich. The altars in this and the next adjoining (mortuary) chapel are not yet provided. The high altar is constructed in the Spanish marble known as Emperor Red; the frontal is divided into three compartments by small columns of Irish marble, with alabaster caps and bases, and the intermediate spaces are decorated by mosaics representing Our Saviour, the Blessed Virgin, and St. Joseph. The tabernacle and throne for the Holy Sacrament attached to this altar are of alabaster. The latter is in four stages of highly enriched work, and terminates in a spire about 25ft. in height from the sanctuary floor. This altar, tabernacle, and throne, and the altars in the Lady Chapel, and that of S. Bridgid, which are of alabaster, have been executed by Messrs. Farmer and Brindley, architectural carvers, London.

The works throughout have been carried out from the designs of the architect, Mr. W. W. Wardell, M.Inst.C.E., F.R.I.B.A., who is also the architect of St. Mary's Cathedral, Sydney. The contractor for the western portion of the cathedral was Mr. John Young, now of Sydney, and for the eastern portion, the last contract, the late Mr. James Young, of Melbourne. The cost of the building may be taken to be about £150,000, but it must be borne in mind that a large portion of it was executed at a time when the prices of wages and materials were very far in excess of those that rule at present.

CONSTRUCTION OF ARCHES IN CONCRETE.—XIII.

SOME considerable difficulty was experienced in effecting the necessary alterations in the old abutments, which had served as the supports of the three previous bridges of stone, brick, and concrete respectively, in order to render them suitable for the experiments upon the next arch. A quantity of the old material was removed, as it was so damaged as to be almost useless, and was replaced by large monoliths, some of which weighed as much as four tons. These stones were lifted from different levels to a maximum height of 16ft. The Monier type of construction belongs to what we have named the compound system, and consists of an arch of cement, strengthened with continuous metallic trellis-work, both over the intrados as well as over the extrados. This steel framework was composed of two sets or series of component members, the one set running in a longitudinal direction, and the other transversely, or at right angles to the first. The longitudinal members were steel rods, 92ft. in length, and ⅝in. diameter, and those at right angles to them were plain flat bars, 7ft. in length and ¼in. in breadth. A width of 3½in. was given to diamonds forming the meshes of the steel frames, of which the lower or intradosal was built up upon the centring, and the upper or extradosal was put together on the site, and raised to its place afterwards. An elevation and cross-section of the Monier arch are represented in Figs. 1 and 2, and there are one or two points in which it differs from its predecessors, and which are deserving of attention. The span, rise, and breadth of all the experimental arches were constant; but in the compound system, as seen in Figs. 1 and 2, the extrados is of a parabolic contour, while the intrados is a true segment of a circle. It arises from this want of concentricity in the two arch curves, that a very much greater depth is given at the springings than at the crown, the actual dimensions being 1ft. 2in. at the latter point and 2ft. at the two former. This difference, or, in fact, any difference at all, did not obtain in the concrete arch described in our last article, and the consequent disadvantages

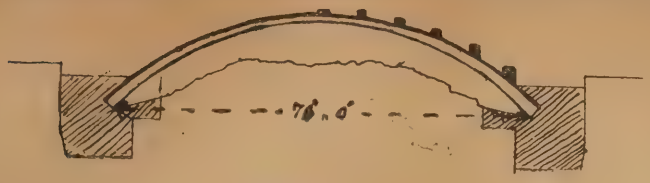


Fig. 1.

Fig. 2.

resulting from the neglect of the proper proportion of depth at these respective points of the structure were fully expatiated and animadverted upon.

Another very important detail was insured in the building of the compound Monier arch, which was purposely set aside in the simple example of concrete. It was the particular composition or mixture of the cement, which was not of a threefold character, as in the plain concrete example, but was of a uniform consistency throughout the whole of the arch. The proportions adopted were 1 part of Portland cement and 3 parts of sand, by volume. A reference to Fig. 1 will point out that both the upper and lower metallic lattice-work were prolonged well into the body of the abutments—in reality, as far as 6ft. 6in. So soon as the abutments had been brought to the proper level, preparations were made for cementing or concreting the lower steel framework, which, for this purpose, was raised by small packing-up stones to clear the centring upon which it has hitherto rested by about ¼in. The cement was most carefully rammed so as to avoid all hollows and irregularities, and to be thoroughly spread over the steel gridiron with a uniform thickness. Instead of commencing, as in the previous experiments, at the springings of the semi-loaded arch and working towards the crown, the building was carried on simultaneously at four points —viz., at both springings, and at points situated midway between the crown and each springing. At the termination of the operations, the arch was thus closed and consolidated at three points instead of only one, as formerly, at the crown. Great care was observed to effect the most complete and intimate corporation and union of the steel and the cement, for upon this being accomplished depends the whole value of the compound system.

With this object in view, the cement was rammed in consecutive layers of a thickness of 6in., until the level of the uppermost layer was just 4in. short of the total depth of the arch. At this stage of the proceedings, the upper trellis frame, which weighed nearly a ton and a half, appeared on the scene. It was literally "tackled," or laid hold on, at some fifty different points, and slowly and gradually lowered to its proper position. When it was once fairly down, it was subjected to the same process of cement ramming as its lower neighbour, and the work continued until the whole arch was completed. A thin top layer of neat cement was ultimately spread over the whole extradosal surface, and the structure was then left to repose a little while before the striking of the centres and the subsequent testing were to take place. During the construction of the arch, samples were taken of the cement employed, and tested to ascertain their ultimate powers of resistance. It should be noted, especially by students and young architects and engineers, that the results arrived at, from experiment and tests upon comparatively small specimens of mortar, concrete, cement, or any other material or combination of materials, will not give the same breaking weight as when the same tests are imposed upon specimens of considerably larger dimensions. The volume of the arch, including the abutments, amounted to 1,400c.ft. Two months were allowed to elapse before any attempt was made to interfere with the wedges supporting the centring, and an additional month intervened previously to submitting the arch to the *peine forte et dure*. After the testing, to which we shall refer later on, and which culminated in the arch finally giving way under a total load of 12·756 tons, the crown recovered itself slightly, although by that time the permanent damage was done. When the task had to be undertaken of breaking up the structure, and disintegrating what small portions had been left intact, the cement was found to be, especially between the lower and upper metallic trellis frames, of very exceptional hardness and tenacity. The extraordinary hardness and solidity of first-class cement work can only be properly appreciated by those who have not only built it, but had to pull it down again. We can call to mind a case which came within our province. It was a case of getting in the foundations and beds for some vertical engines, and the holding-down bolts were inserted in the brickwork according to the wooden templet supplied. When the cast-iron engine bed-plates arrived they would not fit. Some blunder had been made between the pattern-maker and the foundry department, and there was only one course to adopt, that was to pull down the brick-in-cement foundations, and rebuild them with the bolt-holes in their proper positions. Picks, steel wedges, and cold chisels were tried with a very small amount of success, and the demolition was finally and far more expeditiously accomplished by a small charge of dynamite. A few words remain to be said about the behaviour of the steel trellis frame. The upper was deformed and twisted to a very considerable extent, as might be expected from a test pushed *à outrance;* but it was not severed in any place. This is simply a result due to the nature of the stresses it had to encounter, which were of a tensile character. It also appears that the adhesion of the cement and the steel rods and bars was perfect, as manifested by the total absence of all rust or corrosion between the two different materials.

The upper trellis work having been disengaged, the rods and bars were detached from the abutments, the connection between the longitudinals and transversals being cut out, and the general demolition of the structure supervened. It was with great trouble, and with a large development of hard knocks and "elbow grease," that the disconnection between the steel trellis and the cement was finally accomplished. The work of stripping the steel skeleton frame of all the concrete adhering to it was continued until nothing but the metallic bones were left. All the rods and bars of the steel lattice work were more or less twisted and bent out of shape; but none of

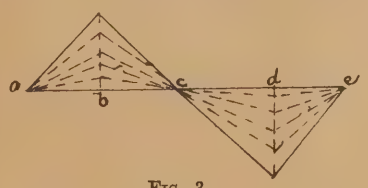


Fig. 3.

them were actually ruptured. In Fig. 3, the diagram drawn to the same scale as those for the vertical deflections of the three other bridges, shows the value of the deflections in the Monier arch. The maximum displacements after the removal of the centres in both a vertical and horizontal direction, were of so trifling an amount as to be not worth recording. It was not until the load reached 2¼ tons per running foot that the first cracks made their appearance, which was equivalent to 0·312 tons per square foot. With this load, the vertical and horizontal deflections attained respectively the dimensions of 5in. and 3in. The same phenomena, with regard to the closing-up of the fissures after the removal of the load and their reappearance when a load somewhat lighter than that originally improved was laid on, were observed; but as the general conditions were identical, the exact particulars call for no especial notice. With a surcharge of 4·273 tons per running foot, the Monier arch collapsed. This load per foot run was equivalent to a total load of 147·365 tons. There can be very little doubt that the working resistance of the arch was practically *hors de combat* before the ultimate rupture occurred. When the loading had advanced to a little under four tons, the vertical deflections had attained to a maximum of 3in., and the lateral to half that amount. Just at this juncture a crack suddenly made its appearance close to the springing of the unloaded semi-arch; in a few minutes afterwards the entire structure came down quietly and gradually until its further fall was arrested by the temporary staging and supports provided for that contingency.

From the manner in which the ends of the entire Monier arch, including the two steel trellis-frames, are virtually imbedded in the mass of the abutments, it may be considered as regularly *encaustré*. Even so, the condition would not impart to the arch type the same advantages which are assumed to accrue to the horizontal beam and girder. In the latter case, though no doubt there is a certain additional amount of strength derived from this mode of fixing the girder to its supports, yet frequently in practice it is not of any great value or importance. In a previous article relating to the testing of the smaller arches, beyond which we have not advanced in England, the method of registering and recording the deflections and displacements of the structure during the whole period of its testing was described and illustrated. At the same time it was stated that for the larger designs a more accurate and precise method would be employed. The chief points claiming attention while the experiment is in progress, are the observation and registration of the horizontal and vertical displacements of the different points of the longitudinal axis of the arch itself, and also—what is of equal importance to ascertain—any displacement to which the supports might be subjected. If the reactions of the supports are inadequate to resist the thrust brought upon them, the best and strongest arch ever built must inevitably come down. There is another description of displacement which must be paid attention to, which will perhaps be best explained by referring to the diagram in Fig. 4. It practically amounts to

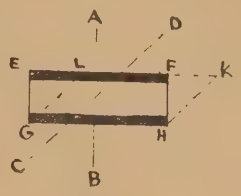


Fig. 4.

the angular movement to which any particular cross-section of the arch may be subjected. This movement is a direct stress of torsion, and occurs occasionally during the testing operations, but generally just at the point of failure. Let a cross-section E F G H be made through any part of the arch, as shown in Fig. 4, and let the line A B represent the vertical axis. Suppose this axis to be displaced or shifted from its original position into that of the dotted line C D, then the whole cross-section would be similarly shifted into the position G L K H. Instead of the centre of the vertical axis remaining unaltered, as assumed in Fig. 4, it frequently, in the experiments, moved bodily to one side or the other, and, as a matter of course, took the arch with it. The variations of temperature were likewise observed, but the records are devoid of both interest and utility, except perhaps so far as the steel arch is in question.

SAFETY FOR WINDOW CLEANERS.

Mr. D. Y. Annan, of Dundee, a Scotch architect, has invented an anti-accident apparatus, costing about half-a-crown (complete), by means of which, aided by a few screws, all the sashes in an ordinary house can be converted at will into casements, and so be cleaned from the inside. Here is a solution of a long-established difficulty, to overcome which all sorts of expensive contrivances have been patented, and a variety of complicated appliances have been invented. "It abolishes awkwardness and attains acceptable advantage," says Mr. Annan. We have carefully examined the apparatus, and, provided it is as carefully fixed, as a more costly one would certainly have to be, there seems no reason why it should not fairly fulfil its purpose.

For very heavy sashes, glazed with plate-glass, we do not think it is adapted, and we have our doubts as to the capability of an ordinary domestic servant being equal to the task of managing even so simple an affair, in which some care on the part of the user is manifestly necessary. Any ordinary mechanic, qualified to adjust and fix a sash in a workmanlike way, could carry out the instructions furnished with the removable hinges, which slot on to screws placed in the frame of the window ready for use at any time when the cleaning has to be done. The bead batten, keeping in

the lower sash, slots on also, and the sash cords have to be made to hook on and off to enable both the upper and lower sashes to swing inwards, of course, as casements. The two adjustable butt hinges suspend the lower sash, and two coupling slotted pieces are adjusted to the top rail of the top sash and meeting rail of the bottom sash, the two sashes thus united swing out into the room, and so enable the cleaner to get at the outside of the glass from the inside without standing on a chair or using steps. Nothing could be more simple when you know how to do it, and the only way to really accomplish the feat is to learn by experience. Whether the landlord would agree to his tenants cutting about the sashes of his houses in the fashion necessary to enable Mr. Annan's apparatus to be used is another matter. It would be safer to consult the owner first, anyhow.

CHIPS.

The new clubhouse of the Lytham and St. Anne's Golf Club, built to the plans of Messrs. Woolfall and Eccles, architects, Liverpool, is now completed. Messrs. Robert Garnett and Sons, Warrington and Southport, have taken the contract for the furnishing.

The new Liberal Club at Acock's Green was opened by Earl Spencer. The building has been erected at a cost of £1,200. The architect was Mr. E. E. Wykes, and the builders were Messrs. Williams and Body, Acock's Green.

A cottage hospital is in course of erection on the London-road, Chippenham. The dimensions will be 72ft. by 56ft. The outside walls will be built of brick, and the elevation will be of the same material, with three gables, all of which will be stuccoed. On the ground floor will be a male ward, and a female ward for each three beds. Separate male and female rooms, also sitting and bedrooms for nurses, bath-room, kitchen, and sanitary offices are provided. Upstairs will be servants' bedrooms, &c. The contract has been taken by Mr. John Smith, of Chippenham, at £1,250.

At the Norwich Consistory Court last week, a faculty was decreed for filling the three-light east window of St. Margaret's Church, Leiston, East Suffolk, with stained glass as a memorial to the late Mrs. Frank Garrett. The object will be the Ascension.

At Friday's meeting of the town council of Salford, Alderman Bow approved the adoption of a new code of building by-laws prepared by the Building Committe. He said the by-laws as framed were the result of very mature deliberation, extending over a considerable number of years. It had been endeavoured to assimilate the by-laws to those of Manchester. He believed they were as complete a set of building regulations as those of any town in the country. After discussion, however, in the course of which several members stated that they had not had time to read the proposed by-laws, consideration of the matter was postponed till the next ordinary meeting of the council.

At Towyn parish church last week a new organ, built by Messrs. Ingram and Co., of Hereford, at a cost of £350, was publicly opened.

Mr. James Knox Taylor, chief of the draughting division in the supervising architect's office at Washington, D.C., has been appointed supervising architect of the United States Treasury, as the result of the special examination instituted by Secretary Gage.

At the Temperance Hall, Yelverton, South-West Devon, on Friday, Lieut.-Col. A. C. Smith, R.E., one of her Majesty's Local Government Board inspectors, held an inquiry into the application of the Tavistock Rural District Council to approve the constitution of Yelverton into a special drainage district, comprising portions of the parishes of Buckland Monachorum and Meavy, and for sanction to borrow £3,000 for the purpose of sewering and sewage disposal for such district.

North-street Congregational Chapel, Atherstone, a building erected early in the present century on the site of a meeting-house built in 1794, was re-opened last week, after having been decorated and repaired by Mr. John Wright, of Nuneaton.

The cost of the Widnes Municipal School and Free Library has exceeded the estimates by some £2,700, and at the last meeting of the town council a notification was received that an anonymous individual had offered to defray this sum.

The many friends of the Rev. R. Medley Fulford, formerly an F.R.I.B.A. in active practice with Messrs. Harvey and Tait at Exeter, who took holy orders eight or nine years since, and went out from Devonshire to St. Andrews, Grenada, will be sorry to learn that he has been ill with fever, and although he is now slowly recovering, the doctor strongly advises his return to England. As a consequence, Mr. Fulford will probably be back by the beginning of April.

OBITUARY.

The death of Mr. Thomson Plevins, one of the oldest and best-known architects and surveyors in Birmingham, took place on Sunday afternoon at his residence, Eaton-road, Coventry, at the age of 72. The deceased was the son of Mr. Plevins, of the firm of Messrs. Pashby and Plevins, builders, and was born in Birmingham in July, 1825. Mr. Plevins, sen., subsequently became a surveyor, and when his son's education was completed he took him into his office, and taught him the profession of an architect and surveyor. When Mr. Thomson Plevins was twenty-one his father died, and he then began to build up a practice in Waterloo-street. His expert knowledge of the laws of building was invaluable to clients engaged in litigation, especially when questions relating to rights of ancient lights were involved, and for many years past there were few important cases tried in the Midlands in which he was not employed as an adviser and witness on one side or the other. Mr. Plevins was also largely employed in negotiating sales of land and property to railway companies and corporate bodies. In compensation cases his advice was also sought by property-owners. When the Birmingham Improvement Scheme was projected, Mr. Plevins was retained by nearly the whole of the owners of the property in the scheduled area, and he was employed either in effecting a settlement with advisers of the corporation, or as a witness when, in the Arbitration Court, the amount of compensation had to be judicially assessed. He was employed in a similar capacity by the owners of the property which was purchased for the enlargement of New-street Station, and he further negotiated the sales of the property acquired by the Midland Railway Company in connection with their enlargement scheme in Suffolk-street. For many years Mr. Plevins was the consulting architect employed by the late Isaac Horton, and was responsible for the erection of many of the largest blocks of offices and commercial buildings in the central parts of Birmingham. He designed the group of buildings, including the Midland Hotel, extending from the London and Midland Bank to Lower Temple-street; the original Grand Hotel in Colmore-row; Colmore Chambers, Newhall-street; Union Chambers, Temple-row; and groups of buildings in New-street, High-street, Corporation-street, Spiceal-street, and other central thoroughfares. Mr. Plevins devoted himself exclusively to his business, and took no active part in the public life of the city, politically or otherwise. Mr. Plevins leaves a widow and four children, the eldest being about 17 years of age.

Mr. Robert John Harrison, engineer and surveyor for the borough of Derby, died on Friday of consumption. He was a native of Southampton, where he received his early training in H.M. Office of Works, under the late Sir Henry James. He afterwards practised as a surveyor in the South of England, but went to Derby in 1877, and held his office since 1888.

Mr. William Radford, civil engineer, of Manchester, and for many years chief bridge master and surveyor of bridges in the County Palatine of Lancashire, died on Monday at South Lea, Whalley Range, in his 81st year. Mr. Radford was born in the Adelphi, Salford. He was educated at the Manchester Grammar School, was afterwards articled to a firm of engineers, and for some time he was engaged in the construction of the Altona and Kiel Railway. Similar work in Denmark gained him the Order of Merit. In 1850 he settled in Manchester as a civil engineer, and was appointed bridge master and county bridge surveyor for the Hundreds of Salford, Blackburn, Leyland, Amounderness, and North and South Leyland. Mr. Radford, who was many years chairman of the Moss Side Local Board, was twice married.

Mr. James Burgess, a well-known master builder of Westbury, died on Saturday, aged 68 years. It is many years since the deceased made a name as a builder and restorer of churches, and he had executed more work of that character than any other builder in Wiltshire. He restored or built no less than 40 churches, not only in the diocese of Salisbury, but in all parts of the country, and at the time of his death he had charge of the building of the new St. Boniface College, Warminster, the estimate of which was £10,000, the building of Atworth Vicarage, the Westbury Cottage Hospital, &c. His chief works were the restoration of the famous church of Edington at a cost of £8,000, and the beautiful Phipps mausoleum in Westbury Cemetery. In local affairs he took a keen interest. He leaves a widow and large family.

The death occurred at his residence, Hoole, Chester, on Tuesday, of Mr. R. Grandidge, J.P., timber merchant, sawmill proprietor, and ship-owner. He was one of the largest importers of Norwegian timber into Liverpool. He was extensively engaged in the creosoting of railway sleepers, and was proprietor of a timber merchant and saw miller's business at Rochdale, which had been in his family for generations. He was chairman of Hoole Urban District Council, and was recently placed on the commission of the peace. He leaves a widow, but no children.

The Wesleyan Chapel at Bolton Brow, near Halifax, was re-opened, after undergoing alterations for the new organ, on Wednesday week. The old choir gallery has been removed and a new gallery substituted at a lower level. The organ has been placed on the new gallery, the organ case entirely filling the recess. In front of the organ are the choir stalls and the rostrum, executed in selected pitch-pine and oak, the rostrum front being bracketed out to allow of the Communion table being formed underneath. Altogether, including the organ, the total cost has been £1,300. Mr. J. Binns, of Bramley, has built the new organ, and the improvements, including the erection of the organ case, have been carried out by Messrs. Fielding and Bottomley, of South Parade, Halifax, from the designs and under the superintendence of Mr. A. G. Dalzell, architect, of the same town.

The Parliamentary notices have just been served on the owners and occupiers of land in the area affected for a proposed light railway to extend from Haxey Station, on the Great Eastern and Great Northern joint railway, to Goole Fields, near Goole, at which point it will connect with the Goole and Marshland light railway, which the Commissioners have already intimated they will sanction. The new line, which will be called the Isle of Axholme Light Railway, will be 23 miles in length, and be of 4ft. 8½in. gauge. The engineers are Messrs. Mammat and White, of Leeds.

A special meeting of the Ipswich Dock Commission was held on Friday to consider the proposals of the Great Eastern Railway Company for carrying out extensive improvements on the riverside. By a majority of 20 to 4 the general scheme was formally approved. The railway company will promote a Bill next session for carrying out works for facilitating the traffic round the dock, including extra accommodation at Ranelagh-road, Princes-street, and Bridge-street crossing, and the construction of a dam across the New Cut, in accordance with the plans submitted to the commissioners, and undertake to carry out all the works within five years. The dock commissioners and corporation of Ipswich obtained Parliamentary powers for constructing a similar dam across the narrow portion of the Orwell known as the New Cut; but, owing to the anticipated outlay, allowed this to lapse.

New Victoria Board Schools in Fearnley-street, Watford, were opened last week. The building is of two stories, and accommodates 1,020 children. The girls' school consists of four classrooms, each for 60 children, and a central hall 35ft. by 34ft. The infants have a similar central hall adjoining, and communicating with five classrooms, accommodating 300 children. The boys' central hall is 71ft. by 34ft., approached by two stone staircases, with eight classrooms arranged on three sides of same, each for 60 boys. The external facing materials are grey bricks, with dressings of red brick and stone. The architect is Mr. A. P. Ayres, of Watford.

The opening of the new gallery and balcony in the town-hall at Downham Market, took place last week. The hall was built in 1887 to commemorate the Jubilee, and the balcony has now been added in commemoration of the Diamond Jubilee. The funds for carrying out the work have been raised by private subscription, the contract being intrusted to Messrs. Collins and Barber. The seating accommodation is about 150.

All Saints' parish church, Chebsey, was reopened on Tuesday by the Bishop of Lichfield, after restoration. The repairs have included covering the roofs with new tiles and their timbers with oak boards; putting mullions and tracery to the denuded windows; also concreting the whole internal area in cement, and laying same either with oak blocks or tiles; stripping the modern plaster from the walls, reglazing most of the windows, opening out the old north doorway, the erection of an oak chancel screen, fitting the body of the church with chairs, fixing the old pewing as wainscot to the walls, the construction of new heating apparatus and chamber, fitting the chancel with alabaster retable and clergy stalls, and new drainage in the churchyard.

Building Intelligence.

ABERDEEN.—The opening of the new medical block at Aberdeen Royal Infirmary, the completion of which marks the reconstruction of the extended buildings commenced in the Jubilee year, took place last week, the ceremony being performed by the Dowager Countess of Erroll. The cost of the reorganised infirmary has been upwards of £70,000. The medical block just finished has a frontage to Woodmanhill of about 200ft. It is four stories in height, the style harmonising with the surgical and pathological blocks on the opposite or Spa-street side of the infirmary ground. On each of the first three floors are two wards with beds for thirteen patients, and the fourth ward will be an erysipelas ward for eight patients. There is also an isolation single-bed ward. The architects for the new block were Messrs. W. and J. Smith and Kelly.

BRISTOL.—Cotham Wesleyan Church in Lower Redland-road was reopened last week; it was originally built and completed nineteen years ago. The main portion of the church was, however, destroyed by fire on the 24th of October of last year, so that the restoration, together with the enlargements and improvements, has therefore been completed within the space of twelve months. Messrs. Stephens, Bastow, and Company, Ltd., builders and contractors, of Bristol and London, were the contractors for the original buildings, and the same firm has now been intrusted by the trustees with the restoration and enlargement, under the direction of the architects, Mr. Robert Curwen, A.R.I.B.A., of London, and Mr. Herbert J. Jones, M.S.A., of Bristol. The amount of the contract for the rebuilding and improvements was £6,555. The roof, the seating, the pulpit, and the whole of the internal joinery and fittings to the chapel itself are executed in pitch-pine. The panelling to the long stretches of gallery front is filled in with figured pitch-pine, as are the fronts to seats and the pulpit. The choir stalls are at the back of the rostrum, and in that space will be the organ keyboard, whilst the organist's place will be between the choir stalls. Mr. W. H. Bromley, of Corsham, has acted as clerk of works.

EXMOUTH.—A new Wesleyan chapel and schools in Tower-street were recently opened. The style is Decorated Gothic. The church consists of nave, transept, and chancel (with octagon end), organ chamber, vestries, tower and spire (rising to a height of 95ft.), and vestibule. A gallery runs across the end of the church. The roof is waggon-headed, and, like most of the interior woodwork, is of pitch-pine. The pulpit is of carved oak, as also is the Communion-table; the panels of the table are filled with needlework designs in gold silk on red velvet. The accommodation is for 620 persons. The school buildings consist of a schoolroom, 54ft. by 32ft., into which open five classrooms and an infants' room. There is also an adult classroom. The architect was Mr. W. J. Morley, F.R.I.B.A., of Bradford, his design having been unanimously chosen in competition. The work has been carried out under the supervision of Mr. Richard Morley, the son of the architect. The contractor is Mr. Gibson, of Exeter. The stained glass is by Mr. Lazenby, of Bradford. The heating has been carried out by Messrs. Thomas Wood and Co., of Bristol, on their low pressure system. A large three manual organ has been placed in the organ-chamber; it has altogether 1,500 pipes, and was built by Mr. Minns, of Taunton. The total cost of the site and buildings is about £7,000.

EDINBURGH.—A new pavilion is to be added to the Royal Infirmary to commemorate the Queen's Diamond Jubilee. It will be placed at the southern end of the infirmary grounds, and resembles in outward appearance the other pavilions, so far as its larger size and the difference in its internal arrangements will permit. It consists of a basement (entirely above ground), three floors of wards, and an attic floor. The basement contains a bathing establishment, including a Turkish bath, with three hot rooms, a needle bath douche baths of various kinds, a vapour bath, and sulphur and other medicated baths. A cooling room is provided, and there are also dressing-rooms, hot linen rooms, attendants' rooms, lavatories, &c. In the basement, two four-roomed houses for resident officials are also provided. The three floors above the basement contain three wards for the treatment of diseases peculiar to women. At the southern end of the pavilion is, on each floor, a ward of 22 beds. Off the corridor are, on one side, an operating-room, two special wards of two beds each, a waiting-room, a demonstration room, and a physician's room; and on the other, a kitchen, a bathroom, lavatory, and other conveniences, an isolation ward, a linen room, and nurses' parlour and bedroom. The attic floor contains 14 rooms for nurses and nine rooms for servants, besides bathrooms, lavatories, &c. The pavilion altogether provides accommodation for 97 persons, excluding the two houses in the basement. The walls are lined with brick, with a hollow space between it and the main wall. Glazed tiles are freely used, both in walls and floors, in corridors, bathrooms, lavatories, kitchens, operating-rooms, staircases, &c. The floors are constructed of iron and concrete, without wood joists. The ward floors are laid with hard-wood planks, but these are nailed into a thick coat of specially prepared asphalte, laid above the concrete. The whole building is thus fire-resisting. The corners are widely rounded, and cornices, door mouldings, &c., are almost entirely absent. The pavilion is warmed by steam in pipes and coils, and the foul air is to be removed by electric fans placed in a tower. The lighting is to be by electricity. The total cost will be about £40,000. The architects are Messrs. Sydney Mitchell and Wilson, 13, Young-street, Edinburgh.

MOTHERWELL.—The Lanarkshire Middle Ward Fever Hospital, the fifth which has been provided by the district committee for the treatment of infectious diseases in that ward of the county, was formally opened at Motherwell recently. The new hospital is situated on rising ground, having an area of six acres. It accommodates 100 adult patients, 80 being equally distributed among four pavilions, and the remainder accommodated in eight private wards of one bed each, one isolation pavilion of six beds, and one observation pavilion of six beds. The four ward pavilions are arranged on the ground *en échelon* with the axis north and south. Each pavilion is divided into two 10-bed wards, and has two separation 1-bed wards attached. The main wards are 60ft. long by 26ft. wide and 13ft. high, giving to each bed 12ft. linear wall space, 156sq.ft. of floor space, and 2,028ft. of cubic space. The floors are of pitch-pine, wax polished, and between each bed is a window 2ft. 6in. from the floor, and extending to the ceiling. The wards are heated by means of open fireplaces and low-pressure hot water, the latter apparatus consisting of cast-iron pipes under the floor circulating water from and to a steam heater in the basement. These pipes have branches rising to radiators in the wards, and in this way the floors of the wards are kept free of heating pipes. The cost of the hospital, including all fittings, apparatus, machinery, furniture, and fees, will be about £37,000, or about £370 per bed. Mr. Alexander Cullen, Glasgow, is the architect.

RASHCLIFFE.—A new infants' school in connection with Rashcliffe church school was opened on Saturday. The school is situate in St. Stephen's-road, opposite the church, and is Gothic in style, in consonance with the church. It contains a central hall 31ft. 6in. by 24ft., and two classrooms, providing accommodation for 30 children each, and a babies' room for 50 children, whilst 75 places are provided in the central hall, making a total of 185 places. The divisions between classrooms and hall are movable glazed partitions, so that all the rooms can be transformed into one, and made to serve a parochial hall. There are also a cloakroom and lavatory. All the internal joiners' work is of pitch-pine. The school is heated with hot water on the low-pressure system. The accepted tenders amount to the sum of £1,510. Mr. J. Berry, 9, Queen-street, Huddersfield, is the architect.

RATHMINES.—The new town-hall, which has been two years in course of erection, from plans by Mr. Thomas Drew, of Dublin, will be opened during December. The hall has a frontage of 48ft., and the depth from front to rear is 189ft. The greatest height to roof is 80ft., and to summit of tower 125ft. The chief feature on the ground floor is the large assembly-room, which is fitted with a stage, and has been provided with a gallery. The room will accommodate on area and in gallery 940 persons. The room is lighted by electricity, as, indeed, are all the other sections of the building. The other apartments on the floor are the secretary's offices, public office, collector's office, sanitary office, engineer's offices, public and private, and the gymnasium. On the first floor, which is reached by a Portland stone staircase, with wrought-iron gilt balustrade and ebony handrail, is the board-room, 50ft. by 30ft., and having a mullioned bay window at one end filled in with lead lights. Over it is the supper-room, also 50ft. by 30ft., having an open roof of pitch-pine springing off stone corbels. This room will accommodate between 600 and 700 guests. The approach to the supper-room is by a pitch-pine staircase. On this floor there are also a number of servants' apartments. The joinery work, the entrance and swing doors, are all of oak, with oak trimmings. Messrs. Goode were the builders, and Mr. P. Coyle the clerk of works.

SOUTH SHIELDS.—The foundation-stone of the John Redhead wing of the Ingham Infirmary will be laid to-morrow (Saturday), by the Earl of Durham. The wing, which will be two stories in height, is being erected to the north of the present block, and, like it, is Classic in character, and the aim of the architect, Mr. H. Grieves, has been to make it symmetrical with the original scheme. The main wards, which are 95ft. 8in. by 26ft., are placed towards the rear. The bathrooms and lavatories are placed at the east end with disconnecting lobbies. A balcony on the first floor is provided. The whole of the windows are to be fitted with double-hung sashes. Each patient will be provided with a separate locker. The ward kitchens, 13ft. 6in. by 12ft. 3in., adjoin the main wards, while the nurses' sitting-rooms are also adjacent. At the west end of the new wing are the isolation wards, 19ft. by 14ft. The convalescent, day, and dining rooms are each 18ft. by 16ft. A staircase, with a lift in the well-way, is provided in a central position. In each of the two large wards there will be 20 beds, and two beds in each of the four small ones. The walls will be of brick, with stone dressings, while the roofs will be covered with Westmoreland slates laid on boarding. The joiners' work is yellow pine and oak, and all moulded work or projections have been avoided. The heating will be by hot water, and open fires will be provided in the smaller rooms. Two of Shorland's stoves will be placed in each of the large wards, with fresh-air inlets and descending flues. The contract for the new wing has been let to Mr. R. Goodwin, for the sum of £5,928, without furnishing.

STRATFORD-ON-AVON.—The restoration of Stratford-on-Avon Church, wherein lie the remains of Shakespeare, was commenced eight years ago. The sum of £6,000 was then raised by subscription, chiefly in the neighbourhood, and expended principally in the repair of the outside of the fabric and the interior of the chancel. Very little was done to the interior of the nave and transepts, and it is now desired to complete the original design by restoring them. The work is being done under the advice of Mr. G. F. Bodley, A.R.A., under whose supervision the previous part of the restoration was carried out. Three things are aimed at: (1) The rearrangement of the organ; (2) the relaying of the floor of the nave, the cleansing of its walls and pillars, and the substitution of open oak benches for the present pews; also the readjustment and enlargement of the heating apparatus, and the introduction of the electric light; (3) the rebuilding, on a revised plan, of the old vestry, taken down about 100 years ago on account of its dilapidated condition. It is expected that the sum of £5,000 will be required, and an appeal is being made for subscriptions.

WESTBOURNE PARK, W.—The extension of St. Stephen's National school was opened on Saturday by the Bishop of London. The increase in the numbers of places provided will more than double the former accommodation. The new extension occupies the site of three houses purchased for the purpose and pulled down, the frontage of the schools being thus doubled. The basement is used for parochial purposes. Half of the ground-floor provides a room 24ft. by 30ft., the remainder is occupied by the new separate entrances and staircases, as well as the cloakroom for both departments. The first floor gives two large classrooms for 60 children each, while the second floor is the same, except that here the two rooms can be thrown into one by means of a folding partition. The schools are lighted throughout by electricity, and are probably one of the first of the National schools to be so lighted; this work has been executed by Mr. W. Mackie. The building has been built by Messrs. Rudd and Son, of Grantham, under the personal supervision of the architect, Mr. Arthur T. Bolton, A.R.I.B.A., of 2, The Sanc-

tuary, S.W., no clerk of works being employed. The cost has been about £7,000, including the site, which cost £2,000.

CHIPS.

The Whitby Rural District Council have instructed Mr. D. Balfour, M.Inst.C.E.,F.G.S.,&c., Newcastle-on-Tyne, to report on a scheme of water supply for Robin Hood's Bay, Thorpe-lane, and Thorpe.

A Local Government Board inquiry was held on Tuesday at Westbury-on-Trym, by Mr. W. O. Meade-King, C.E., into an application made by the rural district council of Barton Regis for sanction to borrow £9,500 for the purpose of sewerage and sewage disposal for the parish of Westbury-on-Trym.

In the Council Chamber, Birmingham, on Tuesday, the presentation took place of the three-quarter length portrait of Sir James Smith (the Lord Mayor), painted by Mr. J. J. Shannon, A.R.A., in recognition of the services rendered to the city by the Lord Mayor during his two years of office. The portrait will be placed in the Art Gallery.

A new board school is in course of completion at Eastville for the Bristol School Board. In the centre is a rectangular assembly-hall, with eleven classrooms and a couple of cloakrooms surrounding it. Some of the classrooms are for 50 children, and others for 60; and the total number for which the school is built is 600. The building is of Pennant with Bath stone dressings, and the roofing is of Broomhall tiles. In the interior the rooms are supplied with a dado of glazed bricks. The architect is Mr. E. W. Barnes, of Guildhall Chambers, Broad-street, Bristol; and the contractor is Mr. J. Browning, of Fishponds.

Memorial-stones were laid last week of the Diamond Jubilee Swimming Baths at Bradford-on-Avon. The building will be Domestic Gothic in style, and the external walls will be of Bradford-on-Avon stone. Provision is made for a swimming-bath, lined with white glazed bricks, 42ft. long by 16ft. wide, with dressing cubicles. The depth of the water will vary from 3ft. to 6ft. Five private baths are also to be provided. Mr. Chancellor, of Bath, has taken the contract for the building, and Messrs. Beaven and Sons are carrying out the heating arrangements. The architect is Mr. Sydney Howard, surveyor to the urban district council.

The foundation-stone of St. Chad's parish hall and schools in Westminster-street, Gateshead, was laid on Monday. The building is Domestic Gothic in style. The main front elevation is faced with pressed Commondale bricks with stone dressings, and other elevations are faced with Birtley bricks. The large hall is lined with brick, a dado of cream-tinted glazed brick running round the hall, a sanctuary being formed at the south end. The hall has a high, open-timbered roof. The school has four classrooms, boiler-house, yard, and offices. The architect is Mr. Eugene E. Clephan, of St. Nicholas Chambers, Newcastle, and the contractor Mr. Isaac Bewley, Dunston.

The aggregate amount of sales at the Auction Mart last week, as registered at the Estate Exchange, was £83,760, nearly £20,000 less than the figure recorded for the corresponding week of last year. A considerable number of properties were offered, but the bulk were of the general type of investments of a moderate class, the few brought into the market of a more important character meeting with but scanty success.

At a meeting of Kilmarnock Town Council on Friday, it was reported that Mr. Gale, the arbiter in the waterworks reference, had allowed the contractor £937 as extras; the sum claimed was £8,500. This being an interim award, the council agreed, on the recommendation of the water committee, to appeal against certain items involving about £100.

A special meeting of the Taunton Town Council was held on Friday to consider a report from Messrs. John Taylor, Sons, and Santo Crimp, of Westminster, on the prevention of the flooding of North Town. The engineers advised the construction of a high-level intercepting sewer, at a cost of £7,350. This was adopted, and it was decided to apply to the Local Government Board for sanction to a loan of £7,500.

The scheme for enlarging St. Mary's Church, Waterloo, Blyth, has taken practical shape. At present the sittings will only accommodate 261 people, but the Diocesan architect, Mr. W. S. Hicks, of Newcastle-on-Tyne, having prepared plans embracing a scheme of gradual extension, and eventually affording accommodation for 1,000 people, the churchwardens adopted the scheme, and let the contract to Messrs. Simpson, a local firm of builders, whose workmen are now engaged on the proposed extensions. The first portion of the work includes the extension of the chancel, the building of a north aisle with organ chamber, clergy vestry, and boiler-house for heating apparatus.

Engineering Notes.

Institution of Junior Engineers.—The members of this body visited, on Saturday afternoon, the section of the Central London Railway between Queen's-road, Bayswater, and Westbourne Park, by invitation of the engineers, Sir Benjamin Baker and Mr. F. Hudleston. The visitors assembled at the site of the Queen's-road Station, adjacent to Kensington Gardens, and after having descended by a lift, inspected the enlarged tunnels where platforms will be constructed, and passed eastwards for several hundred yards along the parallel tunnels, each 11ft. 6in. diameter, in which the up and down lines will be laid. At the end of the boring, which is throughout in the London clay, the task of tunnelling with the aid of the Greathead shield was in progress, and the visitors viewed the mechanism for operating this apparatus by hydraulic power, and the arrangements made for the supply of air to the workmen employed in removing the earth excavated by the cutting edge of the shield. Representatives of Mr. John Price, the contractor in respect of this portion of the railway, escorted the visitors.

Heysham Harbour.—Messrs. Price and Wills, of Westminster, who have secured the contract from the Midland Railway Co. for the construction of the harbour at Heysham, at a cost of nearly half a million sterling, have commenced operations, and in the course of a very short time there will be nearly 2,000 men at work. The Midland Railway Company have purchased a large tract of land at Heysham, and during the past year Messrs. Godfrey and Liddelow have cut a line from a point on the Lancaster line, near Morecambe, to the seaboard between the Near Naze and Red Nab, and it is between these points that the harbour will be constructed. From the Near Naze, which is on the Manchester side, a breakwater, a mile in length, and built on a curve, will run out to a point exactly opposite the present cutting, whilst from Red Nab, on the other hand, a breakwater, 1½ miles in length, will be constructed so as to almost meet the first-named. At the end of each of the breakwaters there will be a lighthouse, and a pier 2,000ft. long will run from the cutting to the opening in the breakwater, which will be in deep sea. The area inside the breakwaters will be excavated to a depth of 17ft. at low water, and one and a half million cubic yards of sand will have to be removed. The seaboard now rises very abruptly, and something like two million cubic yards of earth and rock will be taken away. The sand and the stone removed from the bay and the mounds will be used in the construction of the breakwaters, but the rock will not be hard enough for the facings, for which probably stone from the Bramley Hall quarries will be obtained. The 2,000ft. pier will reach permanent deep water, and vessels will be able to berth at any time of the day or night. Messrs. Price and Wills are under contract to complete the work in four years.

Tunnelling Shap Fells.—The London and North-Western Railway Company are considering the question of improving the gradients on their main line between Tebay and Shap Station. Surveyors have been engaged during the past autumn in trying to find a better route than that which Stephenson founded, and they have staked one out, which is at present under consideration. It strikes off the present line a little north of Tebay, and, passing along the valley of the Birk Beck, passes close by Shap Wells and then enters a tunnel about two miles (and not as has been absurdly stated ten miles) in length, by means of which the worst part of the present ascent is got rid of. The line then rejoins the existing railway near the Shap Granite Works, the whole length of the new line being about 11 miles. An alternative route takes the line near to Kendal, and joins the present railway near Lowther Park.

At the half-yearly meeting of the shareholders in the Hotel Cecil the chairman stated that with regard to the extension of the Strand frontage of the hotel, it had been considered desirable to acquire possession of the houses fronting that thoroughfare. Parliamentary powers had been obtained for the purpose, terms had been settled with the occupiers, and the demolition of the premises had been commenced. The London County Council would at the proper time contribute £30,000 towards the improvement of the Strand frontage, which would be set back some 25ft.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Architectural Association.—The Annual Conversazione of the Association will be held at the Matinée Theatre (St. George's Hall), Langham Place, W., on Friday, the 26th inst. There will be a reception by the President from 8 to 8.45 p.m. A musical play, specially written for the occasion by Mr. F. D. Clapham, with music composed by Mr. Leonard Butler, entitled "The Broken Contract, or an Egyptian Enigma," will be performed at 8.45 p.m.

Bury (Lancs) Master Builders' Association.—The annual dinner and meeting in connection with the Bury and District Master Builders' Association were held at the Grey Mare Hotel on Wednesday week. In the unavoidable absence of the president, Mr. James Byrom, Mr. J. H. Haworth (Ramsbottom) took the chair. The following were elected officers for the ensuing year:—President, Mr. James Byrom; vice-presidents, Messrs. J. Ramsden (Bury) and J. H. Haworth (Ramsbottom); treasurer, Mr. R. Smith; secretary, Mr. J. H. Thompson; auditors, Messrs. J. E. Tinline and J. Inman, jun.; committee (which previously consisted of seven members, but was now increased to ten), Messrs. J. Kay, jun., B. Holt, J. Hamer, S. Clough, J. E. Tinline, J. Bently, J. Castle (Ramsbottom), C. Dennis, R. Hall, and R. Ratledge. The following representatives were elected to the Lancashire Federation of Building Trade Employers:—Executive, Mr. J. H. Thompson; general committee, Messrs. J. E. Tinline and J. Ramsden. Five new members were elected from Bury and district. The business meeting was followed by a convivial gathering.

Leeds and Yorkshire Architectural Society.—The following is the syllabus for the ensuing session. The meetings, which are held on Mondays, will commence at 7.30 p.m.:—November 15, Address by the President, George Corson; Distribution of Prizes, Smoking Concert. November 29, "Stained Glass—Mediæval and Modern: its History and Varied Processes," by Stephen Adam. December 13, "Some Byzantine Churches in Greece," by S. D. Kitson, M.A. January 10, 1898, Dinner. January 24, "Ornamental Hand-wrought Metal Work," by Nelson Dawson. February 8, "Early Renaissance Sculpture in Tuscany," by W. H. Thorp, F.R.I.B.A. February 22, Discussion Evening. March 8, Exhibition of Institute Drawings, Nomination of Officers. March 22, Election of Officers, Annual Report.

Royal Institute of British Architects.—The following is the programme for the session, which, as mentioned elsewhere, was inaugurated on Monday evening by the President's opening address:—Nov. 15, "Notes on Renaissance Architecture in Malta, with Special Reference to the Buildings of the Order of St. John," by A. S. Flower, M.A., F.S.A.; Nov. 29, business meeting; Dec. 13, "Brickwork Tests: Report on the Third Series of Experiments," by members of the Science Standing Committee; Jan. 17, 1898, award of prizes and studentships, preceded by business meeting; Jan. 24, President's address to students, presentation of prizes; Feb. 7, "The Housing of the Drama," by E. O. Sachs; Feb. 21, "The Mediæval Campanile at Rome," by J. Tavenor Perry; March 7, business, including election of Royal Gold Medallist; March 21, "The Heraldry of Antiquity," by G. H. Birch, F.S.A., and "Heraldic Drawing," by J. D. Crace; April 4, "Artistic Copyright," by G. Harmand, Avocat à la Cour d'Appel, Paris; April 18, "Domestic Architecture in the United States," by A. N. Paterson, M.A.; May 2, annual general meeting; May 16, "The Libraries of the Middle Ages," by T. G. Jackson, R.A.; June 6, business, annual elections; June 20, presentation of the Royal Gold Medal, address by the President. The meetings are held on Monday evenings at 8 p.m.

At the diocesan conference held at Truro on Saturday the bishop referred to the completion of the cathedral, which, he said, would be carried out by the rank and file of Cornwall, and not by the aid of cheques. They proposed to finish the nave for the sake of the cathedral itself, and the west front as a memorial. In round figures £25,000 had been subscribed from all sources, and the estimated cost of the nave was £25,000, and of the west front £10,000.

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Our Illustrations.

THE PASSMORE EDWARDS CONVALESCENT HOME FOR FRIENDLY SOCIETIES, HERNE BAY.

In view of the limited accommodation at the convalescent home at Dover (which cannot be extended), Mr. J. Passmore Edwards has generously undertaken to erect a new home for the registered friendly societies. The trustees have succeeded in securing on very favourable terms an excellent site of above seven acres in extent on the Beltinge Estate at Herne Bay, and plans have been prepared by Mr. Alfred Saxon Snell, architect. The foundation-stone is to be laid by Mr. Edwards to-morrow, November 6th. The building is to be three stories in height, and will contain accommodation for 50 male patients. On the ground floor the wide front entrance porch leads to a small hall with a fireplace, and thence to the main staircase, which will be top-lighted. A corridor branches to the right and left of the entrance hall leading respectively to the patients' day-rooms and the administrative offices. The day accommodation comprises a large general sitting and smoking-room, with S. and S.E. aspects, and overlooking the gardens in the rear. In front of this room is a smaller quiet reading-room and library, with a large circular bay overlooking the front garden. The dormitory on this floor is for cripples, or others whose infirmities render ascending a staircase difficult. The large lavatory will be fitted with wash-hand basins and patients' lockers, &c. A bath-room is also provided on this floor. Left of the entrance hall are two rooms for the master and matron, and beyond these a large kitchen, stores, &c., and a service staircase. The dining-hall is a large room 38ft. by 21ft., lighted by end bays and windows in the sides. A platform will be provided at one end, so that the room can be used for concerts and other entertainments. On the first floor are five dormitories, respectively for 10, 8, 6, and two for 4 beds each. The officers' and servants' bedrooms, linen rooms, &c., are placed over the kitchen block. On the second floor, and partly in the roof, are three dormitories for three beds each, one for four beds and one for one bed. All the dormitories allow nearly 900c.ft. for each patient. It is anticipated that in due course more accommodation may be required, and provision will be made so that any addition will not materially interfere with the present building. The external facings will be of Canterbury red brick, relieved with Monk's Park Bath stone dressings, &c.; Broseley red tiles will cover the roof. The walls internally will be plastered; but to all day-rooms and corridors there will be a cement dado. The dining-hall will have a tile or glazed brick dado all round. The ground-floor corridors, hall, and verandahs will be paved with encaustic tiles. It has been sought in the elevation of the building, no less than in the grouping of the rooms, to avoid the idea of an "institution" as opposed to a "home." The architect's estimate of the cost of the building, including fencing and draining the land, is £6,000.

ADDITIONS TO THE SAVOY HOTEL.

The additions to the Savoy Hotel illustrated herewith, from the drawing exhibited at the Royal Academy last summer, have been constructed with steel stanchions, girders, and braces filled in with coke-breeze concrete to form the walls and floors, the walls towards the courtyard being cased with terracotta. The work has been carried out by Mr. George Holloway, from the designs of Mr. T. E. Collcutt, architect.

BUNGALOWS, HERNE BAY.

The bungalows illustrated in this issue are for erection on the East Cliff, Herne Bay, from the designs of Messrs. J. T. Wimperis and Arber. One, for Mr. George Adney Payne, is now nearly completed, with stabling and outbuildings. The drawings, which we reproduce, were shown at the Royal Academy this season. In execution the plans have been diversified, and in all a picturesque treatment has been aimed at.

MEFFAN INSTITUTE, FORFAR.

This drawing, which we give to-day, is from the Royal Academy. It shows the design submitted by Mr. T. Martin Cappon, architect, Dundee, in the late limited competition. It combines a small lending and reference library, reading-room, and librarian's room on ground-floor, with small lecture-hall and museum room on first floor; caretaker's home in attics, and heating chamber, &c., in basement. The built-up and contracted nature of the site presented difficulties as to lighting, which were not easily overcome, keeping in view that the building had to be so designed "that it might be easily supervised by an attendant." The elevation indicates an effort to give such a building character, and break away from the monotony and regularity of street fronts, so common in the small towns of Scotland.

ST. CUTHBERT'S PARISH HALL, DARLINGTON.

This parochial hall, of which we give a view and plan, needs but little description. The platform is so contrived that it can be converted into a second room for classes or the use of the vicar. Messrs. Clark and Moscrop are the architects.

NEW TOWN HALL, STANHOPE.

This hall has cloak rooms at the entrance end for ladies and gentlemen, and a retiring-room as well as an office at the stage end of the building, where there is also a second entrance. The gallery over the main portals gives increased seating accommodation. The hall occupies a very picturesque site, and it is treated in a Renaissance style. Messrs. Clark and Moscrop are the architects.

PRESBYTERIAN CHURCH, HANDSWORTH.

A competition was lately held for these new buildings, which, besides the chapel, include a large lecture-hall and a series of classrooms. The choir, as shown by the plan here given, is accommodated to the rear of the rostrum in a sort of apse, the organ being located to the back of the apse. The seats radiate in auditorium fashion, and the entrances are at the tower end of the building. The authors of this design (Messrs. Ingall and Son, architects), have endeavoured to depart from the type of Gothic more commonly used in this class of church building.

LOGGIA OF S. ANDREA, ANAGNI, ITALY.

Anagni, picturesquely situated on the side of the hills, enjoys a magnificent view in every direction. Its streets are rich in architectural remains, reminding one of its former splendour and importance. Griffins, lions, outside staircases, trefoiled windows, great arched doorways, and open loggias abound in this town, where many Popes resided. The cathedral is one of the most interesting buildings in this part of Italy. The spirited drawing by Mr. W. Campbell of the Loggia of S. Andrea, one of the fragments above referred to, forms one of the illustrations which we give in this week's number. We are indebted to the *American Architect* for the plate from which the sketch is given.

Over £16,000 has been raised towards the erection of a technical college at Wigan.

COMPETITIONS.

Birmingham.—At the last meeting of the City Council the recommendation of the Lunatic Asylums Committee that the plans for the proposed new asylum at Holly Moor, Northfield, be intrusted to Messrs. Martin and Chamberlain, architects, Colmore-row, was, after a somewhat heated discussion, negatived and referred back to the committee, with instructions that invitations should be issued to a limited number of architects to compete for the same. The Asylums Committee have since met and selected six firms, to whom invitations have been sent out, at the same time intimating that instead of offering the usual premiums for success, the committee had decided that each selected competitor should be awarded 100 guineas for the trouble of preparing the plans. The plans will be adjudicated upon by the "two medical superintendents and the City surveyor." The *Birmingham Gazette* states that the firms who have been invited to send in competitive plans are:—Messrs. Martin and Chamberlain, 106, Colmore-row; Messrs. Cossins, Peacock, and Bewlay, 83, Colmore-row; Messrs. Mansell and Mansell, Whitehall Chambers, Colmore-row; Mr. Frank B. Osborn, 13, Bennett's Hill; Messrs. Cross, Brookes, and Nichols, Union Chambers, Temple-row; Messrs. Ingall and Son, 3, Temple-row West; all of Birmingham.

Stock Prize.—The council of the Society of Arts, acting on the recommendation of the Department of Science and Art, have awarded the prize offered by the Society, under the Henry Stock Trust, for competition among students of the Schools of Art in the United Kingdom, for a design for architectural decoration, to Alfred Coumber, of New Cross School of Art, for his design for the decoration of a Turkish Bath. Mr. Coumber's design, for which a silver medal was awarded in the National Competition, consists of five drawings:—(1) Plan of the whole, (2) elevation of a complete bay, (3) sheets of details. The prize consists of the Society's gold medal or a sum of £20.

CHIPS.

Lady Truscott, widow of Sir Francis Truscott, Lord Mayor of London, has just presented stained glass to Truro Cathedral, filling the whole of the great window of the south-east transept in the choir. The window contains scenes from the earthly life and ministry of Our Lord. The cost has been upwards of £900.

The ceremony of turning on the electric light in Cambuslang was performed on Friday night by the chairman of the local gas company. The installation was fitted up by Messrs. Hunter and Jack, Glasgow, and the power is supplied from Cambuslang Gas Works. The engine is 29·5H.P., and is driven at a speed of 250 revolutions per minute, the dynamo being capable of giving 1,100 volts; but it will only be run at present to give 700 volts.

On Tuesday week, the parish church of St. Mary, Breamore, was reopened by the Bishop of Winchester, after extensive restoration. At the same time the bishop consecrated an addition to the churchyard, and dedicated a new organ placed in the church by the Stanford family. The walls of the church have been restored, the old ceiling removed, and the old oak rafters in the roof exposed. New oak seats, together with oak pulpit and reading-desk, lamps for lighting, and heating apparatus have been provided. The cost of the restoration has been defrayed by Lady Hulse, and the work has been carried out by the men on the Breamore Estate, under the superintendence of Mr. Stanford.

Two memorial windows have been erected in St. Mary's Church, Carlton. The subjects are the gifts being presented by the Wise Men at Bethlehem, and the three Marys at the Holy Sepulchre.

The Norwich board of guardians have leased from the corporation of that city the Old Museum (vacated by the opening of the Castle as a museum), and have let their old board-room offices and workshops for a term of 200 years to the Technical Schools Committee.

A tablet in memory of the late Rev. Chancellor James Raine, LL.D. (1830-96) was unveiled in the north side of the choir of York Minster by the Archbishop last week. The memorial consists of a brass tablet, upon which is a Latin inscription. The brass is framed in Purbeck marble, with tracery head, and is surmounted by the sacred monogram, "I. H. S." The tablet was designed by Messrs. Bodley and Garner, architects to the Dean and Chapter, and executed by Messrs. Farmer and Brindley, sculptors, London, having been fixed on the wall by the minster staff, under the direction of Mr. R. C. Green, clerk of works.

SPIRITO SANTO ETERNO DIO ONNIPOTENTE
ALBERTO DI BARNEKOW
ALBERTUS
BAROE DINASTBARNEKOVV
ANNUNZIATO E
MADONNA DEL
DISCESA DAL CIE
XXVIII NOVEMBRE
CONIMMACOLATA
SUO SACRO MANT
PROFERENDO IREVOC
IN LINGVA FRANCESE
ANMDCCCLXXXIV

~ LOGGIA OF S ANDREA ~
ANAGNI. ITALY.

LEGAL INTELLIGENCE.

THE ACTION AGAINST THE ST. PANCRAS GUARDIANS.—The case of "Drew-Bear and Co. v. the Guardians of the Poor of St. Pancras," was mentioned to Lords Justices A. L. Smith, Rigby, and Henn Collins in the Court of Appeal on the 1st inst.—Mr. R. M. Bray, on behalf of the plaintiffs, said that Mr. Justice Ridley had fixed to take the case on Jan. 11 next, but had since written and expressed an opinion that it was exceedingly doubtful if he could take it, having regard to his other engagements.—Mr. English Harrison, on behalf of the guardians, objected to his learned friend reading that letter to their Lordships, as it had not been communicated to his clients. Mr. Justice Ridley, he said, had written on Oct. 26 last a letter to both sides, which he desired his learned friend to communicate to their Lordships.—Mr. Bray said that he would read the letter, which was to the effect that, owing to business engagements, he (Mr. Justice Ridley) could not take the case on Jan. 11, or at any other time.—Lord Justice A. L. Smith: What do you want?—Mr. Bray: I ask your Lordships to say that the case shall be tried by Mr. Justice Ridley.—Lord Justice A. L. Smith said that he had already had two interviews as to the matter in his private room, and he felt that if a spirit of antagonism were adopted, the litigation would never come to an end.—Mr. English Harrison said that the case lasted 22 days before Mr. Justice Ridley. The question which remained to be decided was the mere assessment of damages, which had been allowed to stand over for further investigation. Out of 29 witnesses called, 26 or 27 were called in the case against the architects. Mr. Justice Ridley had said when they went before him at the beginning of the Long Vacation that he could not take the case this side of Christmas. The guardians wished to get the case disposed of, and he (Mr. Harrison) suggested that they should go before another Official Referee. His learned friend, Mr. Bray, would not consent to that, and pressed the case on. Then Mr. Justice Ridley said that he could not possibly take the case before Jan. 11. On Oct. 28 they received an intimation from Mr. Justice Ridley saying that he could not take the case, owing to public business.—Lord Justice A. L. Smith: Saying he could not take the case before January 11?—Mr. Harrison: No, nor at any other time. What has passed between Mr. Justice Ridley and my learned friend I do not know.—Lord Justice A. L. Smith: I think you may be informed of it when you read the letter.—Mr. Harrison said that no definite arrangements seemed to be able to be made. Mr. Justice Ridley said that he could not take the case on January 11, or at any other time. They all knew the pressure of business in the Queen's Bench Division, and he (Mr. Harrison) could not see that any injustice would be done by asking that the case should go before another Official Referee. Mr. Justice Ridley had said that he did not wish to take the case at all. He had also said that it was only under great pressure that he agreed to have his name put in the Order in the first instance. They had taken steps to get an early appointment—before Christmas, if possible—and to keep them tied up in that manner was not, he submitted, fair to the parties.—Lord Justice A. L. Smith said that he and his learned brothers were entirely of opinion that it was a case which ought to go back to Mr. Justice Ridley. He did not think that any other man could do in the time that which he could. Mr. Justice Ridley had gone at great length into the matter, and had come to the conclusion that the contract should be torn up and the case decided on *quantum meruit*. The Court of Appeal, however, had come to a different opinion. When Mr. Justice Ridley came to sit on the case he could soon find what the damages were to be. He (Lord Justice A. L. Smith) was convinced that if the matter went before another referee the whole of the 22 days already spent by Mr. Justice Ridley in trying the case would be thrown away, which would not be the case, however, if it again went before him. Probably his brother Ridley, after finishing the business of this circuit, and before going on another, could find time to take the case, and so be of great use to the parties. The learned Judge's time too would not be thrown away.

RATING OF WATERWORKS RESERVOIRS.—The principle upon which waterworks reservoirs should be rated was at issue at the Teddington Petty Sessions recently, when the Hampton District Council sued the Southwark and Vauxhall Water Company to recover £145 for rates alleged to be due on their Hampton reservoir. The contention of this and the other water companies at Hampton is that they are only obliged to pay rates upon one-fourth of the assessed values of their reservoirs, as they come within the exempting clause of the Public Health Act applying to land covered with water. Mr. Courthorpe Munro, for the plaintiffs, said that the reservoir was built up with high embankments and concrete walls and floor. He admitted that the practice for years had been to exact a one-fourth rate only on reservoirs, but urged that an old decision against the similar exemption of docks had never yet been applied to the case. Mr. Ryde, for the defence, quoted a decision in the High Court that a filter-bed, even when built on arches, was "land covered with water," for this purpose. The Chairman said the Bench must decide the case from a common-sense point of view, and as a company that sold petroleum would be fully rated on its iron tanks, so should the water company be on its concrete tanks. A case for appeal was granted.

IMPORTANT TO LONDON ARCHITECTS.—A Tribunal of Appeal sat at the London Surveyors' Institution on Friday for the purpose of hearing and adjudicating upon an appeal brought under the London Building Act by Mr. H. F. Kite, of Saxonholme, Victoria-avenue, Westgate-on-Sea, against the London County Council. Mr. H. F. Rawlinson was counsel for the appellants, and Mr. Seager Berry appeared for the London County Council. In the case for the appellants it was shown that he proposed recently to erect a number of residential flats at Ronald's-row, at the rear of Highbury-terrace, Islington. The plans were submitted in due course, after approval by the Islington Vestry, to the London County Council, who eventually refused to sanction them on the ground that the height of the proposed buildings exceeded the height permitted by the Building Act, and on the ground that the frontage line was not in accordance with the terms of the Act. Mr. Seager Berry, at the outset, objected to the appeal being heard, inasmuch as the Council, and not the superintending architect, had refused the application, and that under the Act the decision of the Council could not be set aside. A long legal argument ensued, and eventually the Tribunal held that the decision of the Council was irrevocable. Permission was given to the appellants to withdraw, and this was accordingly done.

LONDON SCHOOL BOARD ARBITRATION AT POPLAR.—Mr. Under-Sheriff Burchell and a special jury, at Red Lion-square, Holborn, on Tuesday, heard the case of "Kelly v. the School Board for London," a claim for about £1,400 as compensation for the compulsory sale of the leasehold interest in Nos. 25, 27, 29, and 31, Dee-street, Poplar. The expert witnesses for the claimant were Mr. A. J. Sheffield and Mr. Frederick Ball, while Mr. Samuel Walker and Mr. Eason gave evidence for the Board. The jury returned a verdict for £1,075, or £5 below the formal offer of the Board, and, as a result, the claimant will have to pay his costs. The jury added an expression of approval of the way in which the Board conduct compensation cases.

RE SAMUEL ELLIOTT.—The bankrupt, formerly trading as a joinery and moulding manufacturer at Broad-street House, and Newbury, failed in March, 1895, and applied on Saturday for an order of discharge. The ranking liabilities were returned at £65,241, but proofs amounting to £117,531 have been made by creditors, and the assets which were valued at £8,553 are stated to have realised only £3,788. It appeared from the debtor's statement, that for about thirty-seven years prior to the date of the receiving order he traded at Newbury as a builder and contractor, but for the last eight years of the period as a joinery and moulding manufacturer. During the latter part of the trading he also had a London office at Broad-street House. During the six years immediately preceding the receiving order he was mainly engaged in developing and exploiting certain patented inventions for the annihilation of smoke and fumes. The bankrupt ascribed his failure to losses in respect of his patented inventions, and estimated that about three-fourths of his liabilities were incurred in connection therewith. The application was opposed by the Official Receiver on various grounds. Mr. Registrar Giffard said that 700 or 800 writs appeared to have been served upon the bankrupt in the space of five years, and about 500 executions levied during the same period. The natural inference was that the bankrupt was in a state of insolvency, and that he had gone on trading with a knowledge of his position, especially as he was in the habit of getting persons to accept bills, for which he paid them at the rate of 5s. each. Under all the circumstances the discharge would be suspended for four years from this date.

THE WESTMINSTER IMPROVEMENT.—At the Westminster Town-hall, on Wednesday, Mr. Troutbeck, Deputy High Bailiff, and a special jury heard the case of Mellor's Trustees v. Her Majesty's Office of Works, a claim for £28,000 as compensation for the freehold interest in premises at the corner of Parliament-street and Great George-street, Westminster, occupied by the Aërated Bread Company. The property is let on a lease expiring in 1907 at £700 a year. Mr. Tewson, Mr. Bousfield, and Sir Whittaker Ellis were among the claimants' expert witnesses; while Mr. Robert Vigers, Mr. Galsworthy, and Mr. Horne gave evidence for the Crown. The jury returned a verdict for £26,000.

The unique 16th-century font cover at the parish church of Cockington, Devon, has just been restored by Messrs. Harry Hems and Sons, of Exeter.

STAINED GLASS.

ST. STEPHEN'S, COLEMAN STREET.—This classic church of Wren's is to have a "Jubilee" window, which is being unveiled with ceremony to-day, The subject is the "Stoning of Stephen," and a large figure of that saint occupies the centre portion of the window above the subject. It is the gift of Mr. John Farrand Clarke (who was a parishioner for 50 years) to commemorate the 60th year of the reign of Queen Victoria, and was designed and executed by Messrs. Heaton, Butler, and Bayne, of London.

CHIPS.

A statistical return lately published shows that in Germany many women take part in building operations. Among them are 309 masons, 2,000 workers in marble and slate, and 53 roofers.

Dr. Jonathan Hutchinson, F.R.S., a London physician, has expressed his desire of founding an Educational Museum in his native town of Selby, Yorkshire.

The following candidates have satisfied the Examiners in both parts of the Examination in Sanitary Science at Cambridge University:—Albert J. Adkins, Andrew Balfour, Philip L. Benson, William M. Brown, George H. Cock, William S. Cook, Robert Dick, Charles R. Elliott, Reginald A. Farrar, Sinclair Gillies, Charles H. Graham, Michael Kelly, Andrew J. Laird, Cecil F. Lilley, Alfred T. McConkey, Reginald J. Millard, Thomas B. Stedman, and James R. Watson.

Notices have been given for the construction of a light railway in the Isle of Sheppey. The proposed line is to run from Leysdown, at the extremity of the island, through Eastchurch and Minster to Queenborough, where it will connect with the Sittingbourne and Sheerness branch of the London, Chatham, and Dover Railway.

A window has been fixed in Kelly Church, Devonshire, in commemoration of the Queen's Jubilee. The work has been executed by Messrs. Lavers and Westlake, of Bloomsbury. The window represents the three patron saints, St. George and the Dragon in the centre, and St. Andrew and St. Patrick on either side.

The Museum and Art Gallery Committee, of the Birmingham Corporation have accepted on behalf of the city a characteristic landscape, entitled, "Warwickshire," by Mr. C. T. Burt, and presented to the city by Mr. Mackenzie. The picture was last year in the collection of the Royal Society of Artists. The subject is the great and finely-wooded district of which Kenilworth Castle is the centre.

Barclay Free Church, Edinburgh, which has been closed for the last three months, has undergone extensive alterations and improvements. These comprise the repainting and decorating of the church, the introduction of an electric organ by Mr. E. Hope Jones, electric lighting of the church, the cushioning of all the pews, and other minor improvements. The architects for the alterations are Messrs. Sydney Mitchell and Wilson; the decorating is by Mr. James Clarke, George-street; the electrical works by the Waverley Electrical Company. The total cost of the various improvements has been over £2,000.

A new parish church is being erected at Flookburgh, North Lancashire, from the designs of Messrs. Austin and Paley, of Lancaster. It is Early English in style, and consists of a nave 62ft. by 23ft., having a massive western tower rising to a height of 53ft. only. There is also a chancel, and the north and south aisles are carried through from east to west. The fittings will be of pitch-pine, except the choir-stalls, which will be of oak.

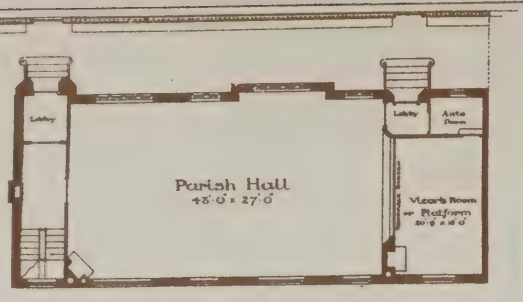
The London and South-Western Railway have definitely decided to make a new line connecting Budleigh Salterton with Exmouth. This will give a circular route, bringing Sidmouth and Salterton closer to Exeter than at present, and will insure both places becoming much better known. During last week Mr. Galbraith, engineer of the London and South-Western, Mr. Drew, land agent to the company, and Mr. Chamber, agent to the Hon. Mark Rolle, were in the district, and the necessary steps for acquiring possession of the land and for obtaining powers to proceed with the construction of the line will be taken almost at once.

Mr. A. T. Nowell's canvas "The Expulsion of Adam and Eve," now in the Autumn Exhibition at Liverpool, has been purchased for the permanent collection at the Walker Art Gallery for £1,050.

The parish church of Langtoft, near Stamford, was reopened, after restoration, last week. The roof of the north aisle has been reconstructed, and the parapet and north wall repaired. The work has been executed by Mr. Cave, carpenter, &c., Langtoft; Mr. F. D. Cave, mason, Market Deeping; and Mr. J. Plowright, plumber, Market Deeping, under the superintendence of Mr. J. C. Traylen, architect, Stamford.

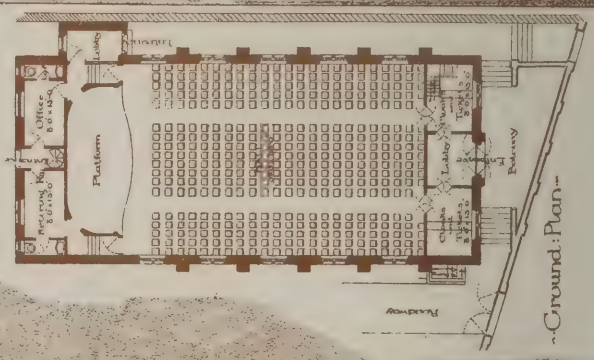
ST CUTHBERT'S · PAROCHIAL · HALL

DARLINGTON



Ground Plan

MESSRS CLARK & MOSCROP ARCHTS



NEW · TOWN · HALL · STANHOPE · MESSRS CLARK & MOSCROP · ARCHTS

"PHOTO-TINT" by James Akerman, 6, Queen Square, London, W.C

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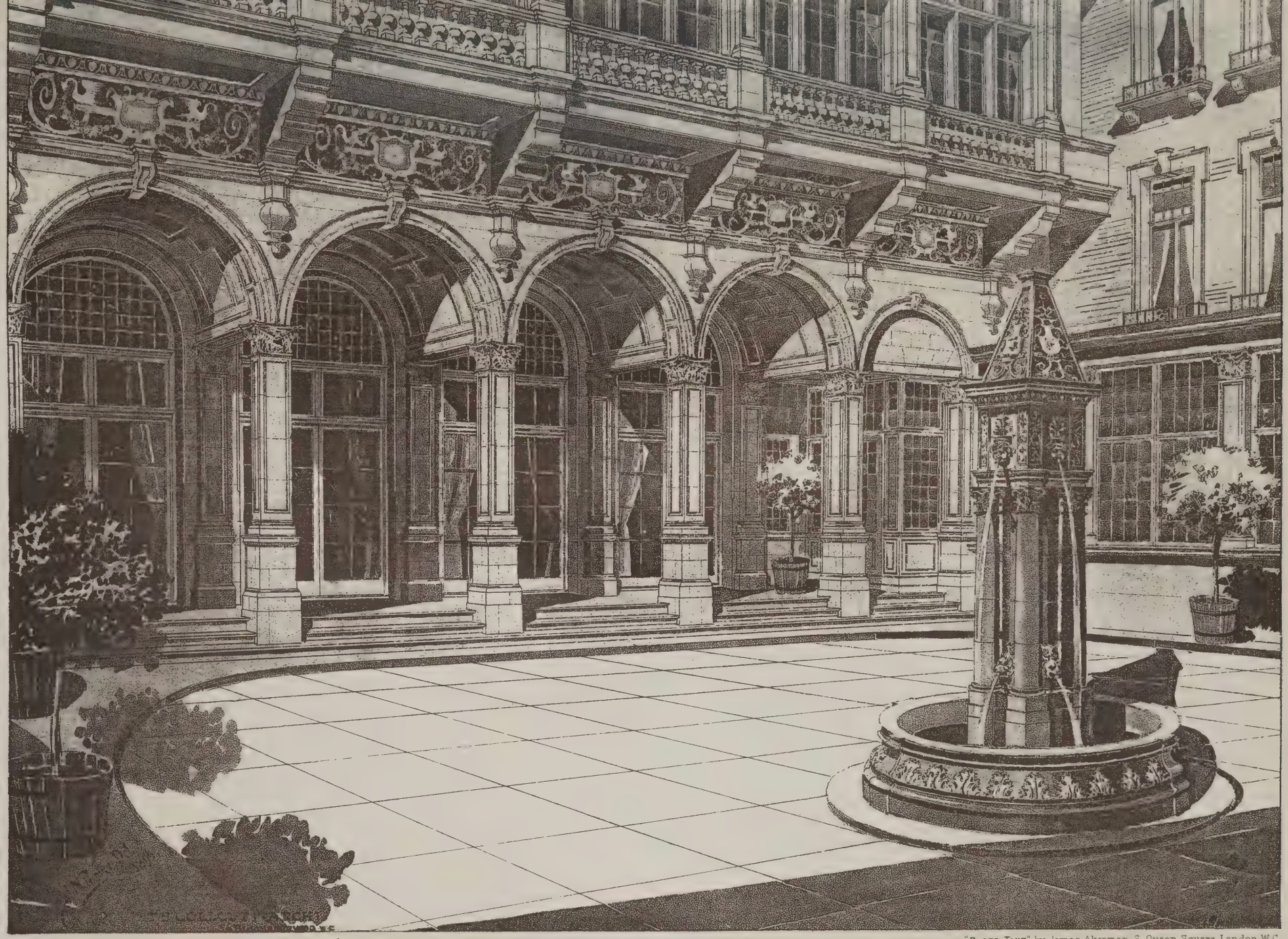

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ADDITIONS TO THE SAVOY HOTEL THOS. E. COLLCUTT F.R.I.B.A. ARCHT

BUNGALOWS AT HERNE BAY

MESSRS WIMPERIS & ARBER ARCHTS

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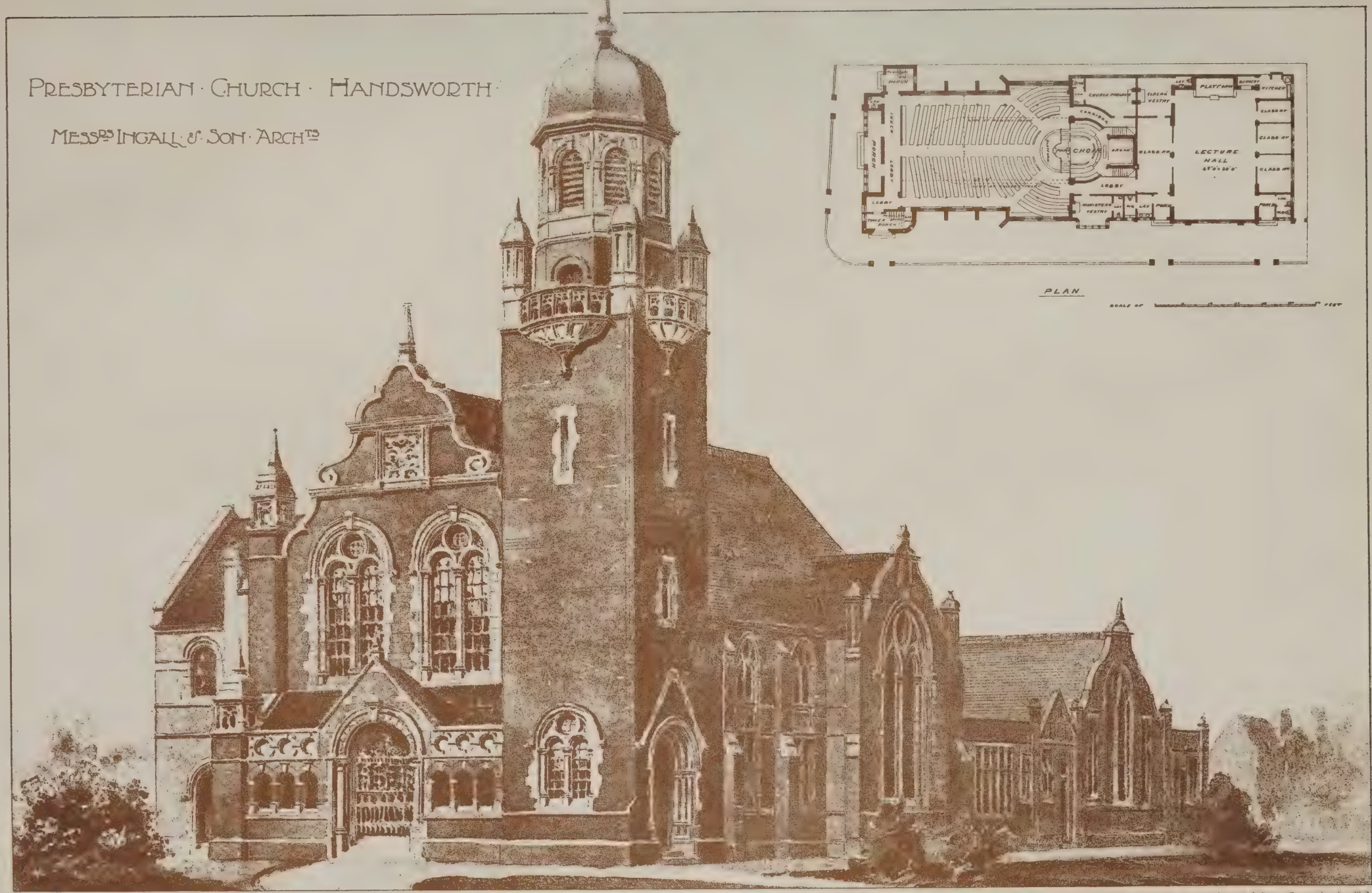
THE PASSMORE-EDWARDS CONVALESCENT HOME HERNE BAY FOR THE FRIENDLY SOCIETIES A. SAXON SNELL F.R.I.B.A. ARCHT

PRESBYTERIAN · CHURCH · HANDSWORTH ·

MESSRS INGALL & SON · ARCHTS



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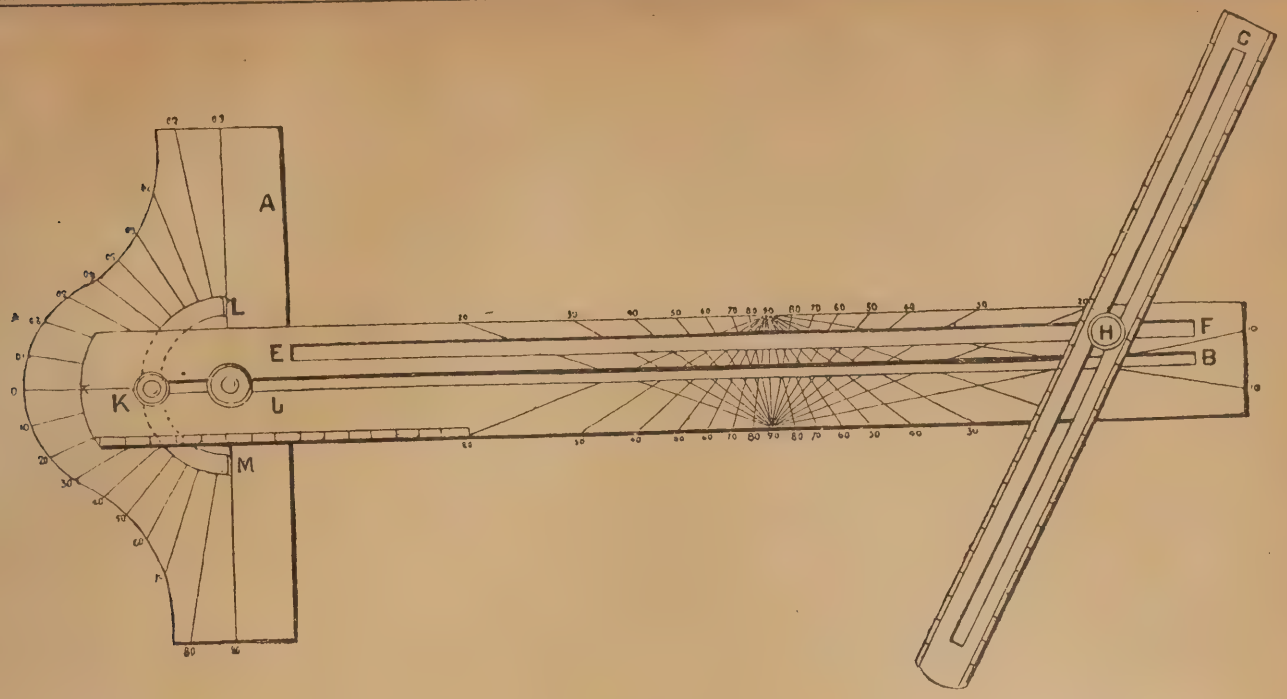

Correspondence.

A UNIVERSAL TEE-SQUARE.

To the Editor of the BUILDING NEWS.

SIR,—In your issue for Oct. 22 you illustrate a new folding tee-square. I would, therefore, like to draw your attention to a tee square I invented some twenty years ago. By means of this instrument and a pencil all the kinds of rectilinear drawing required in a draughtsman's office can be performed. As you will see from the illustration in the inclosed circular the instrument consists of a blade and headstock and a movable arm; the blade works in a semicircular slot in the headstock, whereby the blade can be set at any angle with the headstocks betweeen, by means of the slot in the blade, the latter can move backwards and forwards transverse to the headstock, thus enabling the scale, by chords engraved on the blade, to be brought into arc whenever desired on the paper. By means of the arm that moves in a second slot in the blade any number of parallel lines may be drawn in any position on the paper. It would occupy too much space to describe the instrument in detail; but my object in drawing your attention to the instrument is this: I did not patent it, and I think that, perhaps, if attention were drawn to the instrument in your columns, perhaps some mathematical instrument-maker would feel interested in it to make such an article. If so I shall be pleased to send such a one, or anyone else, a descriptive circular concerning same, and, at the same time, I would say that I have no ulterior motive than obtaining publicity for the article, as I should be only too pleased to see it become an instrument in general use. A few reasons why the instrument was not exploited may appear necessary. When I first invented it the only suitable material I could obtain was copper. I had a model made in the metal, and, after showing it to Mr. John Livain, and the editor of your contemporary, the *Illustrated Carpenter and Builder*, who both expressed their approval of it, I submitted the instrument to Mr. Browning, optician, of the Strand, who promised to exploit it if I could find a more suitable material than copper (the weight of which militated against the easy handling of the instrument. After trying boxwood (which was too brittle), ebonite, zinc, &c., I gave up the matter as hopeless. Aluminium at that time was exceedingly high in price. Now, however, that that metal is cheaper, there could not be found a more suitable material for the construction of the invention, as aluminium is both light in weight, yet hard and durable. In 1880 (Sept. 11) the editor of the *Furniture Gazette* published an illustration and description of the instrument, and at the Health Exhibition I exhibited the model I had had constructed. Now, if any reader cares to take up the exploitation of the instrument, I shall be pleased to send him a descriptive circular and full permission to do what he likes with the instrument without asking for any remuneration.—I am, &c.,

H. C. STANDAGE.

Erdington, Birmingham, Oct. 25.

ARCHITECTS' COMMISSIONS.

SIR,—I send you a copy of a letter that has been sent to Messrs. Norton and Co., Ltd., makers of chimneypieces, Corporation-street, Birmingham, and I should be glad if you could make some reference to it..—I am, &c.,

CHARLES E. BATEMAN, A.R.I.B.A.,
President.

Birmingham Architectural Association,
Queen's College, Paradise-street.

GENTLEMEN,—We have received copies of your illustrated catalogues, with slip attached, offering 5 per cent. special discount to architects.

We beg to point out that this amounts to the offer of an illicit commission, and that its acceptance is against the rules of the Royal Institute of British Architects and this Association, besides being contrary to the practice of respectable architects and a most reprehensible, and immoral proceeding.

We beg to say we are laying the matter before the councils of the Association and the Institute, and that we are sending copies of this letter to the professional papers.

CHARLES E. BATEMAN, A.R.I.B.A., President.
HERBERT R. LLOYD, A.R.I.B.A., Vice-President.

IRISH AND ENGLISH ARCHITECTS.

SIR,—With some knowledge of Ireland and the Irish, kindly allow me to endorse the remarks of "Goth" in your issue of the 8th ult. The architectural profession in Ireland is, as a whole, behind the times. There must be some offices where the leading assistant is an Irishman, but I did not hear of one. Englishmen, and Englishmen only, seem to be required as chief assistants. The reason is obvious. Not only are the latter more capable, but they get through much more work in a specified time. Irishmen are splendid orators. It is also interesting to note that it was left to an Englishman to start the new Association.

Although an Englishman is very acceptable in Ireland in a subordinate position, it seems nearly useless for him to take a place as principal. The fact that he is an Englishman tells against him. This feeling is not reciprocated in England.

"Wire-pulling" takes first place. One wonders where its equal is to be found, as also the barefaced manner in which it is done. The worst part of it is that it is nearly always done under the cloak of religion. "Protestant *versus* Catholic" is victuals and drink to an Irishman.

The advertisement of 18 months ago is not the slander Mr. Butler would have us believe; I think he must have his eyes on the wrong office. Anyway, assistants cannot come to any harm by making careful inquiries before undertaking a somewhat expensive and tedious journey by land and sea.

One can but hope that "Goth's" letter may have the effect of stirring the architectural profession in Ireland to greater efforts—there is much room for improvement.—I am, &c.,

A GHOST THAT WALKED.

CHIPS.

The Duke of Devonshire is supporting a scheme for a light railway in East Sussex. The line will start from Berwick, and proceed by way of Alfriston and Littlington to Birling Gap, where a new watering-place will probably be developed.

A Perpendicular window in St. Michael's Church, Lichfield, has been filled with stained glass representing the Ascension. Mr. A. O. Hemmings, of London, was the artist.

The Montagu Institute and Working Men's Club in Hartford-road, Huntingdon, which has been erected by the Earl of Sandwich in commemoration of his year of office as Mayor has just been opened. It is faced with white bricks, and red quoins, labels, and cornice, with Broseley and blue ornamental tiles and red brick octagon chimneys. The length of the front is 72ft., and the depth is 76ft. The entrance hall, 17ft. by 15ft., has to the right and left reading-rooms, each 24ft. by 11ft., and opposite the entrance through another pair of doors is the lecture-hall, 46ft. by 24ft., and 17ft. high. All the floors throughout the building are laid with wood blocks. The work has been carried out by Mr. Page, of Buckden, under the personal supervision of Lord Sandwich.

In the parish church of St. Ive's, Cornwall, the Archdeacon of Bodmin has dedicated a painted window and a reredos to the memory of the late Archdeacon Reginald R. Hobhouse, who was rector of the parish for half a century. The window has been carried out by Percy Bacon Bros., of Newman-street, London, from suggestions by the architect, Mr. G. H. Fellowes Prynne. The reredos is in carved oak, the work of Messrs. Powell, of Whitefriars, London.

When the inclusive contract just closed by the Dublin United Tramwavs Company and given to the British Thomson-Houston Co., Limited, for the entire equipment with electric traction of that portion of the tramway system now worked by horses is completed, Dublin will be in the position of possessing the largest tramway system operated electrically in the British Isles, covering, as it will, over 100 miles of track, on which will be operated over 200 motor-cars.

The flint casing on the south wall of the tower of the 14th-century parish church of Poynings, at the base of the Devil's Dyke, has just been renewed, under the direction of Messrs. Clayton and Monk, architects, of Brighton. Further repairs are urgently needed, and an appeal is being made for funds to enable the villagers to have them executed.

The Glasgow Tramways Sub-Committee on Electric Traction considered, on Monday, a number of offers for the erection of the entire plant, excepting only the cars, connected with the new Springburn electric tramways route. It was agreed to recommend the acceptance of the lowest offer, that of the Westinghouse Company, an American firm. The offer amounts to £19,657. All the tenders submitted were by American firms.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and Sixpence for every eight words after. *All Situation Advertisements must be prepaid.*

NOTICE.

Bound copies of Vol. LXXII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

SCOTCH MASON. (1. Rivington's or Allen's. 2. Lawrence Harvey's. Both of B. T. Batsford, 94, High Holborn, W.C.)

RECEIVED.—P. D. R.—W. F.—N. B.—H. S. P. and Co.—S. W. C.—E. P. J. and Son.—W. D.—W. A. B.

Intercommunication.

QUESTIONS.

[11831.]—**Bright-Red Cement.**—I would be extremely obliged if you would let me know what parts are required to make a very bright-red cement for compo. work? Whether red oxide is the best permanent colouring, or brickdust of the same coloured bricks as what part of the front might be faced with, or Venetian red?—J. B.

[11832.]—**Blue Prints.**—I shall be glad to know the method adopted in making blue prints and the materials required?—R. M.

[11833.]—**Painting Galvanised Roofing.**—Some galvanised corrugated iron roofing has recently been erected to my order, and one friend advises me to coat the outside of it with boiled linseed oil, and, when it is set, to paint all with the coat of oxide of iron paint so as to preserve it. Another friend advises me to wait some time until the "salts of the galvanising" are out, and then to cover with two coats of oxide of iron paint without previously coating with boiled oil. Which method is recommended, or can you advise a better way of treating the roof?—MUCH ADVISED.

[11834.]—**Section of Girder.**—Will someone kindly tell me how to calculate the required section of a rolled iron girder when the loads are neither in the centre nor equally distributed? Also, what is the safe working stress for steel?—L. H.

REPLIES.

[11823.]—**Farm Building.**—I think "Modern Farm Buildings: their Construction and Arrangement," by A. D. Clarke, would give "Onstead" all the information he requires. The author is Silver Medallist of the Royal Agricultural Society for plans of farm buildings, and his work is recommended in the syllabus of the Surveyors' Institute examinations, published by B. T. Batsford, price 6s. net.—NUTTA.

[11830.]—**Carvers' and Joiners' Workshops.**—One of the finest workshops in the provinces is Mr. Harry Hems', of Exeter. These are lighted east and west, and were designed by Mr. Medley Fulford, Exeter. I believe I have seen all the principal workshops in England, and know of none better adapted to the business referred to.—EDWARD VALE, Weston-Super-Mare.

[11830.]—**Carvers' and Carpenters' Workshops.**—My own premises, rightly or wrongly, have the goodly reputation for being the finest of their kind in the world. I erected them upon two acres of freehold land in 1881, from the designs of Mr. R. Medley-Fulford, F.R.I.B.A., then of this city, but now rector of St. Andrew's, Grenada, West Indies. The Ordnance Survey Map for 1891 shows the actual premises, 270ft. in length. They are built of local red brick, with Corsehill dressings. A perspective sketch of the first half that were erected (the other half was put up in 1884) will be found in the BUILDING NEWS issue for March 30, 1883. From my own observation, I believe the next best premises are those of Messrs. Poyer Bros., at Louvain, in Belgium. Although extensive, there is nothing architectural about them; but they have the advantage of being all on one floor (I have three floors), and have a splendid light. Messrs. Allin and Kitson, of New York, have undoubtedly the largest place for carvers and artistic joinery work in Christendom; but theirs are shops added to from time to time, and many of these additions are of necessity of a somewhat temporary kind. When one of the genial partners of this excellent Transatlantic firm was in Europe a few years ago, and ran down here purposely to see my place, after going over it, he turned, and, shaking my hand warmly, said emphatically: "Well, dear sir, I guess these studios take the cake on both sides. And I only say this after seeing the best of all of them!" Pullman's Palace Car Works at Pullman City, near Chicago, is the place where I have seen the most woodcarvers congregated together at one time. There were several hundred of them, working at a double row of continuous benches, the rear ones in a particularly poor light. They were all on piece-work, and I was astonished (I am speaking of the World's Fair year, 1893) at the low money most of them were able to earn; it was certainly less than the same class of men would be paid in England. If "Provincial Architect" will come down, and take lunch with me (any day convenient), it will afford myself and sons pleasure afterwards to give him the run of our studios. A north light is, of course, the right one.—HARRY HEMS, Exeter.

CHIPS.

At the meeting of the Liverpool Architectural Society, held on Monday evening, a paper was read by Mr. Huon A. Matear, F.R.I.B.A., on "The Birth and Development of Architecture."

At the instance of the London County Council, the owner of a house in South-grove, Highgate, was summoned to the local police-court on Monday to show cause why he should not pull down the top story of the rear portion of the house, including a defective timber framing next to the adjoining house. Evidence was given by Mr. Frederick Hammond, the district surveyor for North St. Pancras, that the premises were in a very dangerous state, and that the work was imperative. The Bench stated that an order would be made for the work to be done in 21 days.

A conference of delegates representing Metropolitan vestries and district boards was held on Monday at the Camberwell Vestry-hall, when a resolution was carried in favour of the Government acquiring the Crystal Palace as a permanent place of instruction and recreation. It was stated that the cost would be about three-quarters of a million, which, if spread over the Metropolis, would mean a rate of one-eighth of a penny in the pound.

The formal opening of the St. Patrick's Elementary Catholic Schools, Cornwall-road, Lambeth, took place on Monday. The total cost of the building and site has been £6,000, the greater part of which has already been defrayed. The schools, which will accommodate 230 boys and girls, are divided into two departments—an infant school and a junior mixed school. A small church dedicated to St. Patrick has also been provided.

A new lighthouse is being completed at Tod Head, near Kinnett, on the Kincardineshire coast. The building is 50ft. in height, and stands on a cliff of twice that altitude, and near by are dwellings for three families of the keepers. The builders are Messrs. Watson and Sons, Glasgow.

The new hospital, Bridport, is being warmed and ventilated by means of Shorland's patent Manchester stoves with descending smoke flues, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

On Tuesday, Wednesday, and Thursday in last week, Mr. Joseph Abbott, Local Government Board arbitrator, sat in the Council Chamber, Waterford, to value the sites acquired for the abattoir, artisans' dwellings, &c., about to be erected by the corporation under the powers obtained by the Act of Parliament passed in 1896. Mr. M. J. Fleming, borough surveyor, and Mr. J. F. Knot, law adviser, stated the case for the corporation.

Next year's Navy Estimates will include some important proposals for the improvement and addition to the barracks occupied by the Portsmouth Division of the Royal Marine Light Infantry, the Lords of the Admiralty having sanctioned plans, to carry out which will cost £3,000. It is also proposed to connect the Naval Barracks and Gunnery School, Whale Island, to the mainland by a swing bridge, for which nearly £5,000 will be asked.

STATUES, MEMORIALS, &c.

DRURY LANE THEATRE.—The Lord Mayor unveiled on Monday afternoon the fountain, which has been erected in the Catherine-street wall of Drury Lane Theatre, as a memorial of the late Sir Augustus Harris. The fountain, which was designed by Mr. Sidney R. J. Smith, F.R.I.B.A., York Buildings, Adelphi, W.C., as hon. architect, is built of granite and red Mansfield stone, and has bronze enrichments. The base is of polished Norwegian granite and Sicilian marble. The water is delivered from a lion's head, and above the basin is a panel illustrative of dramatic art, having figures carrying masks. Above this panel rises a Classic pediment supported by two polished granite columns having drums at the base and musical instruments in bronze carved on them. Under the pediment, which has Tragedy and Comedy masks, and a central lyre, is a niche containing a bust of the late Sir Augustus Harris, modelled and worked in bronze by Mr. T. Brock, R.A., and having the name "Augustus Harris" inscribed underneath on a bronze panel. We illustrated the fountain in our issue of May 14 last.

A Local Government Board inquiry was held at Penzance on Tuesday week by Colonel A. C. Smith. The town council had applied for power to borrow £6,624 for purposes of street improvements, pleasure grounds, and the provision of a borough surveyor's house.

The new volunteer-drill hall at Eastgate, Barnsley, was formally opened by Colonel Stanhope, C.B., on Friday. The premises have been built at a cost of £4,000. They comprise on the street level a drill-hall 85ft. by 45ft., with a drill-shed of similar dimensions beneath it. An armoury, smoke-room, officers'-rooms, clothing-rooms, caretaker's premises, &c., are also provided. The architect is Mr. H. Crawshaw.

The ceilings and walls of St. Mary's Church, Birmingham, are being decorated by Messrs. Horton and Son, of Bristol-street, according to a scheme of colour prepared by Messrs. Bateman and Bateman, architects, based upon the Italian Renaissance of the 15th century, various tints being arranged upon a cream ground. Messrs. Jeffery and Son have executed the various structural works. The opening service, to be taken by the Bishop of Worcester, will be held on Saturday, November 21.

Before Mr. Justice Wright and Mr. Justice Kennedy on Saturday, an appeal was heard, "Baker v. Williams," from a conviction by Southport justices of a dairyman and cowkeeper for contravening a by-law of the Southport Corporation which provided that in cow-sheds in the borough there must be 800c.ft. of free air space for each animal. It was contended for the appellant that the by-law was *ultra vires* and invalid, but their lordships took an opposite view, and affirmed the conviction.

An appeal is being circulated among English Churchman here for the erection of an Anglican cathedral for the diocese of Brisbane, Southern Queensland. A site has been secured, and designs have been prepared by Mr. J. L. Pearson, R.A., who considers that the first part of the cathedral (that being the choir and transepts, accommodating about twelve hundred worshippers) can be erected for about £33,000. Only about £3,000, however, has yet been raised, including £1,000 from the Society for Promoting Christian Knowledge.

The partnership hitherto subsisting between Louis Jacob and J. A. Brand, architects, Gresham-street, E.C., under the style of Jacob and Brand, has been dissolved. A similar announcement of dissolution of partnership appears in Tuesday's *Gazette* with reference to M. H. Agar and A. Musgrave, builders, of Sheffield.

Notices have been given of intention to apply for powers to construct light railways between the Metropolitan Railway Station, Finchley-road, Hampstead, and the adjoining suburbs of Finchley and Hendon by the Finchley District Electric Traction Company.

The London County Council discussed, on Tuesday, the request of the City Corporation for a grant of £16,620, towards the cost of widening Ludgate-hill near St. Martin's-court. As the Council had once before refused to entertain this application, on the ground that the improvement had already been made, objection was made to reopen the matter. Finally, however, the grant was agreed to, on the understanding that it was made under exceptional circumstances, and must be accepted as a final settlement of any outstanding claims.

The Lord Mayor and Sir Edward Poynter, the president of the Royal Academy, with Mr. Temple, the director of the Guildhall Art Gallery, viewed, at the Pantechnicon on Tuesday, the pictures which Mr. D. P. Sellar has offered to present to the Corporation of London as the nucleus of an art collection in the City. The result of their inspection will be made known to the Corporation, and to Mr. Sellar at an early opportunity.

WATER SUPPLY AND SANITARY MATTERS.

CASTLEFORD SERVICE RESERVOIR: SINGULAR FISSURE.—The district council of Castleford have received the report of Mr. Malcolm Paterson, M.Inst.C.E., on the state of their service tank on Red Hill, which is almost without precedent in this country. A huge fissure extends across the entire surface of the bottom, 2ft. to 5ft. in width, and 28ft. deep. This was laid bare some months ago, after the sudden disappearance of the contents of the tank when the concrete bottom was partly removed. The reservoir site is on the Permian formation, the strata consisting of magnesian limestone lying in a compact sand-bed almost indurated to rock. This rock yields the best moulder's sand, which has been excavated for many generations by mining in long galleries with supports and adit entrances. The workings extend for miles and have been proved to approach within a few feet of the reservoir, and probably extend below it on the side. By exposure to air and the infiltration of water, they have gradually crumbled and fissured, causing leakages from the tank, which in their turn have accelerated the waste and the subsidence, and have caused the ruin of the tank. An inspection of these workings was necessary, though attended by danger from loose rock in the roof. In Mr. Paterson's report a previous proposal to buttress the north side by a retaining wall, arched on plan, is set aside as a futile and hazardous operation. Instead of this, he proposes to construct a new reservoir holding 1,250,000 gallons on a new site on adjacent ground to the west of the present tank, which appears to be the only suitable site not honeycombed by the sand workings; but even here he considers that five or six borings, not less than 50ft., are indispensable to prove the ground. The present population of Castleford is 17,000, having increased from 6,271 in 1871. The cost of the new reservoir, if open, is estimated at £3,250, or if covered at £4,700. At the request of the council, Mr. Malcolm Paterson, C.E., has recently reported on the present condition and working of the main drainage system, including the pump-well and tank-sewer. After a detailed examination and certain tests, his conclusions are (*a*) that the stability of the works, which were constructed from his designs in 1877, is intact in all respects, the work being as good as when it left the contractor's hands; (*b*) that the permanent influx of subsoil water by leakage is insignificant, but that certain open lands are drained direct into the system; (*c*) that flushing of a systematic kind has not been used, although each manhole was designed as a flushing shaft, and that the whole of the main outfall and branch sewers, and parts of other sewers, are in urgent need of flushing: (*d*) that the storm water off streets and large yard surfaces should not be taken into the sewers, which were not designed to receive more than the storm water from roofs and small yards, &c. Besides temporary measures, such as cleansing the sewer from the accumulation of solids, Mr. Paterson recommends certain automatic flushing-tanks, self-acting flushes in the tank sewer, storm overflows, revolving screen, &c., at a cost of £1,200. This outlay, he considers, with proper management, will render the Castleford drainage system thoroughly efficient. The river Aire at Castleford is only 28½ft. above sea-level, and the town lies so low as to be subject to surface floods in certain places. Hence the existence of flat gradients and the need of constant flushing. Also, the sewage being pumped 45ft., renders it essential to keep out the subsoil water and the bulk of the storm water. Since the scheme was carried out, at a cost of about £30,000, Castleford has doubled its population, and is still increasing at a rapid rate.

GLASGOW.—An important extension of the Glasgow Sewage Purification Works was inaugurated on Friday by Lord Provost Richmond. The works, which are situated at Dalmarnock, in the east end of the city, were opened in May, 1894, and have consequently been nearly three years and a half in operation. For the site a sum of £35,461 was paid, and a further sum of £86,026 was spent on works and machinery, making a total of £121,488. As then in operation, there was a total daily flow of sewage into the works every twenty-four hours of between five and six million gallons, from which the solids were extracted, and the liquid rendered inocuous by chemical treatment and precipitation. Since then additional sewers have been connected with the works, bringing the aggregate daily inflow up to about ten million gallons. The extensions consist of eighteen precipitation tanks, built of brick, with concrete floors, each 100ft. by 40ft., with a water-holding depth of 7ft. These extensions were designed by Mr. A. B. M'Donald, the city engineer, on the lines of the scheme originally carried out by the late Mr. Alsing, the first engineer of the works, but with improvements, and they bring up the total storage capacity from two to five million gallons. After the inauguration ceremony the company inspected a new land filter, through which the purified effluent finally passes before its exit into the river. They also saw in operation the plant for drying the sludge, recently erected at a cost of over £2,000. Including cost of site and drying plant, the total expenditure on the works up to date amounts to £134,540.

CHIPS.

Colonel C. H. Luard, R.E., held an unopposed inquiry at Willenhall, on Friday, on behalf of the Local Government Board, at the Town Hall, with regard to an application by the district council for permission to borrow £2,129 for sewerage works, and £2,000 for cemetery purposes,

The City Commission of Sewers adopted an arrangement on Tuesday for acquiring the freehold of No. 97, Fleet-street, for £5,000, with a view to extending the widening now in progress on the south side of that thoroughfare from the Circus at Ludgate.

The celebrated French engraver, Charles Courtry, died in Paris on Tuesday from an attack of paralysis. He was only forty-nine years of age. Among his most important works are the "Game of Cards," from Pieter de Hoock's painting; "The Condemned Convict," from Munkacsy's picture; "The Austrian Staff in the Presence of Marceau's Corpse," painted by Jean Paul Laurens; and "The Wife and Children of Holbein," engraved from the famous picture in the Balse Museum.

In connection with the reopening of the parish church of St. Martin's-in-the-Fields, after decoration and alterations, effected from Sir Arthur W. Blomfield's designs, by the proceeds of the Queen's Jubilee Procession, it is proposed to hold a Masonic Service on Sunday next, at half-past three o'clock.

It is proposed to place in Bristol Cathedral a reredos to cost £2,500, and a bishop's throne to cost £700, both designed by Mr. J. L. Pearson, R.A. The cost of the former will be met, it is suggested, by subscriptions raised as a memorial of Bishop Ellicott on severing his connections with Bristol, and that of the latter by personal friends in Stepney of Dr. Browne.

Before Mr. Justice Lawrance and a special jury, on Wednesday, Mr. James Orrock, the well-known landscape artist, sued the proprietor of the Café Monico for damages for injury sustained by him at the café, when the cork of a bottle of potass which was being opened for him by a barmaid flew out and struck him in the eye, inflicting injuries which had seriously interfered with the practice of his profession. He estimated his loss at £1,000. The jury ultimately awarded him £300.

The church of St. Lawrence, Tidmarsh, Berks, has been reopened, after having undergone a complete restoration, from Mr. Oldrid Scott's plans. The nave roof has been stripped and the old plaster done away with, new rafters substituted where defective, and the roof boarded. The tiles are replaced as far as possible, and the rest made good with old ones of a similar kind. The chalk chancel arch, which had several fissures, has been supported on the outside by two buttresses of stone and flint. The decayed wooden steeple is replaced by one of oak shingles, which bears the gridiron as a vane. The modern floor below the belfry floor has been removed, thus exposing to view the ancient oak framing of the turret.

The west entrance archway to the organ of Hazelbeach Church has just been occupied by a memorial screen. It is executed mainly in Hopton Wood stone and alabaster, terminated by a rich pediment of ornamental ironwork. The design was by Messrs. Forsyth and Maule, architects, and was executed by Mr. James Forsyth, of Finchley-road, Hampstead.

At the London County Sessions, on Wednesday, before Mr. M'Connell, Q.C., Hermann C. Halliday, 41, surveyor, was convicted of having obtained £11 5s. on false pretences from Mr. Joseph Burton, a builder. He had obtained the money as payment of rent in advance on behalf of Dr. Monte, of Kensington-gore, who had let Mr. Burton a house, and then appropriated it to himself. It was stated that the prisoner had been twice previously convicted of similar offences, and he was sentenced to 15 months' hard labour.

Mr. James Paton, Curator of the Glasgow Corporation Art Galleries, delivered to a large audience on Tuesday night in the galleries the opening address for the season on the contents of the galleries, his subject being "Italian Art—Introductory."

Mr. Thomas Quinn, Nationalist Member of Parliament for Kilkenny from 1886 till 1892, when he retired owing to ill health, died at his London residence in St. Alban's Mansions, Kensington, on Wednesday night. Born in 1838, he started early in life as a builder, and, coming to London, rapidly created an extensive and lucrative business.

At Tuesday's meeting of the Altrincham Urban District Council it was agreed, on the recommendation of the General Purposes committee, to advertise for competitive designs for new offices, the cost to be limited to £4,000.

Our Office Table.

THE arrangements for the Mediæval and Modern Metal-Work Exhibition at the Royal Aquarium in April next are progressing favourably. The council of advice have adopted schemes for the workmen's competitions and competitive designs, both sections promising to be extremely interesting, especially the former, thanks mainly to the help of Mr. Lewis F. Day and Mr. Maurice B. Adams, who have very kindly and ably helped the Council with designs and suggestions. Particulars of both competitions will shortly appear. A very good Loan Exhibition is certain, and the applications for space—which should be addressed to the organiser, Mr. E. S. Shrubsole, at the Royal Aquarium, Westminster—are already numerous.

PROFESSOR GERALD BALDWIN BROWN delivered in the hall of Free St. Andrew's Church, Drumsheugh Gardens, Edinburgh, on Tuesday, the first of a course of twenty lectures on Italian Art, arranged for by the committee of the Edinburgh Social Union, and illustrated by lime-light pictures. Italian sculpture and painting, the lecturer said, was one phase of the art that from its subjects and tone had been called Christian. The expression of Christian ideas in art varied from age to age. In the earliest mosaic designs these ideas were treated with reserve, while in the middle ages that reserve gave place to an over-insistence on theological doctrines, and to an almost morbid delight in depicting the sufferings of saints or the terrors of the world to come. The didactic element in art became in this way too prominent. In the present day it was often denied that art could exercise any legitimate ethical influence. There was a certain truth in that doctrine; but in the crude form it took sometimes it was belied by the whole history of the arts. Sculpture and painting could, however, most effectively exercise their ethical influence by presenting pure and elevated types and actions that might be left to work an ennobling influence on the spectator. This truth was recognised in the later Middle Ages, though it was not the Italians who first discerned it, but the French. The sculpture on the French Gothic cathedrals presented types of purity and sweetness and heroism, and the work was all pervaded with a fine sense of beauty. In many of the qualities most admirable in the works of the early Italians they had been preceded by the sculptors of northern France nearly a century earlier. If we asked the reason why the Italians, beginning later, advanced so much further in art than the French, the answer would be found in the development among the former of individual genius. Without the action and reaction on each other of strong and original personalities, sculpture and painting never advanced to their highest forms.

A PROPOSAL for the widening of Southampton-row, between Theobald's-road and Holborn, will shortly be presented to the London County Council for adoption. The Improvements Committee report that their attention had recently been called to the fact that premises might shortly be in course of reconstruction at Southampton-row, and that, therefore, a favourable opportunity was presented for widening that thoroughfare. During negotiations with reference to the purchase of property for widening the southern end of the thoroughfare it had transpired that the Duke of Bedford was the freeholder of the whole block of property bounded by Southampton-row, Theobald's-road, Kingsgate-street, and Holborn, and that the leases of all the property, with the exception of one or two sites upon which rebuilding had already taken place, had not many years to run, in fact, most of them would expire in 1901, and they had been led to believe that the Duke would be quite prepared to negotiate for the sale to the Council of his freehold interest in the whole of that large block of property. The estimated net cost of the scheme, including the acquisition of the freehold and the two long leasehold interests in the entire block of property between Southampton-row and Kingsgate-street, was, after allowing for recoupment by sale of the surplus land, £149,500. The proposal would be to purchase the freehold and long leasehold interests in the first instance, and to allow the short leases to run out, the Council in the meantime receiving the rents.

THE small playground between Drury-lane and Catherine-street, known as the Russell-court playground, and traditionally said to be the

churchyard indicated in Dickens's "Bleak House," will shortly be closed to the public. It has an area of 4,050ft., and has been much used by the children who live in the densely crowded neighbourhood. The Duke of Bedford, contemplating carrying out certain improvements in the district, including the formation of a new street across this playground, asked the London County Council to consent to the removal of the playground to another site. It was proposed on behalf of the Duke of Bedford that in exchange a piece of land 4,320ft. in area, and situated in Duke's-court, Drury-lane, should be set apart for a playground. In consideration of the exchange the Council consented to an application being made for a faculty for the ground in Russell-court, which is a disused burial-ground, being used as part of a new street. The faculty asked for has now been granted. It transpires, however, that the owner of the fee was the rector of St. Mary-le-Strand, and that the Council had only a short tenancy of the land in Duke's-court. As the Council, therefore, have nothing to convey, the question of substituting another playground has been dropped. The matter came before the Council on Tuesday, when Alderman Beachcroft called attention to the extraordinary circumstances; but although consideration of the report was adjourned, it seems that the Council are helpless.

At the last meeting of the City Court of Common Council a petition was presented by a number of leaseholders and occupiers in London-wall and Finsbury-circus with reference to the proposed improvement in those thoroughfares. Appended to the petition was a report by Mr. D. Watney and Mr. G. A. Wilkinson, in which these well-known surveyors remarked that it was stated that the total annual rents derived from the property was £3,486, and that if let as cleared ground it would produce approximately £20,000 a-year. From their survey they had come to the conclusion that the annual value of the property proposed to be dealt with was rather over £16,000, whereas, if cleared and the scheme carried out, the ground rents would come out at not more than £15,500. With regard to the scheme generally, they could not but feel that the London-wall and Blomfield-street shops were doomed on account of the necessity of widening those streets, but these shops should not all be demolished at one time; nor did they see any reason why the premises at the rear of these shops should be much interfered with in the rebuilding. The proposed new road was hardly the best method of developing that side of the estate, inasmuch as it would be useless as a thoroughfare, and consequently of no value for shop property. In their opinion there was no good reason for pulling down the houses in Finsbury-circus, as they were of a substantial character, with a good life of 30 to 40 years before them. In conclusion, they had no hesitation in condemning a scheme for the clearance of the houses and premises standing on 2¼ acres in such a busy part of the City of London. The petition was referred to the Bridge House Estates Committee for consideration.

The work of restoring Maclise's two frescoes in the Royal Gallery of the Palace of Westminster, upon which, at the request of the First Commissioner of Works, Prof. A. H. Church, F.R.S., and his assistants have been engaged for some time, has been completed this week, the result of the special treatment, so far as can be at present ascertained, being regarded as of a most satisfactory character. The two frescoes in question—"The Meeting of Wellington and Blucher at Waterloo," and "The Death of Nelson"—have been thoroughly dusted and cleaned with bread before being submitted to the restoring process, which has been carried out successfully in regard to the paintings by G. R. Herbert, R.A., Sir John Tenniel, W. Dyce, R.A., and W. C. Horsley, R.A., in other parts of the building. Mr. Herbert's fresco was so hopelessly decayed, owing to the influence of the London atmosphere, that the professor had to content himself with merely washing the surface with distilled water, whereas in the case of others, notably Mr. Dyce's "Baptism of Ethelbert," the result of the treatment has been not only to render it once more visible from the floor of the Peers' Chamber, but to largely restore it to its original colour effect.

The parish-church of Oldbury-upon-Severn was destroyed by fire on Sunday morning. Before seven o'clock the whole of the walls had fallen in, the roof and the interior of the tower, together with the bell, having fallen some time previously. With the exception of the two porches the building is an entire wreck, the walls of the tower being completely split. The one bell was melted, and the freestone on each arcading is broken and cracked. The huge and ancient font, which was of one stone, is also destroyed. The registers, which were kept in the vestry beneath the tower in a safe, were all consumed, the safe, when it was possible to reach it, being found to be red hot and cracked. The damage sustained is estimated to be from £3,000 to £4,000. The church, situated on an eminence a short distance from the Severn, occupied the site of a Roman camp, and was a stone building of the Early English style. There was originally a spire, which was blown down in 1702. In 1885 and 1886 the church was restored, and the south aisle and porch rebuilt.

In the course of the past summer, in consequence of a sifting of certain traditions found among the residents on the Ruthin side of the Hiræthog Mountains, Mr. R. O. Jones, of Ruthin, has carried out a search over that almost uninhabited region for archæological remains, and has succeeded in finding nine stone circles that were hitherto unknown. Some of the circles are perfect, and others imperfect, the latter having probably been deprived of stone for building purposes. The outside of each circle is composed of large stones, and, in those circles that have not been tampered with, the outer stones are twelve in number. The diameter of the circle ranges from 18ft. to 48ft. Mr. Jones has been in communication with Prof. Rhys, of Oxford, who holds that the remains are far more ancient than the Ogam inscribed stone found in the same region, and now at Pool Park, Ruthin. Mr. J. Romilly Allen, F.S.A.Scot., regards the circles as probably Pagan. They are sepulchral, and often have a cist in the centre, containing an urn or calcined bones.

The roof over Robinson's opera-house, in Cincinnati, fell in during a performance a few days ago, and three persons in the audience were killed and many injured. Mr. Rapp, the president of the Cincinnati Chapter of the American Institute of Architects, who inspected the ruins immediately afterwards, has pointed out what was unquestionably the cause of the accident, by showing that the middle roof-truss, which was of pine, 80ft. in span, had given way, partly through the shrinkage which always unfavourably affects wooden trusses put together with iron bolts, and partly, as it appeared, through rotting at the joints. The roof has been in place more than 25 years, apparently without attention, and it is hardly surprising that it should be in bad condition; and the middle truss, which is most exposed to the influence of the warm and moist air from the auditorium, usually, in such cases, gives way first.

The union carpenters in New York threaten a new and extensive strike, on account of the use in the city of wood finish made in the West, particularly in Cincinnati and St. Louis. The cities, being near the hardwood forests of Tennessee, Kentucky, and Missouri, are favourably situated for selecting and working such material, and for many years, mouldings, doors, panel work, and flooring, in oak, ash, and cherry, have been extensively made there, generally from architects' detail drawings, and shipped to the Eastern cities.

The new annual Directory of the Science and Art Department, just published, announces several important changes, one of these being that building grants for new schools, hitherto made to local authorities in many instances, are to be discontinued, except in the case of applications which have already been entertained, and the income derived from instruction in science or art must be applied for purposes approved by the Department.

In the little parish church of Wonastow, two miles from Monmouth, the Bishop of Landaff has dedicated a new window, a three-light one, by Mr. C. E. Kempe. It represents the Incarnation, the centre light showing the Blessed Virgin and Holy Infant, the side lights representing the Magi and Shepherds.

At a special meeting of the Leigh and Astley Joint Burial Board on Thursday in last week, it was unanimously decided to approve of the plans and estimates for a new cemetery in Manchester-road, Leigh, adjoining the old cemetery, and to obtain the sanction of the vestries to the borrowing of £13,068 for that purpose. The new cemetery will contain over 14 acres, and provide 14,000 grave spaces. Almost all the spaces in the old cemetery, which was opened 41 years ago, are taken up.

MEETINGS FOR THE ENSUING WEEK.

Monday.—Surveyors' Institution. Opening Address by the President, Christopher Oakley. 8 p.m. Bristol Society of Architects. "Mediæval Bristol," by Col. J. R. Bramble. 8 p.m.

Tuesday.—Institution of Civil Engineers. "The Manchester Ship Canal," by Sir E. Leader Williams; with supplemental papers by Wh ately Eliot and W. O. E. Meade-King. 8 p.m.

CHIPS.

The erection of a cottage hospital at Thetford as a memorial of her Majesty's Diamond Jubilee, is being rapidly proceeded with by Messrs. Boughton and Son, builders, of that town, from the designs of Mr. Herbert J. Green, architect and surveyor, of Norwich.

Torquay Town Council are about to proceed with the erection of a refuse destructor, which was approved twelve months ago. Tenders are invited for the preparatory buildings.

At a special meeting of the Hastings Corporation it was resolved to carry out a scheme to obtain a supply of water for the borough from Brede Valley, where experiments have been made with the result that is is believed an abundant quantity of water of the purest quality can be drawn. The total cost of the scheme is estimated at £131,873.

A land surveyor, named William Henry Petitt, living at 64, Argyle-street, Hull, committed suicide on Wednesday evening in last week by shooting himself with a revolver. He was 64 years of age, and has been for some years unable to follow his profession.

Steps are being taken for proceeding forthwith with the erection of the Diamond Jubilee Tower on Castle Hill, Huddersfield, in accordance with the designs of Mr. Isaac Jones, of Herne Hill, S.E., selected in the recent competition.

The proposal of the Manchester Corporation to expend a quarter of a million on the construction of a sewage culvert to the estuary of the Mersey has been rejected by the ratepayers by 49,069 votes to 20,528.

At Nursling, Hants, a church room, erected by Messrs. Golding, of Romsey, was opened last week. It is of red brick, measuring 45ft. by 16ft., and is seated for 140 persons.

At New Pellon, Halifax, the Liberal Club of the Western division of Ovendon Ward opened their new premises on Saturday. The building is of a plain character, and the outer walls are of brick. On the ground-floor is the billiard-room, allowing space for two tables, and on the first floor is the assembly-room, furnishing accommodation for four hundred persons. The total cost will be £600. The architect is Mr. Medley Hall, of Northgate, Halifax.

A once celebrated sculptor, Professor Luigi Amici, died on Sunday in Rome. He was born in 1813 at Jesi, and being early left an orphan, was received into the charitable foundation of San Michele by Cardinal Tosti. Amici was educated as an artist, and soon made brilliant progress, commissions flowing in upon him when he left the institution. His best-known work is the fine monument to Gregory XVI. in St. Peter's, which was erected to the memory of that Pope by the Cardinals whom he had created. After over eighty years of varying fortunes, the sculptor returned to die in the asylum where he had been educated, in the department reserved for poor old men.

The dispute between Langholm Burgh Commissioners and Mr. M. Knox, Langholm, contractor for the repair of Langholm Suspension Bridge, has now gone to the law courts for settlement. Mr. Knox has been served with a summons in an action against him in Dumfries Sheriff Court by the commissioners to compel him to proceed with the repair of the bridge and use such wood as was specified for. The contractor has commenced a counter-claim against the commissioners. The dispute arose from the inspector of work condemning the wood being used by the contractor.

The temporary injunction, restraining the Commissioners for the Harrisburg Capitol from carrying out their proposition to act themselves as judges in a new competition has been dissolved by the County Court of Common Pleas for Pennsylvania; but by mutual consent the question is to be carried up on appeal to the higher courts.

A town-hall and premises in St. James's-square, Bristol, rebuilt from plans by Mr. J. Young, of that city, will be opened on Tuesday next.

The last of the summer excursions of the Northern Architectural Association was held on Saturday afternoon, when a party of 15 members were conducted by Mr. J. W. Taylor over the new Y.M.C.A. buildings, and the alterations to Messrs. Bainbridge's premises. Mr. J. T. Cackett conducted the members over the recent Art Gallery alterations.

LIST OF COMPETITIONS OPEN.

Byfleet—Village Hall and Workmen's Club (£1,500 limit)	25 Guineas	F. C. Stoop, Hon. Sec., Albany House, Byfleet, Surrey	Nov. 13
Southend—St. Alban's District Church	No premium offered; no Assessor named	Rev. E. C. Kimber, Avenue-terrace, Southend-on-Sea	,, 20
Edinburgh—Heating and Ventilating City Fever Hospital	Premium not stated	City Superintendent of Works, Edinburgh	,, 25
Wells City—Public Hall	£25, £15, £10	Reginald L. Foster, City Clerk, 1, Cathedral-green, Wells, Somerset	,, 30
Mexico—Legislature Palace (1,500,000dol. limit)	15,000dol. Mex.	Secretary Public Works, Mexico City	,, 30
Cardiff—Town Hall and Law Courts (A. Waterhouse, R.A., Assessor—£200,000 limit)	£500 (merged), £300, £200	J. L. Wheatley, Town Clerk, Town Hall, Cardiff	Dec. 4
City Corporation—Bronze Diamond Jubilee Medal	£20, £15, £10	Sir J. B. Moachton, Town Clerk, Guildhall, E.C.	,, 6
Nottingham—Laying-out and Planting Basford New Cemetery.	£100, £50	Samuel G. Johnson, Town Clerk, Nottingham	,, 15
Dorking—Workhouse Infirmary (£4,000 limit)	(No first) £15, £5	Geo. Scales, Clerk to Guardians, 35, High-street, Dorking	,, 15
Nottingham—Designs for Basford Cemetery Buildings: Chapels, Crematorium, Lodges, &c.	£100, £50	Samuel G. Johnson, Town Clerk, Nottingham	,, 15
Menai Bridge—Landing Pier (£3,000 limit)	£40	Thos. Hughes, Clerk, Min-y-Den, Menai Bridge	,, 16
Bootle—Fire Brigade and Police Stations (£14,000 and £1,500 limits)	50 Guineas, 25 Guineas	J. H. Farmer, Town Clerk, Bootle, Lancs	,, 31
Crick—Water-Supply Scheme (3,100 population)	15 Guineas, 5 Guineas	Joseph Pym, Clerk, Belper	(1898) Jan. 8
Carlton, Victoria—Children's Hospital	£100, £50, £25	J. Nicholson, Hon. Sec., Pelham-street, Carlton, Australia	(1898) ,, 30
Port Elizabeth—Free Library (Assessors, Sir F. Blaine and R. H. Hammersley-Heenan—£20,000 limit)	100 Guideas, 50 Guineas	G. Cettle, Librarian, Port Elizabeth, S.A.	(1898) Feb. 15
New York—Sun Dial (Plaster Model)	500dol., 250dol.	Sec. National Sculpture Soc., 215, West 57th-street, New York	(1898) ,, 28
Newcastle-on-Tyne—New Infirmary (local Architects)	(No first) £150, £100, £50	Secretary Building Committee, Newcastle	(1898) Mar. 1
Tottenham—School Board Offices	.....	J. F. Adams, Clerk, School Board Offices, Tottenham, N.	—
Bexhill-on-Sea—Promenade Pier and Garden	.....	Secretary, Pier Co., 7, Sackvill-road, Bexhill	—
Blackburn—R.C. Infant School, Dean-street	(No first) £5	The Rector, 48, Islington, Blackburn	—
Dukinfield—Town Hall (£7,000 limit)	£40, £20	Samuel Hague, Surveyor U.D.C., King-street, Dukinfield	—
Peterborough—Additions to the Guildhall (£2,500 limit)	£35 (merged), £15	The Town Clerk, Peterborough	—

LIST OF TENDERS OPEN.

BUILDINGS.

Haswell—Alterations to School	School Board	W. J. Malcolm, Clerk, Easington, Castle Eden	Nov. 6
Swinton—Rebuilding Church	.....	E. Isle Hubbard, M.S.A., Moorgate-street, Rotherham	,, 6
Morecambe—Police Station	Joint Committee	H. Littler, Architect, 21, Pitt-street, Preston	,, 6
Fermoy—Villa	.....	James F. M'Mullen, M.S.A., Architect, 30, South Mall, Cork	,, 6
Haswell—Alterations to School	School Board	W. J. Malcolm, Clerk, Easington, Castle Eden	,, 6
Whitehaven—Kennels for the Eskdale Foxhounds	.....	Mrs. Porter, Randle How, Whitehaven	,, 6
Pontypridd—Additions, White Hart Hotel	John and Co.	A. O. Evans, Architect, Pontypridd	,, 6
Kingussie—Additions to Hotel, Newtonmore	.....	Alexander Mackenzie, C.E., Kingussie	,, 6
Hilderthorpe—House and Shop	W. Moody	J. Earnshaw, M.S.A., Architect, Bridlington Quay	,, 6
Swinton—Rebuilding Church	.....	E. Isle Hubbard, Architect, Moorgate-street, Rotherham	,, 6
Leamington—Greenhouse at Whitnash-road Cemetery	Corporation	H. Consett Passman, Town Clerk, Leamington	,, 6
Maryport—Additions to Wesleyan Chapel	.....	C. Eaglesfield, Architect, Maryport	,, 6
Balsall Heath—Cottages and Stabling at Edwardes-street	Public Works Committee	John Price, City Surveyor, Council House, Birmingham	,, 6
Leeds—Three-story Factory at Byron-street Mills	.....	J. J. Mosley, Estate Agent, 6, Wormald-row, Leeds	,, 6
Morecambe—House and Two Shops in Queen's-square	Equitable Industrial Co-op. Society.	James Marsball, Architect, Back-crescent, Morecambe	,, 6
Lydford—Two Villas and Stables	.....	Wiblin and de Boinville, Architects, 95, Old Town-street, Plymouth	,, 6
Leamington—Alterations to Pumproom Baths	Corporation	H. Consett Passman, Town Clerk, Leamington	,, 6
Fermoy—Villa	.....	J. F. McMullen, M.S.A., 30, South Mall, Cork	,, 6
Bishopstone—Additions to the True Heart Inn	Godwin Bros.	William Drew and Sons, Architects, 22, Victoria-street, Swindon	,, 6
Durham—Alterations, Queen's Head Hotel	.....	A. Stockswell, Architect, 11, Pilgrim-street, Newcastle	,, 6
Hoole—Repairs to Workhouse	Chester Board of Guardians	J. H. Davies and Sons, Architects, Newgate-street, Chester	,, 6
Aberdeen—Additions to St. John's Church	.....	A. Clyne, Architect, 123½, Union-street, Aberdeen	,, 6
Berwick—Alterations to Premises, High-street	Dunlop and Co.	Stevenson and Son, Architects, Berwick-on-Tweed	,, 6
Ipswich—Alterations and Additions to Boys' Middle School	.....	J. S. Corder, Architect, Wimbourne House, Ipswich	,, 8
Torquay—Refuse Destructor, Upton	Town Council	Henry A. Garrett, A.M.I.C.E., Engineer, Town Hall, Torquay	,, 8
Stonehaven—Lodging-House	Commissioners	J. and J. A. Souttar, 42, Union-street, Aberdeen	,, 8
Great Horton—Shop and Two Houses	.....	S. Spencer, Architect, 344, Great Horton-road, near Bradford	,, 8
Broadway—Fire Engine Station	Parish Council	John Morris, Clerk, The Green, Broadway	,, 8
Hailsham—Fever Hospital	Rural District Council	Mitchell and Ford, Architects, 2, Langney-road, Eastbourne	,, 9
Ulverston—Workhouse Alterations	Board of Guardians	C. W. Dean, Clerk, Ulverston	,, 9
Dufftown—Double House, York-street	.....	Jas. McWilliam, Albert-place, Dufftown, Elgin	,, 9
Maryport—Enlargement, Glasson School	Ellenborough School Board	G. W. Turney, Solicitor, Maryport	,, 9
Sheffield—Stables	Corporation	Chairman, Highway and Sewerage Committee, Town Hall, Sheffield	,, 9
Ilkley—Three Houses, Skipton-road	.....	Rhodes Calvert, Architect, 4, Forster-square, Bradford	,, 9
Wimbledon—Repairs to Pumping Station, Durnsford-road	Urban District Council	W. H. Whitfield, Clerk, Broadway, Wimbledon	,, 9
Ulverston—Additions to Sick Ward of Workhouse	Guardians	Chas. W. Dean, Clerk, Ulverston	,, 9
Keighley—Store, Lawkholme-lane	Industrial Co-op. Society, Limited	John Haggas, Architect, North-street, Keighley	,, 10
Homerton, N.E.—Alterations to Children's Homes, Sidney-rd.	Hackney Union	Frank R. Coles, Clerk, Hackney Union, Homerton, N.E.	,, 10
Tynewydd—Rebuilding Llanharran Arms	.....	A. O. Evans, Architect, Pontypridd	,, 10
Stoke-upon-Trent—Alterations at Workhouse	Guardians	C. Lynham, Architect, Stoke-upon-Trent	,, 10
Blackburn—Alterations to Shops, Sarah-Ellen-street	Co-operative Society	Simpson and Duckworth, Architects, Blackburn	,, 10
Gedney—Infants' School at Drove End	School Board	Richd. P. Mossop, Clerk, Long Sutton	,, 11
Southborough—Additions to Gasworks	Urban District Council	P. Hammer, Clerk, Southborough	,, 11
Marlborough—County Police Station	Standing Joint Committee	Charles S. Adye, County Surveyor, County Offices, Trowbridge	,, 11
Poplar—Additions to Public Baths	Poplar Vestry	Clarkson Bros., Architects, High-street, Poplar	,, 11
Ossett—Shop and Warehouse	Co-operative Society	John Kirk and Sons, Architects, Dewsbury	,, 11
Halifax—Engineer's Tool Shop, Union-street South	.....	Arthur G. Dalzell, Architect, 15, Commercial-street, Halifax	,, 12
Carlisle—Two Houses, Aglionby-street	.....	G. Armstrong, Architect, 75, Lowther-street, Carlisle	,, 12
Bramley—Twelve Houses and Two Shops	.....	J. P. Kay, Architect, Park-row, Leeds	,, 12
Swindon—Two Pairs of Semi-Detached Villas, Springfield-road	T. H. Deacon	W. H. Read, M.S.A., Corn Exchange, Swindon	,, 13
Hawes—Market Hall	.....	J. P. Kay, Architect, 31, Prudential-buildings, Leeds	,, 13
Hampton Court—Reconstructing Chapel as Coach-house, Stabling, &c.	.....	Harry Tagg, Thames Hotel, Hampton Court Bridge	,, 15
Hornsey—Central Public Library	Urban District Council	E. J. Lovegrove, Surveyor, Southwood-lane, Highgate	,, 15
Lynton—Cottage at New Mill	.....	G. C. Smyth-Richards, Surveyor, Barnstaple	,, 15
Lancaster—Additions to Girls' School, Middle-street	.....	Austin and Paley, Architects, Lancaster	,, 15
Plymouth—New Markets	Corporation	J. H. Elles, Town Clerk, Plymouth	,, 15
Neath—Smith's Arms Hotel	E. Evans Bevan	J. Cook Rees, Architect, St. Thomas's Chambers, Neath	,, 15
Acton, W.—Fire-engine Station, High-street	Acton District Council	D. J. Ebbetts, Surveyor, 242, High-street, Acton	,, 16
Fenwick—Converting Wesleyan Chapel into Parish Rooms	Parish Council	Thos. Latham, Fenwick, Northumberland	,, 16
Walton-le-Dale—Engineers' Cottage at Sewage-Disposal Works	Urban District Council	F. E. Dixon, A.M.I.C.E., Engnr, Bank Chambers, Fishergate, Preston	,, 17
London, S.W.—Flues and Chimneys, South-Western Hospital.	Metropolitan Asylums Board	T. Duncombe Mann, Clerk, Norfolk House, Norfolk-street, W.C.	,, 18
Burnham-on-Crouch—Seven Coastguard Houses	Admiralty	Director of Works, Admiralty, Northumberland-avenue	,, 19
Thorne—Renovating Wesleyan Chapel	.....	J. Wills, F.S.A., Derby	,, 19
Ystradygylais—Coelbren Schools	School Board	R. Morgan, Callwyn, Neath	,, 20
Brentwood—Extension of Clerk's Offices at Asylum	Visiting Committee	W. P. Gepp, Clerk, Chelmsford	,, 22
Lewisham, S.E.—Coroner's Court and Mortuaries, Ladywell-rd.	Lewisham Board of Works	Surveyor's Department, Lewisham Town Hall, Catford, S.E.	,, 23
Ballyhaise Station—Two Cottages	Great Northern Railway, Ireland	T. Morrison, Secretary, Amiens-street, Dublin	,, 25
Buenos Ayres—Central Railway Station (cost, 4,000,000 piastres)	.....	Legation of Argentine Republic, London	Dec. 26
Leeds—Caretaker's House, Whingate-road School	Leeds School Board	W. Packer, Clerk, School Board Offices, Leeds	—
Armley—Two Houses in Whingate	.....	Ambler and Bowman, Architects, 9, Market-place, Leeds	—
Whitehead, Belfast—Villa Residence	D. J. Lanigan	Thomas Pentland, Architect, 35, High-street, Belfast	—
London—Additions to House at 5, Whitehall Gardens	.....	R. Curwen, A.R.I.B.A., 149, Bishopsgate-street Without, E.C.	—
Aylesbury—Three Shops and Houses, Cambridge-street	H. J. Goodey	W. F. Taylor, Architect, Aylesbury	—
London, E.C.—Three Blocks of Artisans' Dwellings in Moira-place and Plumbers'-place, City-road	Shoreditch Vestry	H. Mansfield Robinson, Clerk, Town Hall, Old-street, E.C.	—
Hillsborough—Two Houses	.....	T. Peckett, 19, Wood-road, Hillsborough, Sheffield	—
Ashton-under-Lyne—Cottages	A. B. Wilkinson	Eaton, Sons, and Cantrell, Architects, Stamford-st., Ashton-u-Lyne	—
Haydon Bridge—Cottage Villas	.....	George Tyzack, Tyne View, Haydon Bridge	—
Carlisle—Offices at Caldewgate	Carr and Co.	Johnstone Bros., Architects, 39, Lower-street, Carlisle	—
Bridlington Quay—Villa	.....	John M. Dossor, A.R.I.B.A., Architect, 2, Manor-street, Hull	—

BUILDINGS—*continued.*

Aston-cum-Aughton—Additions, Swallow-Nest Schools	School Board	W. Dust, 40, Bank-street, Sheffield	—
Harrogate—Cabman's Shelter		H. E. and A. Bown, Architects, Harrogate	—
Stowe—Small Farmhouse, Lea Heath	Stowe Charity	W. H. Walley, Architect, Queen-street, Burslem	—
Sowerby Bridge—House in Clifton-street		S. Wilkinson, Architect, Sowerby Bridge	—
Rushwood—Lodge	T. Willans Nussey, M.P.	H. E. and A. Bown, Architects, Harrogate	—
Barnsley—Eleven Houses		Wm. McCoy, Wellington-street, Barnsley	—
Margate—Additions to Hope and Anchor p.h., High-street	W. W. Wooder	A. Latham, Architect, 15, Cecil-square, Margate	—
Rochford—Cottage		Rainbow Cottage, Ashingdon, Rochford	—
Manchester—Premises	Grange Park Dairy Co.	E. W. Leeson, 49, Princess-street, Manchester	—
Ashton-under-Lyne—Seven Houses, Stockport-road		Edward Garside, Architect, Town Hall Chambers, Ashton-u-Lyne	—
Knottingley—Stables, Lamb Inn	Carter's Brewery Company	Tennant and Bagley, Architects, Pontefract	—
Aberdeen—Offices on Annfield, Hazelhead		D. Rose and Co., Union-street, Aberdeen	—
Donaghadee—House on Shop, High-street	Mrs. Davidson	T. Portland, Architect, 35, High-street, Belfast	—
Belfast—Rebuilding Licensed Premises and Two Houses, Peter's Hill	Francis M'Kenna	John J. O'Shea, Architect, 16, Chichester-street, Belfast	—
Truro—Passmore Edwards' Buildings Central Technical Schools for Cornwall		Alfred Blenkinsop, Secretary, Truro	—
Tallow, Co. Waterford—Alterations to Rectory, West-street	Select Vestry	Rev. J. R. H. Becher, M.A., Tallow	—
Shrewsbury—Additions to Premises, Castle Foregate	Industrial Co-operative Soc., Ltd.	Architect, Co-op. Wholesale Soc., Ltd., 1, Balloon-st., Manchester	—
Belfast—Four Houses, Two Shops, & Two Stables, Connswater		H. H. M'Kenna, 51, Ann-street, Belfast	—
Arnside—Two Semi-detached Villas	Elijah Nelson	John Stalker, M.S.A., Architect, Kendal	—
Lingwood—Reading Room	Reading Room Committee	John Broom, Lingwood	—
Sligo—Completing Dominican Church		The Priory, Walkin's-row, Sligo	—
Mossley—Two Cottages, Stockport-road	Oldham Brewery Co.	C. T. Taylor, A.R.I.B.A., Clegg-street, Oldham	—
Mautby—Additions to Rectory		Rector, Mautby, near Great Yarmouth	—
Cork—Alterations to Premises, Knapp's-square	N. Ross	Arthur Hill, A.R.I.B.A., Cork	—
Cork—Two Villas, Douglas-road		D. J. Buckley, Architect, 21, Adelaide-street, Cork	—
Selly Oak—Porter's Lodge at Workhouse, Selly Oak	Guardians of King's Norton Union	Edwin Docker, Clerk, Workhouse, Selly Oak	—
Rochdale—Minister's House at Castlemere	Wesley Circuit Trust	T. Townend, jun., District Bank Chambers, Rochdale	—
Leeds—Two Houses at Street-lane		J. Wray, Spencer-lane, Leeds	—
Walton-on-Naze—Two Shops and Dwelling-Houses	W. B. Greenwood	Chas. E. Butcher, Architect, 3, Queen-street, Colchester	—

ENGINEERING.

Jarrow—Floating Pontoon; also a Steel Girder Bridge	Corporation	J. Petree, Borough Surveyor, Corporation Chambers, Jarrow	Nov. 8
Bangor—Concrete Reservoir (500,000 gallons), Twrgwyn	Water Committee	John Gill, City Surveyor, Bangor	„ 9
Bedlington—Water Supply Works	Urban District Council	C. D. Forster, Clerk, 24, Grainger-street West, Newcastle	„ 10
Victoria—Electric-Light Cables and Fittings	Government	Agent General, 15, Victoria-street, S.W.	„ 10
Liverpool—Engineering Work at Workhouse	Guardians of Toxteth Park	J. Moulding, Clerk, 15, High Park-street, Liverpool	„ 10
Southborough—Water-Mains Extension	Urban District Council	Philip Hanmer, Clerk, Council Offices, Southborough	„ 11
Southborough—Laying Gas Mains (2,400 yards)	Urban District Council	Philip Hanmer, Clerk, Council Offices, Southborough	„ 11
Swindon—Sewage Tanks	Swindon New Town U.D.C.	H. Kinneir, Clerk, Public Offices, Swindon	„ 12
Glasgow—Laying Mains (2,200 yards run)	Corporation	J. D. Marwick, Town Clerk, Glasgow	„ 13
Mundesley—Waterworks	Erpingham Rural District Council	T. Ling, Clerk, Northrepps, Norfolk	„ 13
Heywood—Coke Elevator	Gas Committee	J. H. Baldwick, Town Clerk, Municipal Buildings, Heywood	„ 16
Burnley—Electric-Lighting Cables	Corporation	W. R. Wright, Borough Electrical Engineer, Burnley	„ 17
Leeds—Heating Fever Hospital, Manston	Corporation	Town Clerk, Town Hall, Leeds	„ 18
Blackpool—Electric Traction	Corporation	R. C. Quin, Borough Electrical Engineer, Blackpool	„ 22
Belen Para, Brazil—Water-supply Works	Government	Brazilian Consulate, London	„ 30
Southampton—Pontoon	Harbour Board	E. Cooper Poole, Surveyor, 4, Portland-street, Southampton	Dec. 6
Craiova—Waterworks	Town Council	The Mayor, Craiova, Roumania	„ 7
Ostend—Harbour Works (estimated cost, £496,792)	Official	Provincial Government, Bruges	„ 14
St. Gilles-lez-Bruxelles—Gasworks	Council	The Secretary, 504, Chaussée de Mons, Anderlecht, Brussels	„ 31
Brazil—Railway from Novo Hamburgo to Caxies	Government	Central Directorate, Public Works, Porte Alegre	„ 31
Pernambuco—Port Works	Government	Brazilian Ministry of Public Works, Rio de Janeiro	(1898) Feb. 28
Madras—Utilisation of Water of Periyar Lake		Chief Engineer for Irrigation, Madras	(1898) July 1
Flushing—Two Sluice Gates	Official	Provincial Government, Middelburg, Holland	—

FENCING AND WALLS.

Stockbridge—Dwarf Concrete Wall (600ft. run)	Rural District Council	W. J. Ayles, District Surveyor, Brompton, Stockbridge	Nov. 9
Ravensthorpe—New Wall	Urban District Council	J. Watts, Church-street, Dewsbury	„ 10
Greenwich—Dwarf Wall and Iron Fencing, South-street	District Board of Works	J. Spencer, Clerk, 141, Greenwich-road, S.E.	„ 10
West Hartlepool—Iron Fencing, Burn Valley (1,650 yards run)	Corporation	J. W. Brown, Borough Engineer, West Hartlepool	„ 11
Lancaster—Boundary Wall, Springfield Park	Streets Committee	T. C. Hughes, Town Clerk, Lancaster	„ 13
Keswick—122 yards of Stone Wall, 4ft. 6in. high		Owner, Red House, Keswick	—

FURNITURE AND FITTINGS.

London—Supply for Metropolitan Police Service (Three Years)	Official	The Receiver, New Scotland Yard, S.W.	Nov. 17
Moulsford—Asylum		The Steward, Moulsford Asylum, Wallingford, Berks	„ 17
Crewe—Technical Institute	Town Council	J. A. Jenkins, Secretary, Municipal Offices, Crewe	—

PAINTING.

Porthcawl—East Convalescent Home		S. H. Stockwood, Bridgend, Glam.	Nov. 6
Weston Peverel—Police Station	Parish Council	J. Hawker, Mutley House, Plymouth	„ 6
Bradford—Redecorating Tennyson-place Chapel		J. W. Thorpe, 29, Otley-road, Bradford	„ 6
Ardsley—Three Schools	School Board	Thos. Harper, Clerk, Stairfoot	„ 8
Stairport—Three Board Schools	Ardsley School Board	The Clerk, School Board Offices, Cradley, Leeds	„ 8
Northampton—House, 15, Fish-street	Corporation	W. Shoosmith, Town Clerk, Guildhall, Northampton	„ 12
Sleights Bridge—Two Villas		D. Richardson, Newholm, Whitby	—

ROADS AND STREETS.

Leeds—Forming New Streets off Morris-lane, Kirkstall		J. Braithwaite, 26, Norwood-place, Headingley	Nov. 6
Dewsbury—Sewering and Kerbing Greenwood-street		T. W. Speight, Architect, 28, Boothroyd-lane, Dewsbury	„ 6
Nantymoel—Paving and Kerbing Nantymoel-row, Nantymoel, and Ogmore Vale	Urban District Council	S. H. Stockwood, Clerk, Bridgend	„ 8
Castleton—Making Good Hanover-street	Urban District Council	R. Bruce Wallis, Clerk, Council Offices, Castleton, Manchester	„ 8
Reddish—Road Improvement Works	Urban District Council	Thos. H. Duckworth, Clerk, Council Offices, Reddish, nr. Stockport	„ 9
Hornsey, N.—Making Good Inderwick-road	Urban District Council	E. J. Lovegrove, Engineer, Southwood-lane, Highgate, N.	„ 9
London—Supply and Laying of Asphalte	Bermondsey Vestry	Fredk. Ryall, Vestry Clerk, Spa-road, Bermondsey	„ 10
Levenshulme—Paving and Sewering Six Streets	Urban District Council	James Jepson, 9a, Union-road, Stockport	„ 13
Mickleham—Carriage Drive through Norbury Park Estate	L. Salomons	J. Bastin, Norbury Park Farm, Mickleham	„ 13
Romford—Supplying and Laying Norway Granite Kerb, Victoria Stone Paving, Granite Setts, and Tar Paving	Urban District Council	Geo. Bailey, Clerk, Romford	„ 15
Southend-on-Sea—Works on the Bournemouth Park Estate	Kilworth's Trustees	Wilson and Phillips, Surveyors, Clarence-street, Southend-on-Sea	„ 15
Richmond—Road Works	Town Council	J. H. Brierley, Borough Surveyor, Town Hall, Richmond, Surrey	„ 17
Paignton—Roads and Sewers on the Oldway and Redcliffe Estates	P. E. Singer	R. J. Beadon, 165, Manor-street, Clapham, S.W.	„ 20
Weston-super-Mare—Roadmaking on Smyth-Pigott Estate		Price and Wooler, Surveyors, Weston-super-Mare	„ 22
Altofts—Making Good George, Brook, High, and York Streets	Urban District Council	William Wilkinson, Surveyor, District Council Offices, Altofts	„ 22
Battersea—New Road and Sewers, Hyde House Estate		F. and W. Stocker, Surveyors, 90 and 91, Queen-street, E.C.	„ 22
Mansfield—Forming West Hill-avenue		R. Frank Wallace, Surveyor, Mansfield	—
Shenfield—Roadmaking and Drainage Works		A. T. G. Woods, Surveyor, Brentwood	—

SANITARY.

Ludgate-circus, E.C.—Alterations to Underground Convenience, New Bridge-street	Commissioners of Sewers	H. Montague Bates, Clerk, Guildhall, E.C.	Nov. 6
Tong—Sewers, &c. (1,300 yards)	Urban District Council	John Dufton, Clerk, Council Offices, Tong-street, Dudley Hill	„ 8
Provanmill—Drainage Works	Lanark District Committee	William H. Hill, Clerk, 194, Ingram-street, Glasgow	„ 8
Brighouse—Sewering of Victoria-street	Highways Committee	Emerson Brooke, Borough Surveyor, Public Offices, Brighouse	„ 8
London, E.C.—Laying Pipe Sewers	St. Luke (Middlesex) Vestry	G. W. Preston, Clerk, Vestry Hall, City-road, E.C.	„ 9
Birkenhead—Sewering and kerbing Hillside-road, Tranmere	Corporation	Alfred Gill, Town Clerk, Town Hall, Birkenhead	„ 10
Erdington—Sewerage Works (2,900 yards) at Bromford	Urban District Council	Herbert H. Humphries, Engineer, Public Hall, Erdington	„ 10
Southend-on-Sea—Sewer, West-road, Prittlewell	Corporation	Alfred Fidler, A.M.I.C.E., Borough Surveyor, Clarence-rd., Southend	„ 10
Hilperton—Draining Burial Ground		Walter W. Snailum, Church-street, Trowbridge	„ 11
Kilbirnie and Glengarnock—Drainage Works	Ayrshire County Council	James Barr, C.E., 221, West George-street, Glasgow	„ 15
Rotherham—Sewers, Richmond Park District	Sewerage Committee	H. H. Hickmott, Town Clerk, Council Hall, Rotherham	„ 16
Lytham, Lancs.—Sewerage Works (2,368 lineal yards)	Urban District Council	Henry Bancroft, Civil Engineer, 88, Mosley-street, Manchester	„ 16
Ashington—Sewer, near Hirst	Urban District Council	Charles Anderson, Clerk, Bridge-street, Morpeth	„ 17
Stevenage—House Connections to Main Sewers	Urban District Council	W. Onslow Times, Clerk, Stevenage, Herts	„ 18
Aston Manor—Sewers, Cheston-road and Plume-street district	Aston Manor Rural District Council	H. Richardson, Engineer's Offices, Council House, Aston Manor	„ 23
Launceston—Sewerage Works	Corporation	A. P. I. Cotterell, A.M.I.C.E., Lonsdale Chmbrs., Baldwin-st., Bristol	Dec. 1

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THE LAW OF MATERIALS.

A REVOLUTION in building is almost inevitable if we go on introducing without prevision manufactured materials as substitutes for the natural productions—mineral and otherwise—to which we have been so long accustomed. The increasing use of Portland cement, concrete, and other artificial substances as substitutes for stone has, no doubt, opened the way for a variety of inventions and methods which would have verily astonished, if not alarmed, our forefathers. What would they have thought of whole blocks of buildings constructed of cement concrete—floors of concrete and iron—stairs and landings of artificially-made blocks—window and door dressings, sills and lintels of manufactured stone—which in surface and colour almost equal the natural sand and limestones, and surpass them for qualities of strength, durability, and resistance to fire? They would have been equally astonished to behold inside partitions and ceilings made with materials other than timber lath and lime plaster, of expanded metal lathing covered by manufactured plasters and slabs of great fireproof resistance and strength. The result of these artificial productions has been to diminish greatly the amount of stone and timber in our buildings, and to utilise instead various products till lately thought useless—like slag and clinkers, and mineral fibres of the asbestos kind. That substances formerly accounted of no value and mere waste should have been thus utilised for building construction seems only to be fulfilling an economical law of which our ancestors were almost ignorant. What the consumption of stone and timber might have been if clay products and cement and iron manufacture and other waste materials had not been discovered and taken their place largely, it would have been impossible to say. Building would have become extremely costly, and our supplies of those natural productions very limited.

In the next place it is desirable to notice that with the introduction of artificial compounds like concrete, cementitious stones, cast iron, and other fabrics, the modes of conversion have been changed. To a large extent the saw, the chisel, and other tools have been superseded by moulds, castings, and other apparatus. Stone has to be quarried and sawn into blocks; the stonecutter has to square up the rough stone, to make plane surfaces by hammer and pitching-tool, to cut drafts round the edges, and the surfaces have to be finished with the axe, bush-hammer, and other tools. Every student of masonry knows that several operations are necessary to form a springer, or a skew block for a moulded arch. But with the artificial stone all these labours are reduced: a mould can be made into which the raw materials, sand, and lime are mixed in due proportion, and the stone can be turned out under pressure to the required size and shape, all dressing by hand being dispensed with. Thus tool labour is saved, and moulded work of the most elaborate kind can be turned out at much less cost. Whether the result is so artistic is another matter; but the effect of this simplification of labour is to produce more elaborate details and multiply mouldings. Ornamental carving is also superseded by imitations cast in moulds; but as most architects know, these are spiritless and poor apologies for their existence, for they lack the real motive of carving with the tool. If there is one greater evil than another of being an artist, it is in the employment of moulded or cast ornament—in other words, of being obliged to use a material which can only be adorned by the pattern-maker in his own way. A casting in metal or plaster cannot be like relief or carved stone, because in the first place the material is not the same, and secondly the artist who models is not a stone-carver. The architect has, of course, to face these facts, and the sooner he brings himself to square with them the better. He can at least endeavour to shake himself free from the traditions and trammels which have grown up with the older materials; to look upon the artificial productions as having other conditions, and to try and understand them; but the fatal mistake of the modern average architect is to follow that method which he has been in the habit of using—in other words, to apply the same treatment to the new material. In this manner we see stucco and cement imitations of stone details and ornament, iron columns and arches cast and moulded like those of stone, and various other blunders. It is so easy to apply the old method, as it saves thought and labour, and so the mischief is repeated and the progress of architecture hindered.

Looking at the change in another way, the introduction of composite for simple and natural materials has involved a new method of putting them together. Why is it so many of our buildings are failures architecturally? We are constantly told that our age is without an architecture of its own; that we can only copy old buildings, that our modern works, which are essentially new in conception and are built with modern materials like iron and concrete, are extremely ugly and disappointing. We cannot deny the charge, but they are so because we have not yet learned a method of combining these materials and putting them together. New materials demand new forms. As every language has its own grammar and its peculiar idioms and modes of expression, as every production of nature has its own way of growth and combination, so must every new material follow the same law. The experimental stage is, no doubt, unprofitable and unsatisfactory. We can imagine an architect or engineer putting up the first warehouse of concrete and iron, or the railway station in which iron or steel is employed on the roofs. His first effort is uncouth and unsatisfying, it is criticised freely; but still it may be a bold attempt to design in those materials without imitating old forms and features. The designer of the Forth Bridge has not certainly produced so pleasing a structure as the recently-erected Tower Bridge, though it is a bolder and more original attempt to throw off restraints and traditional treatment. What looks now more pleasing to the eye as not offending our prejudices too violently may in another half a century appear a mistake; while the bolder design across the Forth, in which the metal has been structurally disposed without any effort to conceal it, will be regarded as one of the foremost steps in the new architecture. So with many other structures, like the Eiffel Tower and other daring efforts to use iron in accordance with its own laws, which is, after all, only following the same principles of design which actuated the masters of the Greek and Mediæval ages. That the latter knew nothing of iron as a structural material was no fault of theirs; but if they had they certainly would have used it exactly as the engineer now uses it in his cantilever or suspension bridges. They would never have thought of making an iron column resemble one of stone, much less of casing it with marble. We look in vain for an architecture of concrete and iron, just because we have not yet dared to break through the conventions of an historic architecture; but it will come, nevertheless, when the architect begins to see the law of materials more clearly than he can now. Let us take one simple object—an iron bracket for a signboard. The old craftsman of the 15th and 16th centuries, of Nuremberg, or of some Flemish town, fashioned his wrought-ironwork upon right principles. He hammered out his bars and forged and welded them into scrolls and all kinds of delicate hammered work, for he knew that his hanging sign board or his pieces of ornamental iron on his gable fronts were destined to bear chiefly tensile and cross strains. The modern cast-iron maker of brackets tries to imitate the open work and lightness of these beautiful examples of forged iron, forgetting that his material ought to be solid, and is not adapted for such purposes; so, too, he imitates the lightness of the old wrought-iron grilles, by casting his metal in ridiculously light ornament. The ornamental cast railing used before houses, with its twists and scrolls, cusped imitations of hammered work, soon tells the tale of its apostasy by a broken and mutilated appearance, while the wrought-iron railing or grille is always strong and ornamental. Why; it is needless to assert a common fact, wrought iron is fibrous, tough, and malleable, while cast iron is granular and brittle. The old smith understood the fibrous nature of their material; the modern likes to do what the old smith did, though working with a very different iron. Going back to our stone, too, the idea of even grain and texture and stratification is sadly overlooked in the same way. The old mason and builder knew perfectly how to place his stones in a wall; he laid them on their natural beds, as they stood in the quarry; he knew also the effect of stratification of veins and vents in laying and working and carving his stone; he knew exactly what his chisel or "point" could do, and if he transgressed any of these rules the work soon decayed. The cement-made stone of aggregates and Portland cement is unstratified; it has no veins of flinty hardness interspersed with calcareous matter or soft grains; in a word, it is perfectly even in texture, and can be placed in almost any position; it submits to the process of either moulding or tool-working. Do these differences of texture suggest any correspondent treatment? We have no evidence that they do, or that the manufacture of any of our artificial stones has been at all taken into account. One other important fact remains. The ancient granite and stone architecture was monolithic. Great masses of granite or marble were used by the Egyptian and Greek builders; but now the tendency is to use small blocks of stone or baked clay. It is true concrete blocks of huge size are made for quay and dock walls and breakwaters; artificial stone slabs of large size for floors and landings; and we have floors and ceilings constructed of monolithic proportions, but they are not in the same sense monolithic. Again, our construction is no longer simple, but composite. Even our artificial stone landings and floors are made up of several substances incorporated together, aggregates and cement and iron. Our construction also is no longer solid like the ancient, but to a large extent cellular or hollow; and here we have a very important principle to remember. What are our best fireproof floors but cellular structures of concrete and iron? What our most effective domical erections but cellular constructions in which the forces are concentrated in a few ribs filled between with some light material, and so of all modern contrivances in which thrusts and stresses are restricted to iron members? Has the modern designer looked at the possibilities of this system? Boldly face it he must. He cannot be always affecting the solid treatment.

The effect of these influences upon the architecture of the day, it may be premature

to predict. From what we have said, the change has been in the direction of greater complexity. The homogeneous and solid construction of stone is gradually giving place to a more composite and cellular mode of building, in which artificial products and fabrics of the most varied kind enter. Solid, thick stone walls are less used; brick, concrete, terra-cotta, faïence, in combination with iron and steel, are rapidly supplanting the monolithic system of building, especially in America. A skeleton structure of steel, with the interstitial spaces filled in by certain walls of light material, is a mode of building common to all the cities in the States. In this country, artificial stones, cement, iron and steel, and a host of new materials of a decorative character are competing with stone and timber, and it is left to the architect to combine and adapt them in the best way he can. No longer are solidity and massiveness required to give stability and resist external forces as of yore, but the designer has to arrange his materials so that each shall do its part. Resistance of pressure or strain is now to be met by specially-designed sections of masonry or iron distributed in the body of the work, so that the material is employed to the most economical advantage. These are the problems which the modern designer has to face. Hitherto he has been groping in the dark, trying to bring his design into line with old examples, sometimes ignoring the new conditions, at other times clothing them with old forms, courses which are leading him into a hopeless state of distrust and uncertainty.

TECHNICAL OBJECTIONS.

RED-TAPE and technical points of law frequently impede the operation of the London Building Act. District surveyors and Metropolitan magistrates are often at loggerheads about some point of wording a notice, the date of serving a notice, or some question of interpretation. These vexatious hindrances only serve to delay the administration of the law, and to encourage litigious owners and builders to disobey the regulations of the Act. Several instances of this kind have occurred of late. Not long ago the London County Council moved for a rule *nisi*, before the Divisional Court of Queen's Bench, for a mandamus, calling upon Mr. Mead, the Metropolitan magistrate, to show cause why he should not hear a summons under the Dangerous Buildings Clause. In this case the County Council had not been able to find out who was the owner of the buildings in a dangerous state, and the notice had been affixed, according to statute, on the premises. This mode of serving the notice was not considered right by the magistrate, who thought that the summons ought to be served personally on the unknown owner, as required by the Summary Jurisdiction Act. As was pointed out by the counsel of the County Council, if this ruling was right, it would be impossible for the Act to be carried out in all cases where the owners could not be found. A rule in this case was granted by their Lordships. We believe it is no uncommon occurrence for the County Council to find it difficult to trace the real owner of a dangerous building. Clause 106 of the Act makes it clear that if the certificate of the surveyor is to the effect that a certain structure is in a dangerous state, the Council may cause the same to be shored up and secured, and a proper hoarding put up for the protection of passengers, and shall cause a notice to be served on the owner or occupier of the premises requiring him forthwith to take down or secure the same. If the owner cannot be found, section 188 provides that the notice may be served by delivering a copy thereof at, or sending it in a registered letter by post, to the last known residence (in the United Kingdom) of the person, or to some person on the premises, or if no person be found on the premises, then by fixing a copy on some conspicuous part of the building. A sub-clause says any notice by this Act served on the "owner" or "occupier" may be addressed by the description of the "owner" or "occupier" of the premises (naming the premises) in respect of which the notice is served without further name or description. According to these provisions, the County Council had strictly, it would appear, followed the Act. In another instance, the magistrate at the Westminster Police-court was called upon to decide a case in dispute between a builder and a district surveyor. The builder obtained a building agreement from the Crown in respect of some buildings, and was about to rebuild loftier and larger premises; but the district surveyor objected to the plans, and gave notice of the same, on the ground, among other things, that sufficient open space was not provided for at the rear of the new buildings. The magistrate decided that the district surveyor's notice was wrong, and should have been differently framed. The builder's appeal was accordingly allowed, with costs. We are not informed what was wrong in the notice; but the question of greater concern to the holders of property is that their rights in respect of buildings erected prior to the passing of the Act ought to be observed.

We could mention other instances in which magistrates have refused to hear summonses on the ground of informal or defective notices, the consequence of which has been a delay, or the case has been dismissed. A well-framed notice depends on many technical points—on a careful study of the definitions of the Act, and of various provisions such as given under section 187 *et seq.* No doubt there is considerable difficulty experienced in carrying out these provisions. Responsible owners absent themselves to avoid expense; occupiers are not to be found, and magistrates are eager to find out errors in the notices. Great responsibility falls upon the district surveyor in these circumstances: instead of being assisted, he is thwarted in the performance of his duty. The unfortunate part of the technical opposition is that dangerous structures, inferior construction, and the encroachment on areas in and round buildings; erections of greater height than are permitted by statute law are allowed to pass, and the spirit of the Act is seriously impaired. We have no doubt the objections of the surveyor in some cases are trivial and vexatious, or there has been a lack of cordiality between owner or builder and district surveyor, the latter may have acted precipitately on insufficient evidence, without giving the builder the opportunity of seeing the mistake. But in the majority of instances the fault is with the owner who likes to "steal a march," or take advantage of a wrongly-dated or worded notice. In the case of dangerous and neglected structures, the Act allows the owner, if dissatisfied, to give notice in writing to the Council of his desire to refer to arbitration; he may, in fact, appoint an independent surveyor to report in conjunction with the district surveyor on the state of the structure, and if they cannot agree, the question may be referred to a third surveyor previously appointed as an arbitrator. These provisions allow the owner of any dangerous or objectionable building to obtain a fair hearing.

THE ARCHITECTURAL ASSOCIATION.

THE third ordinary meeting for the present session of the Association was held on Friday evening, the President, Mr. Hampden W. Pratt, F.R.I.B.A., in the chair. The following fourteen gentlemen were elected as members:—E. P. Archer, A. C. Stair, C. C. Duggan, R. C. Fry, J. Haslam, C. F. Innocent, E. H. Kent, F. G. May, E. O. Payne, W. S. Payne, J. H. Pearson, C. E. Pease, C. M. Quilter, and E. R. Taylor. Mr. N. L. Ashburner had, it was stated been reinstated as a member, and five nominations for membership were read. The PRESIDENT announced that the annual *conversazione* would be held on Friday, the 26th inst. (a fortnight hence) at the Matinée Theatre, late St. George's Hall, Langham-place, W., where a play, specially written by Mr. F. D. Clapham, would be rendered at 8.45 p.m., entitled "The Broken Contract; or an Egyptian Enigma."

A PROPOSAL FOR CLASSIFYING BUILDERS' WORK.

Mr. S. FLINT CLARKSON, F.R.I.B.A., past-president, read the following paper on this subject:—The proposal is that Classes, such as fair (A), good (B), best (C) shall be agreed upon. The suggestion is made in the interest of employers, architects, and contractors. It will probably be about equally serviceable to all, as long as contract amounts are settled by competition tendering. Other systems besides competition may be tried with advantage; but at present the greater part of the work is allotted in that method, which seems likely to be kept to also in the immediate future. Drawings, specifications, quantities, competitive estimates, clerks of works, and other superintendence, and 5 per cent. are the recognised machinery by which an employer gets exactly what he ought to wish for, and is assured that he is to pay no more than the market price for it. We propose only a minor improvement in the regular machinery. Let us see why it seems desirable.

GRADATION IN QUALITY

is as legitimate in builders' work as it is in anything. People know this very well, though they may grumble when gradation takes too wide a range. Proportion is not simply securing the right relation of function and apparent importance. Thorough proportion requires that materials and workmanship shall be varied judiciously by the architect in different buildings, and in different parts of the same building. Blunders and wild tendering will account for anything, but there will be smiles, and notes of admiration also, for less outrageous disparities—which might often be traced to misapprehension as to the class of work required. Between work of the highest class and fair work without pretension to excellence, there is a wide distance. From work ranking with the best of all time we reach by proper stages the most ordinary work—sound and serviceable, though wanting in fineness of quality and finish; and thence the *déclassés* may be reached—found in building as in life. Certain contractors lay themselves out for work of a certain kind—selecting workpeople and materials accordingly—and anything out of the usual course meets with less cordial welcome, and is sometimes not competed for with eagerness. The selection of such imperfectly sympathetic contractors accounts for other bad tenders—as also the selection of people who differ a good deal in the class of their business. Classification of work will not help us over all difficulties, but it may be of service in many. Any decent names of classes will prove better than any others as soon as they are generally accepted. Naming of sub-classes would cause little trouble; everyone could do it for himself, or definitions might be agreed upon from time to time, and then used in general practice. There must naturally be two extremes and a mean. The worst work with which an architect could be connected would be at one end, first-rate monumental work at the other, and something better than the one and less excellent than the other between.

SUGGESTED CLASSES.

Class A.—Nothing special anywhere; the most current things in all trades. Class B.—Something below the best; special design, adaptation, &c., in the more important parts of the building; good execution, but a keen regard for cost. Class C.—Excellence in materials and execution; the most finished work of the time; for the best public and private buildings. Objectors will hint that some contractors might try to supply the least costly work of its class—in fact, the worst work which the architect would pass—instead of what was intended; but the same sort of contractors do that sort of thing now. It will also be suggested that several specifications are not effective, and that classification might be interpreted by some architects as an encouragement to undue brevity. "The building is to belong to Class B, and is to be completed in all respects accordingly," is the pithiness which is

feared; but the passion for detail will keep most architects on the old lines. Hurried, slovenly, and generally inferior specifications (and drawing) should not increase in number, as they are serious evils; but it does not follow that anything which might prevent an inferior specification from failing hopelessly would necessarily be an evil. Hopeless failure results when everything proves adverse; but purses pleasantly full, well-occupied lives, and a healthy appetite for compromise, enable many meagre specifications to keep their virtue. Sometimes they are even (in retrospect) looked upon as blessings in disguise. Some employers appreciate low tenders; the architect who has obtained so much for so little is spoken of as skilful and economical; and the contractor, if treated with judicious liberality, does not object to posing as a benefactor who works more cheaply than other people. Contractors are sometimes informed, in suitable language, that they are not to add a large sum per page of specification to their tenders, because the specification seems unusually big, and so much per drawing also, because some of the detail drawings, which will form part of the contract, have been prepared in good time instead of later on. Shrewd employers have the same thing in view when they ask whether a specification of 150 pages is really necessary, and hint that explanations about moderation in quality to the builders submitting tenders should be very precise. The mention of a recognised class of work at the beginning of a specification

NEED NOT LEAD TO THE OMISSION FROM SPECIFICATION

of a word. The proposed prefatory words would, however, throw a strong light upon every detail. There are pieces of work which fall to every one of us, where time is so all-important, that delay of a few days in starting the work may lead to serious reflections on the energy and resource of the architect. These are, happily, exceptional cases, though apparently on the increase. But an architect thus pressed for time, after describing all special items and throwing the rest of the work into one of the proposed classes, might feel solid ground under his feet in carrying through a contract. The Classification would frequently be, in effect,

A RECORD OF THE RESULT OF NEGOTIATIONS;

such a record as ought to be in writing, in view of the uncertain future—for general understandings are frequently misunderstood: memory fails, or ill-will and bad blood distort it, and much else; or parties die and give no sign. People who can get on with very imperfect specifications manage to struggle through with more perfect ones. Difficulties arise when a contractor tries to supply a good deal less, and an employer at the same time asks for a good deal more, than the discreet architect considers that the contract provides. The employer, who anxiously suggested explanations to the contractors as to a moderate sum and a good deal of work for it, may find that events before the contract was signed, after a busy interval, become more and more shadowy. He then prayed, as a favour, for mediocre work; now he and his friends read the specification with much care, and interpret conventional phrases literally and liberally—and there is perhaps assistance for them from legal minds. If the contract made it quite clear that work of Class A was intended, such an employer might be disposed to leave things alone. An architect selected because he has a reputation for thoroughness and work of high quality; an appeal by the employer for the mildest treatment such a reputation will permit; resolute bargaining and a low contract sum; and in the sequel a tender solicitude for the keeping up of the architect's reputation—might thus, in the future, be treated by a playwright as one of the dramatic situations possible only in the elder days. No minor change will prove a panacea for all building ills. A trial of classification is only a modest little practical proposal. It could be easily introduced, and should be generally accepted in a short time.

SEVERAL OBJECTIONS TO THE PROPOSED CLASSIFICATION

were raised in the discussion which followed the reading of the paper. The President remarked that at first sight the matter seemed very simple; but the more it was looked into, the more difficult any such system appeared to realise in a practicable way. If they inspected a completed building it was quite possible to classify it as A, B, or C; but how could they classify a structure not yet commenced? The different degrees of merit in buildings were, after all, matters of specification, and rather depended on qualities of material than on workmanship. He could conceive of contractors very reasonably saying, for their own reputation's sake, that their works were only of one class, and that the best, and thus the first class of men would be self-excluded from tendering for works of class B or A. Again, many buildings would fall under various classes in their several parts. He thought the question was much more one for builders to discuss than for architects.

Mr. W. H. Seth-Smith, in proposing a vote of thanks to Mr. Clarkson, said his proposal was very fresh, but he feared it would be exceedingly difficult to put into practice. After all, two-thirds of the cost of a building was for workmanship, and this must be paid for in any case at trade union rates. The suggestion was one for consideration between architects and clients rather than architects and builders, and it was most desirable that from the very outset the architect should know the character of building desired by the owner.

Mr. J. H. Leaning said they were so much indebted to Mr. Clarkson for giving so much consideration to a subject of great interest to the profession that he was sorry to have to totally disagree with his conclusions. The question had been the undercurrent of an architect's life for years. Every professional man felt that, let him do what he might, he could not always get what he wanted from the contractor, and yet he realised that he could not reject everything. In every contract the builder seemed to look round and expect some advantage, and the architect felt a little reluctance in squeezing the utmost from the contractor. In the case of a job which was obviously not of the highest class there was still more leniency in the mind of the professional man. A distinction should be made between such cases and those in which the architect, instead of being master of the works and chief director, was merely a spectator. Just as a horse could tell in a few minutes whether his rider knew his business, so did a builder, with a few feelers, and an interview, and a detail, know his architect. Seeing how far he could go, and being only human, the builder generally went that far, and a little farther. But they were discussing the effect of all this upon the practice of the qualified and honest practitioner; as for the other class of man, nothing could be done for him, and the sooner the public found him out the better. Now it was suggested by Mr. Clarkson that the establishment of a series of classes or grades of quality would dispel this hitherto unspoken-of element of uncertainty in building, and that by adopting this system they would eliminate the speculative margins which builders when tendering on the present system were compelled to allow. The classification was not, it appeared, to take the place of the architect's specifications; on the contrary, it would not lead to the omission of a single word. Its effect would, therefore, be to further define the architect's definitions, or, as Mr. Clarkson had put it, "to throw a strong light upon every detail." He proposed, therefore, to examine briefly where the differences between good and bad materials and workmanship were to be found. Firstly, by the fitness and efficiency of its several parts, such as thicknesses of walls, scantlings of timber, and the amount of detail put into finishings; these surely were matters entirely determined by the specification, the drawings, and details. Secondly, by the quality of the materials used and the style and finish of the workmanship. Attempts were made in most specifications to regulate this factor also, and it was presumably this branch of the specification to which Mr. Clarkson would make his classification apply. He (Mr. Leaning) made these apparently superfluous generalisations because there seemed to be a confusion of ideas in Mr. Clarkson's definition. He said that Class B related to "Special Design, Adaptation," &c. Did this mean that the builder was tendering from ⅛th scale drawings, and that he must allow for some special mouldings and architectural efforts, which would come in the first category, here and there, although not shown or specified? Or did it mean that for the class of buildings in which such things were to be found? Class B was the one most suitable; but as it read it was misleading, because Class C reverted to the second category, and said, "Excellence in Materials and Execution." He (the speaker) wished to emphasise this, because it brought him to his first point—viz., that the classification could only be made to apply to the quality of materials and workmanship, and not to the drawings and detail. The latter, of course, were dealt with by the quantities, and if varied, could be adjusted. Mr. Clarkson did not mention quantities, but alluded to contractors tendering at so much per detail and so much per page of specification. That might, perhaps, explain his difficulty. How was it that a speculating builder could produce a house for so much less than could the architect? Largely, he (Mr. Leaning) maintained, by economies effected in the first category, such as varied proportions for mortar and concrete, thinner inner walls, reduced scantlings of timber and lap of tiles or slates, omissions of roof boarding and felt, omissions of grounds to all joinery, two-coat plastering instead of three, stock mouldings, zinc instead of lead, cast railings instead of wrought, three-shilling locks and eighteenpenny taps, cast-iron mantel registers instead of grates, varnish in lieu of French polish, cement fillets for flashing, composition gaspipes, no attempt at ventilation, 15oz. glass instead of 21oz., &c., &c., and, in addition, the omission of architect's fees and surveyor's charges. All these were quite distinct from any general saving in quality of materials or workmanship, and were capable of clear and easy definition by drawings and specifications. They did not, therefore, concern architects, but with the second category they were now seriously dealing; but even here there was very little which could evade clear definition. The speculating builder saved by using grizzles and placers for his brickwork, and employed promoted labourers to build it, with the result that there was no bond, the joints were badly filled, and the perpends bad. He used sand no one else would have, lime that was stale, spruce deal for floors and joinery, foreign steel, light lead pipes and light lead or zinc, thick laminated slates, probably inferior Port Madocs. Lastly, and most important, the speculating builder employed piecework, which meant the minimum of labour everywhere. But even here, as regarded materials, the architect was able, without much trouble, to bind the builder hand and foot. He could specify the maker of his facing bricks, the maker of his lime and cement, the maker and quality of his glazed bricks or rubbers, the quality of his sand and where it was to be obtained, the maker of his steel work, the quarries and quality of his stone, the weight of his lead and zinc, and so on. The architect's chief difficulty was with regard to his timber and deal. As to these, insistence upon well-known brands seemed to be the only safe guide; but considering the fact that the joinery and carpentry generally amounted to one-fifth part of the whole job, and that half that represented labour, while the difference between the best deals now used for buildings and fourths was not more than 30 per cent., the possible saving on a £2,000 job could not be more than about £60. As to labour, it must be admitted that the architect could not specify so precisely. The only protection, especially just now, was to go to builders who held a command of the labour market, and with whom their leading men in each trade had worked for years. An acquaintance with the methods of workmen and with the capabilities of modern machines, and a careful study of the various ways of doing the same thing and the relative value of the results, ought to qualify an architect not only to specify intelligently, but also to be certain of getting what he wanted. They saw, then, that the proportion of work in a building which was indefinable was really quite small, and got smaller with every day of our increasing technical education. The classification would be very well if applied to separate articles; but when applied to a collective mass it ceased to have any meaning. Further, it allowed nothing for questions of taste, nor for locality. He hoped he had succeeded in showing that by the present system it was quite possible, and by many architects whose name it would be invidious to mention, to produce works of the very best description, and, where necessary, to economise without any sacrifice of good construction or taste. It required a great deal of attention to secure this result, but so did everything worth doing, and Mr. Clarkson's proposed classification would need quite as much definition as the specification would. Quantity surveyors were often reviled for their long-winded specifications. They were willing martyrs; they had their

reward in a long rest after the signing of the contract, for with their specifications and an intelligent builder there was no contingency that could arise which was not answered by a clause in the specification; without such a specification daily letters arrived asking what had been taken, and how the contractor was to carry out the work.

Mr. J. Douglass Mathews thought there could be little difficulty with the best class, and little more with the lowest class of buildings; but many obstacles would present themselves in the way of getting work of the quality demanded for the medium classes. The differences in timber and fittings could all be covered by the specification and drawings, and he feared that the builder's tendency would be to carry out each work according to the class just below that specified. He would suggest that Mr. Clarkson should write a further paper on the subject for consideration at the R.I.B.A., in which the treatment of this subject should be a little less foggy.

Mr. Henry Lovegrove thought the names of classes should be reversed, and that "A" should denote the best quality, and "C" the lowest. What would Mr. Clarkson do in the case of a building specified to be of the poorest class, if subsequently defects showed themselves in the building? Could not the contractor shelter himself under the fact that it was specified to be of the lowest quality?

Mr. J. Osborne Smith held that no builder could mistake the class of building required if the specification and drawings were clear and materially consistent; and Mr. Max Clarke failed to see what object would be gained by the architect or building owner by the proposed classification. All builders believed that the work required belonged to the lowest class.

Mr. Clarkson, in replying to the vote of thanks, said he was surprised that so few speakers had seen the desirability of such classification. He should not abandon the subject, but should carry the proposal further in a paper to be read elsewhere.

SOME NEW BUILDING MATERIALS—ASBESTIC AND PETRIFITE.

Mr. H. D. Searles-Wood, F.R.I.B.A., past-president, read the following paper on these materials.

ASBESTIC.

Asbestic comes to this country, he explained, from Lower Canada, and is a name given to a by-product from the manufacture of asbestos from serpentine. After the fine white fibrous asbestos has been extracted by machinery, this sand [illegible] and it is the various uses to which this can be put that he proposed to call attention. It is claimed for plaster made with ordinary lime and asbestic (the proportion recommended being 3cwt. of lime to 1 ton of asbestic) that it is absolutely fireproof, and being fibrous and possessing very great elasticity, there is no cracking, chipping, or crumbling away, and nails driven into it enter in the same way as into a pine board, and can be easily withdrawn. This plaster is also a perfect non-conductor of heat. It is stated that this plaster, being a perfect non-conductor of sound, has a curious effect on the room or hall where it is used, making them much easier for singing or speaking in. For the protection of metals, this substance has a great future. An elaborate series of experiments were carried out by General Povey Smith, when he found that asbestic not only protected the metal against fire, but at the same time preserved it from any corrosion. The covering properties of the asbestic plaster are about 40 per cent. more than those of ordinary plaster, and it is 40 per cent. lighter to handle; the mixing and application are so much easier that there is a saving of 25 per cent. in actual labour. The

DIRECTIONS FOR USE

are given as under:—For rough coat: Slake about 3cwt. of lime, and while liquid run it through a sieve into a box large enough to hold one ton of asbestic. Mix thoroughly, adding the requisite amount of water. After the lime and asbestic are thoroughly mixed, the plaster should be allowed to stand at least twenty-four hours before being used. For finishing coat: Mix two parts of lime to one of asbestic finish and gauge with plaster of Paris. No hair or sand is required. The price of the asbestic, per ton of 2,240lb., is £3; asbestic finish, £5. The sole agents for London are Messrs. Witty and Wyatt, of 88, Leadenhall-street, E.C., where numerous samples can be seen. The plaster takes about three weeks in setting to get thoroughly hard, and it gradually toughens after that time. The asbestic is now being made up in slabs about ¼in. thick; these can be worked as easily as wood, and as non-conductors of heat and cold they can be utilised for walls, ceilings, cornices, mosaics, &c., and can be used out of doors and coloured as required. This material is far more suitable for buildings in new countries, such as Africa or West Australia, than corrugated iron or canvas and framing. The non-conducting property of asbestic plaster would be of great value. For hot countries glazed asbestic tiles are being made for roofing purposes. In the manufacture of paper, asbestic is being largely used. Paper 130in. in width is being produced in one factory for building purposes. Asbestic has been recently selected by the London County Council as one of the fireproof materials that may be used in the alterations at Olympia. Talking over the subject of this paper with Mr. Drew, when at Furness Abbey, the lecturer asked him what new material in his opinion was most wanted. He replied, "An artificial slate." In the samples produced, the surface is smoother than intended; but they show that a good roof covering can be made in this way. They would be light, non-combustible, and non-conducting, and could be made to any shade of colour.

PETRIFITE

is a white cement which appears to have the power of binding together almost any material that can be thought of. The principle of the invention was discovered in 1891; but it was not until some years later that a cheap and practical method of making petrifite was worked out and patented, and even now it is not practically on the market, though he was informed that it is hoped it may be by the 15th of this month. During the lapse of time from its discovery a large series of exhaustive and interesting experiments have been made, and some wonderful results obtained. Messrs. David Kirkaldy and Son have reported on the following experiments:—

	Result.
25 per cent. Portland cement and clean pit mud, petrifite, and ordinary sea-sand.	Petrifite eleven times the strength.
Petrifite and common earth.	Nearly four times the strength.
Natural Bath stone: 10 per cent. petrifite and ordinary sea-sand.	Nearly twice as strong.
Natural Portland stone: 25 per cent. petrifite and ordinary sea-sand.	Stronger when only 30 days old.
Marble Carrara blocks: 50 per cent. dust from the same with petrifite.	Eight per cent. stronger.
Tensile strength: 25 per cent. Portland cement and clean pit mud. 25 per cent. petrifite and clean pit mud.	Over five times as strong.
Tensile strength: 25 per cent. petrifite, sea mud, and powdered chalk.	Over seven times as strong.
Porosity: 25 per cent. Portland cement and clean pit mud. 25 per cent. petrifite cement and clean sea-sand.	Nine times less porous.

In a further report made by Messrs. Kirkaldy in May, 1897, as to the effect of immersion in water, it was found to reduce the ordinary petrifite 25 per cent. in strength, as against 10 per cent. in natural Portland stone and 20 per cent. natural Bath stone; but in samples made with hydraulic petrifite, which is ordinary petrifite mixed with from 5 to 10 per cent. of inexpensive materials, the diminution in strength is slight. As regards hardness of surface and hardness internally, there is hardly any appreciable difference between 2 to 1 Portland and 6 to 1 or 9 to 1 petrifite. A backing of 6 to 1 petrifite, faced with 3 parts plaster of Paris to 1 of petrifite, yields a hard and smooth surface very suitable for walls. The tests made to ascertain the relative adherence of petrifite mortar show that 6 of sand to 1 of petrifite adheres as well to the face of rough bricks as good Portland cement mortar mixed 3 to 1. In the case of bricks with rather smooth surfaces, petrifite mortar gave nearly four times the adhesive strength. Petrifite mortar mixed 3 to 1 with smooth bricks had ten times the adhesive strength of the same proportion of Portland cement mortar. Another feature of petrifite is that it adheres to wood. Messrs. Kirkaldy summarise their two reports by stating that petrifite has the following valuable properties:—(1) Its combinations have great crushing and tensile strength and adhesive qualities. (2) It will solidify unclean materials, the presence of which, even in small quantities, would be fatal to the setting of Portland and other cements, and bind together into useful blocks many substances which cannot now be utilised. (3) Dirty or unwashed materials can be used, which is not the case with other cements. (4) Its compounds do not sweat or effloresce, thus enabling sea sand to be used. (5) It will adhere perfectly to wood or iron. (6) As ordinarily used it solidifies slowly, so that work need not be hurried; it then dries and sets hard with great rapidity. (7) It is so powerful that a much smaller quantity suffices, considerably reducing the cost of freight and transport. (8) After setting has commenced, it can be still used again, as but little deterioration takes place, unlike other cements, when small quantities have to be mixed for immediate use. (9) It does not become inert after exposure to a damp atmosphere. (10) It may be used when quite freshly made, without fear of failure. Messrs. Stunger and Blount's report states that petrifite, when mixed with a suitable aggregate—*e.g.*, sand—expands on setting to about the same small extent as Portland cement. Mr. G. F. Harris, stone and quarry expert, summarises his very interesting report on petrifite sandstone, that the Petrifite Company can deliver a first-class dressed building stone in London at a price under half that of dressed natural building stone, and of a superior quality. As a plaster, petrifite has been reported on by Mr. Marson. Its advantages over Portland cement are that it can be used with sea-sand without risk of efflorescence, and the surface is harder and closer than when Thames mud is used. Petrifite grips the whole surface, both smooth and rough places, and, being "fatter" than Portland cement, can be laid more easily and dries better. Compared with Keene's cement, it has the advantage of being non-porous, much harder when set, and can be worked much more quickly. If petrifite compounds are painted whilst wet, the paint sinks into the soft material. It takes no longer to dry than ordinary paint put on woodwork. In twenty-four hours a room can be finished and ready for occupation. With colouring matter, petrifite and water is a first-class substitute for ordinary distemper. As a cement for iron, an ordinary galvanised iron building can be covered with petrifite plaster, and will adhere perfectly. Petrifite has one special quality—viz., that the water which is added does not evaporate but enters into a chemical union with the cement. The hardening process takes a very short time; it may be delayed by cold weather. Used as artificial wood, petrifite mixed with sawdust has certain advantages over ordinary wood. This artificial wood can be cast into any shape or size, and can be worked with the same tools as ordinary wood. It also has the advantage that it can be made in large masses, uniform in quality and strength throughout. Petrifite can be run, moulded, or worked by a tool; either moulded and built in the walling in blocks, or run and modelled *in situ*.

A vote of thanks was accorded to Mr. Searles-Wood on the motion of Mr. Seth-Smith, seconded by Mr. C. H. Brodie. In reply to the President, Mr. G. F. Seddon, the engineer to the Petrifite Company, gave some further particulars as to that material, and explained that when placed on the market the price would be about 60s. a ton, or 50s. for the petrified cement, thus comparing with Keene's cement. The President remarked that they had heard all the advantages of the material—what were its weak points? To which Mr. Seddon said that Messrs. Kirkaldy could not find any weak points—a reply received with hearty laughter and applause.

ELECTRIC LIGHTING NOTES FOR ARCHITECTS.—VIII.

By an Assoc. Inst. Elect. Engs.

ACCUMULATORS (*continued*).

Having shown the possibility of storing energy, it now remains for us to consider the various storage cells on the market, and to add such particulars respecting the characteristic qualities, capacities, weights, and dimensions of each kind, as may lead to the proper selection of a battery to suit the requirements of individual cases. We shall then refer to the general methods of working accumulators, and it is particularly important to remember that storage cells play a very useful part in private installations, and that consequently the choice, fixing, and working demand more attention than in central lighting stations, where fully qualified engineers are in constant attention. Many firms now undertake to fix batteries, and to maintain them in working order by contract. In cases where unqualified

persons have to attend to them, it is a good plan to adopt this method, since the abuse of accumulators is always attended by bad results. With private installations it is advisable to call in the makers or some expert to inspect the storage cells at regular intervals, by which means the life of the accumulators may be prolonged.

The following are the most common types of cells in use for private installations:—The "E.P.S." cell, the "D.P." cell, the "Epstein" cell, the "Chloride" cell, the "I.E.S." cell, and the "Tudor" cell.

The E.P.S. cells are manufactured by the Electrical Power Storage Co., and are well known both for private installations and central stations. This type is of the Faure or pasted plate pattern, and as these cells have been in use for many years, they have undergone many improvements, and now are justly considered among the best on the market. Their low cost of maintenance and high efficiency have given every satisfaction. There are two general types of E.P.S. cells adapted for private installations, the earlier "L" type, and the more recent "K" or high-discharge type. The former is specially recommended for large storage capacity, whilst the latter is recommended for varying loads. The normal rates of discharge are 4·5 and 8·5 ampères per positive plate for the "L" and "K" types respectively. We give below particulars of these cells, and here may add the advantages claimed by the makers for the "K" as against the "L" type:—

1. The space occupied for storage per ampère discharge for the "K" is about half that required for the "L" type cells.
2. The weight for storage per ampère discharge for the "K" is about three-fifths that necessary for the "L" type cells.
3. The number of plates to be maintained with the "K" type is only half the number as when the "L" type are used, the load being the same in both cases.
4. The prices of the two types of cells having the same number of plates being approximately the same, the cost per ampère in the discharge circuit is, in the "K" type, only about one-half that of the "L" type.

Particulars of the E.P.S. Cells in Glass Boxes.

Description of Cell and No. of Plates.	Acid for each Cell.	Working Rate.		Capacity in Ampère-Hours.		Approximate Dimensions.	Weight of Cell Complete with Acid.
		Charge Ampères.	Discharge Ampères.	At List Rate.	At Half List Rate.		
	lb.					in. in. in.	lb.
L 15	48	25 to 30	1 to 30	330	...	$9\frac{5}{8} \times 11\frac{3}{4} \times 13\frac{5}{8}$	128
L 31	96	50 to 60	1 to 60	660	...	$18\frac{1}{8} \times 12 \times 13\frac{5}{8}$	265
K 15	44	30 to 58	1 to 58	196	245	$9\frac{5}{8} \times 11\frac{3}{4} \times 13\frac{1}{2}$	161
K 31	88	62 to 125	1 to 125	420	525	$18\frac{1}{4} \times 11\frac{5}{8} \times 13\frac{1}{2}$	330

The "D. P." cell is manufactured by the D. P. Battery Company, being the joint invention of Dujardin, Drake, and Gorham. The plates of this cell are built up of a number of roughened lead strips placed horizontally one over the other, the face of the plates being formed by the edges. To give stability, the ends of the strips are lead—burnt into a solid lead framework formed by upright rods. It is claimed for the D.P. cell that it combines the durability of the Planté cell with the capacity of a pasted type. The construction of the plate (1) presents a large active surface, and gives to them a high charge and discharge rate without fear of disintegration or buckling; and (2) enables them to expand, whilst forming, and contract, during discharge, without injury. The plates are *formed* in the same way as Planté plates. From the large number of private installations using these cells it is evident that the D.P. accumulator has proved itself to be a satisfactory storage cell.

The "Epstein" plates are prepared by boiling solid lead plates in a 1 per cent. solution of nitric acid and water until the plate assumes a dull-grey appearance. In this condition a deposit of lead salts is formed when dried in the air, and as this adheres to the plates, a porous surface, insoluble in dilute sulphuric acid, results. Furthermore, the surface of the plates is increased five-fold since both sides are corrugated, and, after boiling, is in a condition to be *formed* electrically, and it very readily acquires considerable electrical capacity. These cells are particularly adapted for very heavy discharges, since there is no tendency to dislodge the active material from the grooves. The normal maximum rate of discharge is 30 ampères per positive plate, which for short periods may be doubled. Under the normal rate of discharge the capacity is 120 to 150 ampère hours per positive plate, whilst at half the normal rate the capacity is 140 to 170 ampère hours per positive plate.

Since this cell was introduced it has rapidly grown in favour, and is much used in private installations; and for the purpose of making comparisons between the Epstein and other cells, particulars of the various sizes are given below. The advantages claimed for this cell are:—(1) Great mechanical strength, and no tendency to buckling, since the solid web of lead in the middle provides a strong backbone. (2) Impossibility of disintegration of the active material. (3) Minimum internal resistance, because of the intimate contact between the active material and the conducting parts. (4) Impossibility of "local action" taking place between the active material and the conducting parts.

Particulars of Epstein Cells.

Description of Cell, and number of Plates.	Working Rates.				Capacity, Ampère-hours.	Approximate Dimensions.	Weight of Cell, with Acid.
	Charge. Ampères.		Discharge.				
	Normal	Max.	Amps.	Hours.			
			5	12	62	in. in. in.	lb.
S. 3	7	10	8·5	6	53	$9 \times 2\frac{1}{4} \times 12\frac{3}{4}$	24
			15	3	47		
			25	12	310		
S. 11	35	50	42	6	265	$9 \times 8\frac{1}{2} \times 12\frac{3}{4}$	103
			75	3	235		
			60	12	744		
S. 25	84	120	102	6	636	$9\frac{1}{8} \times 19\frac{7}{8} \times 12\frac{3}{4}$	246
			180	3	564		
			16	12	190		
M. 3	20	26	26	6	160	$14\frac{3}{4} \times 3\frac{1}{2} \times 18\frac{1}{2}$	94
			40	3	120		
			48	12	570		
M. 7	60	78	78	6	470	$14\frac{1}{8} \times 7\frac{1}{4} \times 18\frac{1}{2}$	223
			120	3	360		
			96	12	1,150		
M. 13	120	160	160	6	960	$14\frac{3}{8} \times 13\frac{5}{8} \times 18\frac{5}{8}$	449
			240	3	720		
			240	12	2,280		
M. 31	300	390	390	6	2,340	$14\frac{7}{8} \times 32\frac{5}{8} \times 18\frac{7}{8}$	1123
			600	3	1,800		

The "chloride" cell is manufactured by the Chloride Electric Storage Syndicate, Ltd., and from the results which have already been obtained, it is looked upon as one of the most promising storage cells, and is rapidly coming into favour, although but recently introduced commercially. Both at Manchester—where it is used for equalising the distribution of electrical energy during periods of heavy loads, and for relieving the generators after midnight—and in connection with the Isle of Man tramway system, it has proved itself capable of withstanding rough usage and heavy discharges.

The method of manufacturing the cells is unique, and embodies certain features of construction different from those already mentioned. Small square tablets made by mixing chloride of lead with a given proportion of chloride of zinc, are placed in a mould so that a grid or framework of lead alloyed with a small percentage of antimony may be cast round them, great pressure being applied to force the molten mixture into the mould. On removing the chlorine and zinc from the compound plate by a process of electrical disintegration (which takes place when the plates are immersed in a dilute solution of zinc chloride together with zinc plates, and a current sent through them), there is left a considerable amount of porous lead within the framework. They may then be readily *formed* electrically in the usual way, which gives the plates a more homogeneous and perfect nature, absolutely uniform and of maximum porosity, enabling them to have an exceptionally high storage capacity. Furthermore, the process gives a combination of perfect electrical and mechanical connection between the framework and the active material. The great porosity of the active material and the special process of manufacture permit a very high rate of charge and discharge; in fact, the makers claim that they may be discharged, if desired, in one or two hours, without detriment or risk of damage, and charged in three hours. For private installation work two types—the R and S types—are manufactured. The former, permitting very high rates of charge and discharge, is recommended for general working where the rate of discharge is not required for more than eight or nine consecutive hours; whilst the S type is recommended for high storage capacity. The following particulars show that the weight of these cells for a given capacity compare most favourably with any cell in general use. The advantages claimed for the chloride cells are solidity, durability (disintegration of active material almost impossible), efficiency, and cheapness.

Particulars of the Chloride Cells.

Description of Cells and No. of Plates.	Working Rates.			Capacity in Ampère Hours.	Approximate Dimensions.	Weight of Each Cell Complete.
	Maximum Charge Ampères.	Discharge.				
		Amps.	Hours.			
		190	1	190		
R. 11.	100	90	3	270	in. in. in.	lb.
		57	6	342	$10 \times 12\frac{1}{8} \times 16$	149
		41	9	369		
		45	10	450		
S. 11	45	40	12	480	$9\frac{3}{4} \times 13 \times 17$	165
		35	15	525		

Another cell recently introduced is the "I. E. S.," manufactured by the International Electric Storage Company, Ltd. The plate is made of a lead-shaped grid somewhat like a comb, and this grid is then fitted with strips of perforated sheet celluloid in the manner which has proved most successful from a practical point of view. The active material is then laid on, and the whole plate at this stage of its manufacture presents a surface entirely composed of lead oxide. It is then slipped into a perforated celluloid envelope which it fits closely. The plate is then ready for use, and after its first formation by charging settles down into a solid and compact plate, which, however, can freely expand and contract to the required extent, and in which no travelling or movement of the particles of the active material can take place. The capacity of the plate is claimed to be from three to five times that of the E.P.S. plate of the same size and surface. It is also capable of standing heavy charges and discharges.

The last cell which we shall describe is the "Tudor" cell, the invention of Henry and Hubert Tudor, and previous to its introduction to the English market it had an extensive sale on the Continent. The process of manufacture combines the Planté and Faure processes, and presents free play to the active mass without affecting its bearer. This is accomplished by employing a naturally-formed plate (Planté's method) as the positive, and a pasted plate (Faure's method) as the negative. The positive plate is cast in a special mould, and, having a number of grooves, presents in proportion to its weight a large amount of active surface, approximately eight times that of a smooth plate of the same external dimensions. The result is that solidity is secured, together with perfect connection between the peroxide and the lead conductor. The efficiency of these cells is high, and the durability greater than with ordinary pasted cells, since the positive plate is the one which deteriorates most quickly. Furthermore, they may be quickly charged, and, if desired, may be discharged in one hour.

THE SURVEYORS' INSTITUTION.

At the first meeting of the session, held on Monday, the president, Mr. Christopher Oakley, read his opening address before a full gathering of the members. He referred first to the fact that of all the Council who governed the affairs of the Institution in 1868, its first year of existence, but two members now survive, Mr. R. C. Driver, of Whitehall, and Mr. W. Sturge, of Bristol, and strongly recommended the younger members to read the addresses of some of the former presidents, as containing much wise and valuable advice, and as emphasising the fact that the success of the Institution depended on the conduct, influence, and co-operation of the individual members. There had been, he said, very little legislation during the past Session of Parliament which nearly affected the surveyors' profession. The Extraordinary Tithe Act settled some doubtful points in previous Acts. The Market Gardens (Scotland) Act and the County Dublin Surveyors' Act did not materially affect them. The Public Offices Act authorised the purchase of the site of premises on

the north side of Lord Carrington's House, and other premises in Whitehall Place, for the purposes of a new War Office. This clearance would, he thought, increase the difficulty and cost of obtaining offices in Westminster. The Agricultural Rates Act, 1896, had given rise to much discussion, and there was still a good deal of uncertainty as to what was "agricultural" land and what was not, and some dissatisfaction among the clergy that tithe and rent charge should not be allowed the relief afforded by the Act to other incomes arising out of the land. The recent book of the Duke of Bedford's "The Story of a Great Agricultural Estate," showed that on one estate of 32,000 acres the expenditure, in seven years out of twenty since 1876, exceeded the income by some £39,000, while another estate showed a deficiency of nearly £10,000 in five years. This seemed, he thought, conclusively to show the inadvisability of breaking up large estates to form small ones, for the supposed benefit of the community. The President next dealt at considerable length with the Report of the Royal Commission on Agriculture, and after setting forth in some detail some of the facts contained in the report and the evidence, briefly condensed the conclusions of the Commissioners into the following:—1. That the fall in prices owing to foreign competition has caused the present grave state of affairs. 2. That they found no prospect of any material relaxation of this competition. 3. That we must look forward to a further reduction of land susceptible of arable cultivation at a profit, with a corresponding contraction of production, and diminution of our rural population. Referring to the effect of agricultural depression on property sales, the register of sales kept at the London Auction Mart showed that in the years 1875, '85, '94, '95, and '96, the sales of landed properties over 100 acres and upwards outside London amount respectively to 96,000, 31,000, 11,500, 36,000, and 77,600 acres, at prices averaging respectively 52s., 32s., 25s., 19s., and 25s. per acre. The sales of freehold ground rents registered during each of the same five years, amounted respectively to £9,500, £12,000, £13,500, £18,000, and £25,000, the average number of years' purchase being respectively 26½, 27¾, 28, 30½, and 33½ years, which at all events showed that there were still persons who thought such investments worth a high price as securities. The London County Council in their Improvements Act, 1897, obtained the sanction of Parliament to three schemes of street widening—viz., the Strand and Holywell-street scheme, that for widening the southern end of Tottenham Court-road, and that for a new street in connection with the northern approach to the Tower Bridge. Into all these the principle of "Betterment" coupled with "Worsement" entered, under different modifications. In conclusion, the President referred to the new institution buildings in Great George-street, which, under the supervision of the architect, Mr. Alfred Waterhouse, R.A., were now making rapid progress, and he expressed a hope that some part at least might be available early next summer.

A vote of thanks having been moved by Mr. E. P. Squarey, and seconded by Sir Henry Cartwright, and carried unanimously, the meeting adjourned.

NOTES ON SURVEYING AND LEVELLING.—V.*

By Walter Tester.

SETTING-OUT THE BASE OF THE TOWER.

THIS article will be devoted to the setting-out of the base of the steel tower, octagonal on plan, the eight main pillars of which come down one just inside each of the corners of the octagon-shaped building dealt with in the last article.

The plan and elevation, Figs. 1 and 2, show the section of the main pillar, and the detail of the base and holding-down bolts. The bases are 9ft. by 10ft., and there is to be 14ft. by 14ft. of concrete underneath the latter, at least 4ft. 6in. thick, or more if the rock at that level is not perfectly sound.

As soon as the excavations for the basement floor of the building are sunk down to 49·62 level (as described in the last article), the holes for the concrete can be marked out. The dimensions required for this purpose are given on the accompanying elevation, Fig. 2, together with

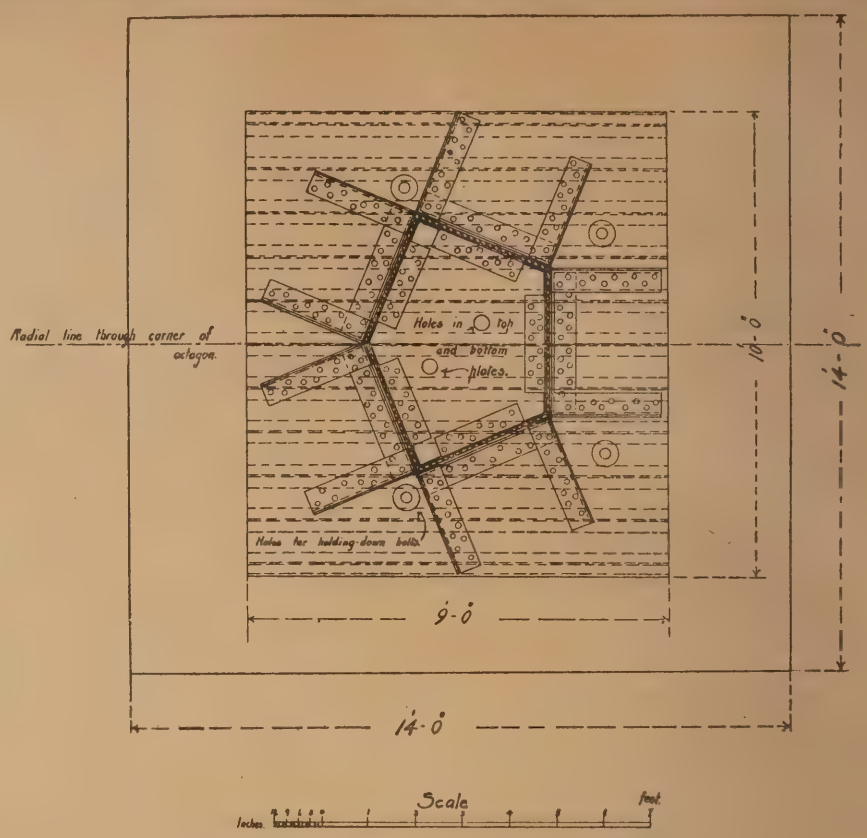

FIG. 1.

certain others that will be required for setting-out, and it will be as well in this place to explain how they are arrived at. Of course, the general dimensions of the tower have already been settled, and the surveyor is supplied with the following particulars:—Rake of the pillar, 12° 15′ 13″ out of vertical; width across the tower on a diagonal line at the 60·00 level (above Ordnance datum), 132ft. 9in. to the inside of the pillar; half-width to the centre of the octagon, 66ft. 4½in.; horizontal width of the pillar, 4·0112ft. Now let us take any right-angle triangle, A B C, having an angle of 12° 15′ 13″, as sketch, Fig. 3.

Angle A	=	12°	15′	13″
,, B	=	77	44	47
,, C	=	90	0	0
Total....		180	0	0

Then— Sin. A × A B = B C

And— Cosin. A × A B = A C.

Then, from the Tables—

Sin. 12° 15′ 13″ = ·2122393
Cosin. 12 15 13 = ·9772177

That is supposing we have the long dimension A B; A C is found by multiplying it by ·9772177, and B C by multiplying it by ·2122393. Now the dimension of the tower on a diagonal line at 60·00 level being 66ft. 4½in. = 66·375 from the centre point to the inside of the pillar + 4·0112 = 70·3862 to the front angle, and the length on the rake to the underside of the 4ft. 6in. of concrete from the point where the 60·00 level cuts the front angle of the pillar is—

13 1½
4 6¼

= 17 7¾ = 17·64583

17·64583 × ·9772177 = 17·2438 vertical
17·64583 × ·2122393 = 3·7451 horizontal.

60·00 70·3802
17·2438 3·7451

42·7562 74·1313 = 7·4ft. 1 9/16in.

In a similar way the dimension from the centre of the octagon and level of the front angle of the pillar (produced) can be calculated for any depth necessitated by a greater thickness of concrete than 4ft. 6in., on account of the rock not being perfectly sound; also the levels of the top and bottom edges of the 14ft. width of concrete; the triangle formed by the rake of the bottom of the concrete with horizontal and vertical lines being similar to the one we have just been dealing with—viz., the one formed by the line of the rake of the pillar with vertical and horizontal lines—that is, they both contain the same angles; all that is necessary being to multiply the longest side of the triangle by ·9772177 and ·2122393 for the other two sides. In the same way the dimensions and levels at the top of the concrete are calculated. They are given on the accompanying elevation (Fig. 2), but sufficient has been said to explain how they are arrived at, and it is not necessary to give the calculations in detail.

The surveyor is now in a position to proceed with the marking out of the holes for the concrete, and it will be assumed that the centre point of the octagon used for setting-out the building has been retained, and that the brick pier on which it is marked with a nail, is standing up three or four feet above the basement formation level, so that by tilting the telescope of the theodolite down, the surveyor can command a good view into the farthest side of the hole in which the tower base is to be placed. The radial lines used for setting-out the octagon of the building are also retained. The surveyor should check each one of these by again setting out the angles 22½°, 67½°, 112½° off the axis line, as explained in the last article.

Having set out the radial line for one of the holes, he can measure out the lengths 64ft. 4 9/16in. and 79ft. 0 13/16in., and two lines square off at these points and 7ft. out each side will define the position of the hole. The hole being in this way marked out on the basement floor formation level, the excavator can proceed to sink it down to the required depth (see Fig. 2), and in order that there shall be no mistake, the surveyor should put in a nail at each corner of the hole with his level, say, at 48·00; two measuring staves should then be made, of such a length that when they are placed underneath the nails and fixed vertical with a plumb-bob, they will give the depth to be excavated to. One of these staves will be perfectly straight, and 4ft. 2¼in. long (48·00 less 43·82); but the other one will require to have a return piece square off at the top and 11½in. long (65ft. 4 1/16in. less 64ft. 4 9/16in.), the length of the other portion being 7ft. 1⅞in. (48·00 less 40·85), and it should also have the length 2ft. 9in. (48·00 less 45·24) marked on.

Assuming that the rock is perfectly sound at this level and cut to the correct rake, the surveyor must next mark out the position for drilling the four holes for the holding-down bolts, and for this purpose a wooden template (see sketch, Fig. 4) is provided by the maker of the steelwork

* The illustrations by kind permission of Messrs. Maxwell and Tuke, the architects and engineers.

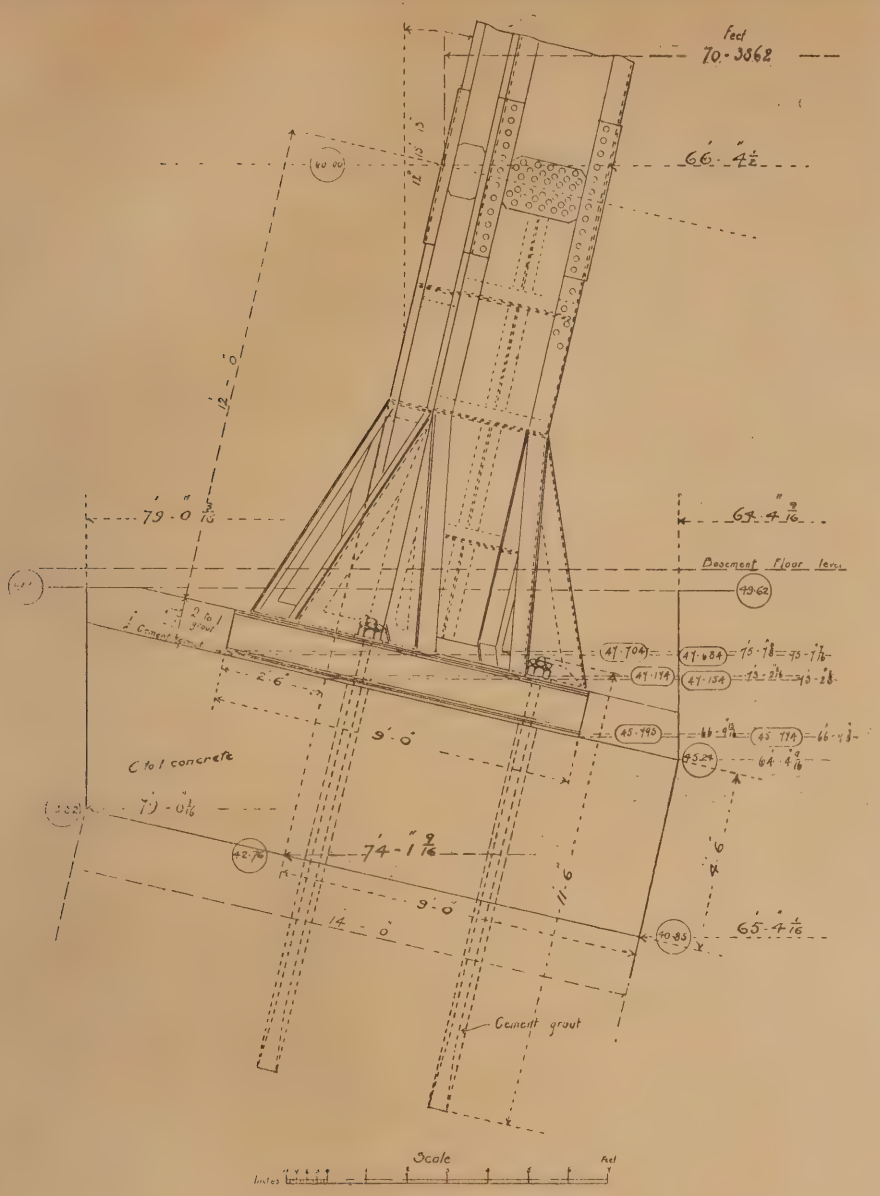

FIG. 2.

with holes cut in it corresponding to the ones made in the steel bases, and also with the front angle of the pillar, and the radial line marked on it. Having set out the requisite angle, the surveyor should have a board fixed by nailing to the rock on his radial line at each side of the hole, standing up above the formation level to the height of his centre point. On each board he should mark the exact position where his line cuts, by

FIG. 3.

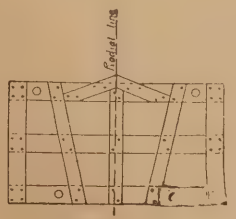

FIG. 4.

means of the theodolite, and have a saw-cut made at these points in the boards. A string line can then be fixed over the centre nail and through the saw-cuts in the boards, and will, in this way, be kept perfectly level and truly on the line, and prevented from swaying over the hole. He should now measure out carefully with his steel tape, from the centre point, the dimension 74ft. $1\frac{9}{16}$in. (for 4ft. 6in. of concrete, or the corresponding one for any other thickness), and put a pin in his string-line to the exact measurement. This point can now be carefully plumbed down into the bottom of the hole, using a heavy plumb-bob. Having marked this point with a nail driven into the rock, he should fix the front angle point of the template exactly at the spot, and in order to get it truly on the diagonal line, he must plumb another point down off his string line, which must coincide with the line marked on the template. The exact centre point of each of the four holes for holding-down bolts can then be marked with a nail, and the template can be removed. Four nails should be driven into the rock around each centre, sufficiently away from it to prevent them being disturbed by the drilling operations, and in such a position that diagonal lines between them will cut at the exact point. The four holes being marked, the drilling machine can be got to work, the angle at which the drills work being set with a template provided for that purpose, which is merely like a large set-square having angles of 12° 15′ 13″, 77° 44′ 47″, and 90°. (See sketch, Fig. 3.) The best way to use it is to set the side A C perfectly vertical with a plumb-bob; the side A B will then be at the required rake. After the holes for holding-down bolts are drilled down to the required depth in the rock, a boxing is fixed over each hole at the proper rake, and sufficiently long to go through the concrete, being well stayed to the sides of the hole with timber to prevent it from being disturbed.

The four boxings being fixed, the concrete can then be put in, and the next thing requiring consideration is finishing the top surface of the latter, which requires to be done with considerable accuracy. The method adopted at New Brighton was as follows:—Around the sides of the hole were fixed timbers exactly at 48·50 set carefully with the level. (See sketches, Figs. 5 and 6.) A template was made as sketch, Fig. 6, of the exact length and depth, to finish the surface to the required level, and so as to work along two cross-pieces, shown on the sketch, the template being kept square with the latter by means of

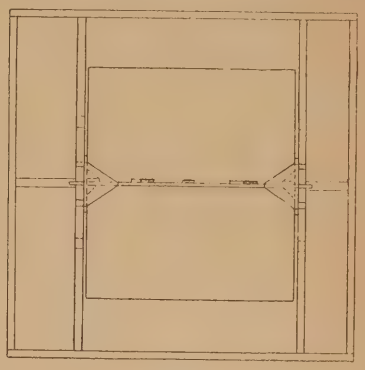

FIG. 5.

guide pieces as shown. These cross-pieces were fixed to the exact dimensions required measured out in a similar way to that already described for fixing the template for holding-down bolts. The template serves for all the eight holes, which are dealt with in every particular as described. When the concrete is sufficiently set, the boxings can be removed, and the holding-down bolts placed in position. The first portion of the pillar comes on to the works separate from the base and brackets; but they are all riveted together up to the first joint in the pillar just over the hole, and when ready are lowered on to wedges at the four corners of the base, arranged for adjusting the levels of the tower. The bases must be exactly correct in position, and in order to attain this end the brick pier on which is marked the centre of the octagon is built up, perhaps 15ft. or 20ft. high, with a platform round the top for the surveyor, so as to get a view with the theodolite on to the surface of the concrete at the side nearest the centre point. The nail at the lower level is not disturbed and the pier is built hollow, and with eight holes at the bottom on radial lines, so that the tape can be hung on to the centre nail. The centre point is plumbed up from the nail on to the higher level, and a plate as sketch Fig. 7 is fixed.

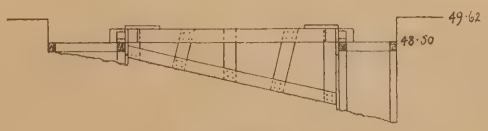

FIG. 6.

This plate has a centre-piece screwed to fit the theodolite, and also three adjusting screws for setting level, and must be fixed with its centre exactly coinciding with the centre of the octagon.

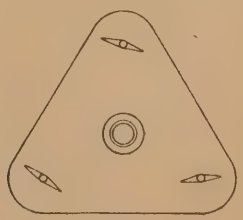

FIG. 7.

The theodolite is screwed to this plate instead of to the legs in the ordinary way, thus saving time in fixing, and, as the plate cannot move, insuring its being always at the same point. The position where the radial line cuts is marked on the steel

base-plate and on the pillar, and the base must be fixed so that these marks coincide with the vertical hair of the theodolite, the angles being set out as already described; also it must be perfectly true to measurement from the centre of the octagon, the dimensions being set out as before. The central pier is retained until the tower is up to the first girder level, the pillars all being set exactly on the radial lines with the theodolite, and when the tower is complete up to this height it can be checked, to see that it is perfectly vertical and level, and adjusted by means of the wedges on which the bases are built. Being now as near perfect as possible, the holding-down bolts can be run in, also the ¼in. thickness of cement under the bases, and everything fixed, concrete being eventually filled in the holes up to the basement floor level.

PAINT-MIXING

IS not an every-day art. There are scores of provincial small master-painters who follow the time-honoured rule-o'-thumb method of mixing their own paint—a wooden keg, with a piece of coarse canvas stretched across its top, still meeting all their requirements for paint. Whether this old-fashioned method be followed, or the more up-to-date one of grinding up the paint in a colour-mill, neither process helps the beginner in knowing what colours to blend to produce a certain tone of colour or match any particular hue. This part of the paint may, however, have to be acquired by long practical experience; but to be up-to-date, a much faster plan is to employ one's spare time in making experiments on the following lines, and jotting down the results in a notebook especially reserved for the purpose. Select a definite quantity—say 1oz. of each of the pigments, in dry powder, of which the particular shade of colour is composed. Take up a little of each colour on the top of the palette-knife, rub them up together on a piece of thick glass—placed over a sheet of white note-paper—or else on a china slab. Drop a few drops of linseed-oil on the dry pigment mixture, and rub up the whole until of a homogeneous compound. Note whether the hue of the mixture thus made matches the one desired, and if not, add a little more blue, yellow, or other pigment required to produce the particular tone or shade required. When you have matched the particular colour desired; weight of the remainder of each batch of dry colour, and also note how much oil has been used to bring the mixture to the right consistency.

For example.—Suppose you want to match a light French grey tint, the compounds of which you know to be white-lead, ivory black, orange chrome yellow, you will start by taking about equal bulks of the black, yellow, and white. On mixing these you will at once be struck with the fact that the compound is too yellow, not black enough to produce a suitable grey. You therefore increase the amount of the black and also the white; the mixture is much too dark, so you keep on adding more and more white, until you have produced the exact light tint required, adding oil as required; but do not make the mixture too sloppy—only just the stiff consistency an oil paint would be when used. On weighing the dry colours you find that for every one grain of orange chrome yellow used you required two grains of ivory black and 480 grains of white lead. You also note that out of the ounce bottle of linseed oil you have used a little more than one half. Put the remainder of the oil into a graduated glass measure, and the number of minims used will show the number of parts of oil required—*e.g.*, 480 parts of dry white-lead, 2 parts of ivory black, 1 part of orange chrome yellow, 280 (about) parts of oil; these proportions are for best quality pigment unadulterated. For impure badly-coloured pigments the proportions of them would vary slightly from the above. On making a medium French-grey tint, you would note that only half the above quantity of white-lead would be required. Although you are here only working in grains, all that you have to do, after working up bulk quantities, is to make the lb. a cwt., the units in proportion. To find the quantity of oil needed, calculate the percentage amount required in compounding the experimental sample, then 280 minims out of 1 fluid oz. of oil equals that 57 per cent. of the oil was required to commingle the pigments. When you find out the proportions of any particular colours stated in the following formulæ do not give the prescribed hue, you may not unreasonably suspect that some one or other of the pigments are adulterated, and therefore the suspected sample should be assayed or compared with a standard pure colour. The assay should be made for intensity of staining power, opacity or covering power, and unctuosity or power of combining with the oil vehicle. These tests are made as follows: To assay for staining power, take equal weights of the suspected pigment and of a pure one, and also the proper quantities of dry white-lead; mix one lot of white-lead with the suspected pigment, and the other lot of white-lead with the genuine sample that is to be used for comparison; put an equal number of drops of oil to each mixture, and rub them up separately on a slab of white porcelain, then compare the two mixtures. If the suspected sample is weaker in tone than the genuine one, you have good grounds for supposing that it is not a pure pigment.

To assay for covering power, take equal weights of the suspected pigment to a sample of genuine ditto; add an equal amount of oil to each, and rub the colour up on a piece of glass. Rub each sample of colour out to cover as large a surface as it will without actually showing the glass beneath. Measure the difference between the extent of surface covered by each sample. That which covers the larger surface without losing its opacity possesses the greatest covering power. The opacity may be determined by holding the piece of glass up to the light, or by placing a sheet of coloured paper beneath the glass, on which the colour is rubbed out, and noting any difference or modification in hue that is produced by the coloured paper.

To ascertain the unctuosity of the pigment, or its capacity to combine with oil, take equal weights of the suspected and a genuine sample of pigment; add an equal number of drops of oil to each pigment, and rub them up separately, and compare the consistency of each sample. The stiffer the consistency, the greater is the capacity for combining with oil.

The bottle or vial which holds the oil should be of a known capacity, and be fitted with a cork, down the side of which is a V-shaped slit cut. This will permit the oil to flow out at a uniform rate in drops. The specific gravity of a pigment is no criterion as to its genuineness or freedom from adulteration.

In mixing paint by the old-fashioned method of straining through canvas over the mouth of a keg or tub, it is usual to use white-lead already ground in oil, and to dilute this with oil and add the staining colours, and mix the two by rubbing the pigment and oil in coarse canvas by means of a brush. As only a pound or two of colour can be worked up at a time, this is a very tedious way of colour-mixing, and inducive to laziness on the part of the operative.

If a hand or power colour-mill be used, it is best to mix up the staining colours in a little oil or turps before mixing with the white-lead. This mixing should be done on a stone slab, with a stone or glass muller. The number of turns the colour is put through the mill will depend on the importance of the work in which it is to be used, and also on the nature of the paint compound. Some pigments require a great deal more grinding and mixing than others.

RECIPES FOR MOULDING COLOURS.

All parts by weight, fluids by fluid measure, unless otherwise stated. No classification is made as to cost price of each paint compound.

POSITIVE COLOURS: REDS AND THEIR ALLIES.

1.—Vermilion: 3 parts English vermilion, 1 part orange mineral.
2.—Scarlet vermillion alone.
3.—Deep scarlet: 8 parts vermilion, 1 part white-lead.
4.—Light scarlet: 20 parts vermilion, 1 part golden ochre, 7 parts white-lead.
5.—Crimson: 25 parts Indian red, 7 parts crocus martes, 6 parts oxide of zinc, 6 parts whiting.
6.—Light red: bright red oxide of iron.
7.—Blood red: 15 parts crocus mastes, 10 parts whiting, 1½ part peroxide of iron ore (hematite), 1 part Venetian red, 3 parts silica.
8.—Cherry red: 2 parts English vermilion, 1 part carmine.
9.—Turkey red (paint): 56 parts light red oxide, 126 parts precipitated barytes, 28 parts Paris white, 23 parts boiled oil (to make it into a paint).
10.—Deep crimson: 2 parts carmine, 1 part vermilion.
11.—Oriental red: 2 parts Indian red, 1 part red-lead.
12.—Brick red: 1 part Venetian red, 4 parts white-lead.
13.—Tuscany red: 8 parts Indian red, 1 part rose pink.
14.—Indian red: 3 parts Indian red, 5 parts native barytes, 1 part Paris white (2 to 3 parts boiled oil to form a paint).
15.—Armenian red: 2 parts Venetian red, 1 part yellow ochre.
16.—Mexican red: 4 parts Venetian red, 1 part red-lead.
17.—Deep Indian red: 16 parts Indian red, 1 part lampblack.
18.—Moorish red: 3 parts aniline vermilion, 1 part rose pink.
19.—Red oxide of iron (paint): 3 parts red oxide of iron, 6 parts native barytes, 1 part Paris white (2 to 3 parts boiled oil).
20.—Pink, light: 24 parts white-lead, 1 part vermilion.
21.—Pink, bright: 24 parts white-lead, 1 part orange mineral.
22.—Pink, Venetian: 20 parts white-lead, 1 part Venetian red.
23.—Pink, Indian: 40 parts white-lead, 1 part Indian red.
24.—Pink, royal: 2 parts zinc-oxide, 1 part carmine lake.
25.—Pink, coral: 5 parts white-lead, 1½ parts vermilion, 1 part orange chrome yellow.
26.—Pink, shell: 50 parts white-lead, 2 parts vermilion, 1 part orange chrome, 1 part burnt sienna.
27.—Orange: 1 part white-lead, 1 part orange mineral.
28.—Pink, Venetian (paint): 11 parts Venetian red, 1 part red oxide of iron, 24 parts native barytes, 8 parts Paris white, 6½ parts boiled oil.
29.—Pink, geranium: 60 parts zinc-white, 1 part geranium lake.
30.—Pink, flesh: 120 parts white-lead, 2 parts yellow ochre, 1 part Venetian red.
31.—Pink, carnation: 16 parts zinc-white, 1 part rose madder.
32.—Pink, carnation: 12 parts white-lead, 1 part scarlet lake.
33.—Pink, carnation, rose: 16 parts white-lead, 1 part rose-pink.
34.—Pink, rose: 16 parts zinc-white, 1 part Munich lake.
35.—Pink, rose, pale: 32 parts zinc-white, 1 part Florentine lake.
36.—Pink, rose, deep: 8 parts zinc-white, 1 part Victoria lake.
37.—Pink, rose royal: 16 parts white-lead, 1 part rose lake.
38.—Pink, salmon: 60 parts white-lead, 4 parts vermilion, 1 part lemon chrome.
39.—Pink, salmon: 36 parts white-lead, 4 parts golden ochre, 1 part Venetian red.
40.—Pink, fawn: 24 parts white-lead, 3 parts golden ochre, 1 part vermilion.
41.—Pink, terracotta: 2 parts white-lead, 1 part burnt sienna.
42.—Pink, terracotta tint: 20 parts white-lead, 1 part terracotta.
43.—Pink, Indian: 40 parts white-lead, 1 part Indian red.
44.—Pink, royal: 2 parts zinc-white, 1 part crimson lake.
45.—Pink, opaque: 32 parts white-lead, 1 part red lead.
46.—Pink, transparent: 32 parts zinc-white, 1 part rose madder.
47.—Pink, coral tint: 15 parts white-lead, 1 part deep aniline vermilion.

VIOLETS, PURPLES, LILACS, AND LAVENDER HUES.

48.—Lilac: 30 parts white-lead, 1 part madder lake, 1 part ultramarine.
49.—Lilac, rich: 64 parts zinc-white, 1 part mauve lake, 1 part madder lake.
50.—Lilac, purple: 16 parts white-lead, 1 part cobalt blue, 1 part carmine lake.
51.—Lilac: 40 parts white-lead, 1 part rose pink.
52.—Lavender: 16 parts zinc-white, 1 part mauve lake, 2 parts rose madder.
53.—Lavender: 88 parts zinc-white, 3 parts ultramarine, 1 part carmine.
54.—Lavender: 48 parts white-lead, 1 part ultramarine, 1 part rose pink.
55.—Purple: 4 parts zinc-white, 2 parts ultramarine, 1 part carmine.

56.—Purple, deep: 3 parts white-lead, 1 part ultramarine, 1 part rose pink.
57.—Purple, royal: 4 parts white-lead, 2 parts cobalt blue, 1 part carmine lake.
58.—Purple, slate grey: 60 parts white-lead, 3 parts ultramarine, 1 part Indian red.
59.—Purple, transparent: 1 part cobalt ultramarine, 1 part carmine.
60.—Purple, transparent violet: 4 parts ultramarine, 1 part crimson lake.
61.—Purple, opaque violet: 6 parts white-lead, 3 parts ultramarine, 3 parts rose lake, 1 part ivory black.
62.—Purple, mauve: 12 parts zinc-white, 4 parts cobalt blue, 1 part carmine lake.
63.—Terracotta red: 1 part white-lead, 1 part burnt sienna.

(*To be concluded.*)

A RARE CHANCE FOR ARCHITECTS.

THE prospectus of the Phebe Hearst Scheme for the University of California has been issued by the trustees at San Francisco, giving the architectural profession such a chance to distinguish themselves as is not likely to occur again. The Governor of the State is the Chairman of the Trustees; one of the Board of Regents and one of the Professors of the Faculty represent the University. Mrs. Phebe A. Hearst, widow of the late United States Senator, Mr. George Hearst, has provided ample funds for the competition, and the site is described as "the most beautiful site on earth for the purposes of a university." The architect of such a home as the promoters contemplate for this university, which is to become one of the great seats of learning of the world, "will make his name imperishable." "There are to be no definite limitations of cost, material, or style. All is to be left to the unfettered discretion of the designer. He is asked to record his conception of an ideal home for a university, assuming time and resources to be unlimited. He is to plan for centuries to come." "In fact it is a city that is to be created—a city of learning—in which there is to be no sordid or inharmonious feature." "It is seldom in any age that an artist has had such a chance . . . . with such an entire exemption from the influence of discordant surroundings." There are to be 28 buildings at least, and about five million dollars have already been pledged for a beginning. The University was founded in 1862. The charter was given by the State in 1868, and its income is augmented by the Government. It is thus National, and its present resources are valued at nine million dollars, in addition to an income of 40,000dol. from the United States and of about 250,000dol. from the State tax. The site includes 245 acres, and is at Berkeley, where it covers an area more than 700ft. in altitude, with a superb outlook over the bay and city of San Francisco. Maps, charts, and photographs are to be supplied. Ample prizes are offered. There are to be two contests. Here, then, is the chance free to all talent to win the day. Apply to the Trustees, 217, Sansome-street, San Francisco, California.

LONDON RIVERSIDE CHURCHES.*

THIS is a companion volume to the author's "London City Churches," which we noticed some time ago. Mr. Daniell here describes the most noteworthy churches "situated on or near the banks of the Thames between Kingston on the west and Greenwich on the east, omitting those within the city boundaries," before described. The book is illustrated by over 300 views by Alexander Ansted. Some of these are sketched in a free and spirited style, but rather too small to be of much value. Others are more suitable for vignettes. Mr. Daniell is descriptive and historical. The leading peculiarities of the edifices from an architectural point of view are briefly pointed out, together with the names of great men who find resting-places in these interesting churches, and of their monuments. It is mainly in this latter regard that the author's book will be found of service as a guide. Such names as Sir Thomas More, Fletcher, Massinger, Andrewes, Raleigh, Caxton, Blake, John Evelyn, Gulliver, Dr. Johnson, Charles Dickens, Hogarth, Gainsborough, and Theodore Hook give an abiding interest to the edifices. It would be impossible to give the reader any idea of the number of buildings described. Of course, the larger part of these churches are of quite modern date, like that of St. Mary Magdalene, Richmond, which, with the exception of the old battlemented tower of flint and stone, is of brick of Classic design; so, also, is that of St. Mary, Twickenham, but both have many associations and interesting monuments. St. Anne, Kew, is another 18th-century church of Queen Anne character, with a Doric portico. St. Paul's, Hammersmith, is shown by two views. The old demolished building had a picturesque tower with lantern; the new edifice (1882) is of Early English character, but of little architectural interest. A characteristic 18th-century church is that of St. Mary, Battersea, which has a steeple of some picturesqueness seen from the river. St. Mary, Lambeth, has also a picturesque tower from the Thames; but the church was rebuilt by Philip Hardwick in 1850. Good sketches accompany the descriptions of St. Mary-le-Strand, the best of Gibbs's churches, and of St. Clement Danes, by Sir Christopher Wren; but the illustrations of St. Saviour's, Southwark, do inadequate justice to the restored church. The south view is meagre. Other interesting churches noticed are St. George's-in-the-East, by Hawksmoor; St. George's, Southwark; St. Alphege, Greenwich, by John Webb, one of Inigo Jones's pupils; St. Anne, Limehouse, by Hawksmoor, the latter of interest for its Classical steeple of pleasing and broken outline; St. Paul, Deptford; and All Saints', Poplar. All these churches are of Classic design, and particularly interesting as examples of 18th-century architecture. Not possessing any pretensions to architectural style, but rather as having an historic and monumental interest, these riverside churches must be accepted, and Mr. Daniell has brought together, in a summarised and interesting form, all the literature and records that throw light upon his subject.

* London Riverside Churches. By A. E. Daniell. With illustrations. Westminster: Archibald Constable and Co., Whitehall Gardens.

CHIPS.

A new Baptist chapel at Cwm, Churchstoke, Salop, was opened last week. The builders were Messrs. E. Davies and Son, of Newton, Mont.

The Local Government Board have appointed Mr. H. E. Greene, Q.C., M.P., arbitrator in disputes under the Housing of the Working Classes Act, 1890.

A new building, comprising stockroom, workroom, and bedrooms, has been added at the rear of the drapery premises of Messrs. F. Corder and Son in Tavern-street, Ipswich. Mr. J. Shewell Corder is the architect and Messrs. T. Parkington and Son, of Ipswich, are the builders.

In the case of J. Blackman, of Catford, S.E., builder, the order of discharge from bankruptcy has been suspended for two years, ending July 30, 1899.

At the annual meeting of Greenock Dean of Guild Court, Dean M'Gregor reported that during the year 623 cases were considered, comparing with 757 last year. The probable total cost of the buildings, additions, and alterations for which plans were passed amounted to £75,755, against £83,000 last year, which, however, was a record year. The total number of plans passed was 136, of which 13 were for villas and cottages, 14 for tenements, 23 for business or other premises, and 96 additions or alterations.

It has been finally decided to build the new Royal Infirmary for Newcastle-on-Tyne, upon a site of ten acres on the Castle Leases given by the city council. The cost of this hospital, about £100,000, will be borne by Mr. John Hall, a local ship builder, and the site of the present infirmary will presently be handed over to the corporation.

Mr. Clement C. R. Spelman, a member of the firm of Messrs. Spelman, valuers and estate agents, has been elected as Mayor of Norwich.

The Forestry Department of Western Australia report that negotiations have been entered into between parties in Italy and at Perth, W.A., with a view to the opening of trade in Australian timbers. A Hamburg merchant is also inspecting the timbers with the idea of making purchases for the German market.

Improvements have been effected at the Halifax parish church. Additions have been made to the organ. Electric lighting has been provided in the church, the installation having been made by Messrs. Dixon and Sons, Boar-lane, Leeds, and the supply is drawn from the corporation mains. The reopening services begun on Saturday.

Eddleston parish church was reopened on Sunday. It is almost a year since the interior of the church was completely gutted by fire, only the walls being left. The restoration has cost about £1,160.

COMPETITIONS.

Birmingham.—The report of the Lunatic Asylum Committee, that they had selected six firms of local architects to engage in a limited competition for the proposed asylum at Holly Moor, Northfield, each firm to be paid a fee of a hundred guineas, led to an animated discussion at the meeting of the city council on Tuesday; but it was eventually adopted, with an addition, binding the committee to call in an independent architect as assessor. The newly-elected Lord Mayor severely rebuked Mr. Stembridge for asserting that it was a foregone conclusion that the plans of Martin and Chamberlain (who were originally recommended as architects for the building, and are one of the six firms invited to compete) would be accepted. Mr. Stembridge withdrew the remark, but gave notice of motion that two other architects—Messrs. Essex Nicol and Goodman and Mr. W. Henman, the designers respectively of the new meat market and new hospital—be added to the half-dozen invited to send in plans. We gav the six names of firms last week, p. 651.

Bury, Lancs.—The designs of Messrs. Woodhouse and Willoughby, architects, of 100, King-street, Manchester, have been accepted for the erection of the Bury Art Gallery and Public Library. The chief purpose of the building is to house the Thomas Wrigley collection of pictures and statuary, valued at from £60,000 to £100,000, which was given to the town as a Diamond Jubilee memorial. We shall illustrate shortly the selected design, which is English Renaissance of the 18th century in character, and is to be faced with stone.

Harrogate.—A site has been secured for a new technical school for Harrogate at the junction of Bower-road and Hayura-crescent, and the committee have decided that local architects be invited to send in competitive designs, for which prizes of £20, £10, and £5 will be offered. The instructions provide that more attention shall be devoted to the interior of the building than to external ornamentation. The chief room is to be at least 45ft. by 35ft.; whilst a number of smaller rooms are to be provided. It is desirable that a large room should be available for conversaziones, &c., and it is suggested that the elementary, building, and lecture-rooms should be so designed as to be convertible into one large room. The building will be two or three stories high, and must be so arranged as to allow for extension if necessary. The building proper will be of stones and the cost is not to exceed £3,500.

Harrisburg, Pa.—The Pennsylvania State Capitol Commissioners have selected Mr. Henry Ives Cobb, of Chicago, as architect of the new building to be erected at Harrisburg. Whether the courts will allow him to carry out his design is not yet settled, but he has been instructed to prepare working drawings at once.

Ipswich.—The school board received at their last meeting a report by a committee on the six sets of plans sent in by local architects for the new higher grade school to be built on the Tower House property. Mr. E. R. Robson, architec to the education department, has been appointe assessor, and it was resolved that the authors o the plan he selected should be appointed as architect of the new higher grade school. On opening the envelope which accompanied the plans recommended for adoption, the authors turned out to be Mr. J. S. Corder and Mr. W. Brand, of Ipswich.

Wolverhampton.—The committee formed for providing a new free library by voluntary efforts have selected Mr. Waterhouse, R A., as assessor to decide on the competitive plans to be sent in by twelve architects for the new building. Owing to an extension of the site, the architects are given until February 14 next to send in the plans. The cost is estimated at £10,000.

A Local Government Board inquiry has been held at St. Stephen's-by-Saltash relative to an application to borrow £2,000 for works of sewerage at Burraton. Colonel A. Smith held the inquiry, and very little opposition was offered.

Mr. R. H. Jeffes, an assistant in the office of the surveyor and water engineer to the Tottenham Urban District Council, has been appointed assistant on new streets, sewers, buildings, &c., in the urban district of Esher and The Dittons, under Mr. A. J. Henderson, A.M.I.C.E., engineer and surveyor to that council.

Building Intelligence.

BENWELL.—The foundation-stone of an English Presbyterian church was laid at New Benwell, near Gateshead, on Wednesday in last week. It is being built from plans by Messrs. Badenoch and Bruce, of Pilgrim-street, Newcastle-on-Tyne, the builder being Mr. Thomas Hunter, of Washington, Co. Durham. The hall occupies the eastern portion of the site, and between the church and hall the classrooms and vestries are placed. The church is planned with nave and aisles, the aisles and west end having galleries, the whole providing seating accommodation for 650. The floor has a fall of 9in. in the length; the pulpit and communion platform are at the east end, and the west gallery has been reserved as the organ chamber. The fall of 16ft. in the length of the site is utilised to get the caretaker's house, tea-room, heating chamber, and coals under the hall and classrooms, but entering off the back street. On the same level as the church, and immediately behind, are placed the minister's vestry, a room for ladies, and a small hall for prayer meetings, and infants' class, and a flight of short steps leads to the large hall, with accommodation for over 400. The first floor over the vestries is occupied by three classrooms. The whole block is designed in the Early English style; the walling is of local stone, in coursed rock facing, with chiselled stone dressings, the bays of the nave having buttresses at every principal, and the alternate bays having the upper windows carried up as dormers. Internally, the nave is divided from the aisles by an arcade of five bays on either side. The roof and internal fittings, gallery front, and pews are of pitch-pine, the ceilings being of pitch-pine cleading in narrow widths, formed into panels with mouldings planted on. It was found necessary to go down about 16ft. all along the west front to secure a suitable foundation. To overcome this difficulty concrete piers were carried down to the required depth, the spaces between being bridged with concrete blocks about 4ft. wide and 2ft. thick, in which rolled steel girders are embedded to strengthen the concrete and tie the piers together. The foundations throughout are of Portland cement concrete, and are taken down to the clay.

BRADFORD.—A new Theatre of Varieties, of large and attractive proportions, is about to be erected in this town on the site of the Alexandra Hall, stabling, and vacant land adjoining, in Horton-lane, containing an area of 4,400 yards. Mr. W. G. R. Sprague, of London, is the architect. The building is to be of concrete and steel. The auditorium will accommodate 3,000 persons, and electric lighting and low-pressure hot-water heating will be adopted. It is not proposed to entirely demolish the hotel. Of its 140 bedrooms, 82 will be retained, but the hotel will have no connection with the theatre. A new front will be given the structure, one feature being a colonnade on the ground level. A search-light will be fixed aloft. The entrance to the theatre will be through lobbies opening into a vestibule 45ft. square, the roof of which will be carried by twelve marble columns with carved caps. It will be lofty and decorated in the Arabesque style. The vestibule, by two short flights of white marble steps, will give access to the grand circle, boxes, and fauteuils. The theatre will also be decorated in the Arabesque style, and 2,000 16c.p. electric lamps will illuminate the interior. Saloons, retiring-rooms, and lounges are to be provided for each section of the auditorium. The house will be built on what is known as the two-tier system—viz., fauteuils, stalls, and pit on the ground floor; grand circle and boxes on the first tier; balcony and gallery on the second tier.

BYKER-ON-TYNE.—A new board school at Raby-street, Byker, was opened last week by the Mayor of Newcastle. The design and arrangement are on the "central hall" principle. The halls on each floor are 73ft. by 30ft. Opening off the main hall on the ground floor seven classrooms are arranged, each 26ft. by 24ft., and separated from the main hall by glazed screens. The first floor is similar to the ground floor. Each set of desks is lighted from the left hand of the pupils. Between the entrance doors and central hall cloakrooms are designed, fitted with requisite cloak-horses and lavatories. Next to the main entrances are arranged at each end three rooms for teachers (six in all) with lavatory accommodation. The infants' school is designed as a one-story building, the central hall being 62ft. by 32ft., with desks for one class. Off this main hall are seven classrooms with glazed screens as in main school. All walls are lined throughout to a height of 4ft. with glazed bricks. The caretaker's house is in the centre of the site. The accommodation is for 1,540 children. The total outlay will be about £12,950. The contractor is Mr. Thomas Hunter, of Washington. The clerk of the works is Mr. Boocock, and Mr. W. Lister Newcombe, F.R.I.B.A., of Newcastle, is the architect.

EDINBURGH.—The Edinburgh District Lunacy Board has just purchased the estate of Wester Bangour, by Uphall, extending to 861 acres, for £13,000, as the site for a new asylum. The District Lunacy Board have during the last few months had under their consideration the character of buildings to be erected for the accommodation of about 600 patients, and appointed a deputation to visit the principal asylums in England and the Continent and to report. The deputation visited a number of asylums on the Continent and in England, and returned impressed with the conviction that the system adopted at Alt-Scherbitz, near Leipzig, was the best they had seen, and the one which Edinburgh should adopt. The Alt-Scherbitz system is the segregated or village type of asylum. The idea at the basis of the whole scheme of its construction and administration is to endeavour to assimilate as far as is possible the conditions of life of the patients to those of sane people in an ordinary rural community. At a meeting of the Lunacy Board, held last week, the report of the deputation was fully discussed, and it was thereafter unanimously resolved to proceed with the construction of the new asylum buildings upon the villa system. The plans will be open to limited competition, and a rough estimate of the expense of the whole land, buildings, furnishings, water supply, &c., is made at about £150,000.

STONE, NORTH KENT.—The visiting committee of the City of London Lunatic Asylum recently submitted to the Corporation plans for proposed improvements to the asylum building at Stone, near Dartford, at a cost of £46,770, and these plans were adopted. The visiting justices afterwards invited tenders for the work from eighteen well-known firms of builders. Three declined, and the remaining fifteen sent in tenders ranging from £59,000 to upwards of £80,000. Those tenders were for the erection of the fabric of the building only, and did not include any machinery, internal fittings, or furnishing. The visiting justices consider that a further sum of £10,000 beyond the amount of the lowest tender will have to be expended on those items and on certain works which have become necessary. A very considerable increase had taken place in the price of builders' materials, more particularly in the price of bricks, and owing to the disturbed state of the engineering trade difficulty has been experienced on the part of the firms tendering in obtaining quotations for the ironwork required. The visiting justices are, therefore, seeking to obtain an increase of the grant from the Corporation to £70,000 instead of £46,770.

WOLVERHAMPTON.—Among the plans passed for new buildings by the Public Works Committee of the Corporation are some for Messrs. T. W. and J. Walker, hardware merchants, Temple-street, who propose to erect offices and warehouses in Fryer-street on a site lately acquired from the Corporation. Adjacent and in the neighbourhood of Canal-street, where old buildings are to be demolished, Messrs. John Shaw and Sons, also hardware merchants, Church-lane, are about to erect new and larger warehouse premises. Near to Messrs. Walker's intended new buildings, Messrs. Chubb and Son, lock and safe manufacturers, are about to erect a new manufactory to abut on Railway-street and Fryer-street, in lieu of their existing factory at the top of Horsley Fields. Other extensive business premises are likewise to be provided in the same locality on various sites sold by the Corporation under their improvement scheme. Development of building estates on the Heath Town side of the borough is going on at a rapid rate, especially in the neighbourhood of Park Village, Cannock-road, which is assuming the proportions of a newly-established town. Among the causes for this are the removal of Messrs. J. Evans and Sons' Culwell Engineering Works to Heath Town, and the erection of the electrical works of Messrs. Thomas Parker, Limited, and other establishments on the north-east side of the town. At the present time there is a brisker demand for houses than can be met, and such as has not existed for many years past.

Engineering Notes.

BUDE AND HOLSWORTHY RAILWAY.—This line, giving access to the picturesque coast of North Cornwall, is being carried out by the London and South-Western Railway. It will, for the present, be a single road, and will be 10½ miles in length. A short distance from the point where the new railway starts from Holsworthy (as a continuation of the existing line) a viaduct is being constructed, probably the highest in the West of England, except that at St. Austell. It consists of nine spans of a uniform width of 50ft., the greatest height from the bottom of the Deer stream being 93ft. The work on the railway is being carried on under the superintendence of Mr. W. Grainger, the representative of Messrs. John Aird and Co., of London, the contractors, and of Mr. E. Connal, resident engineer, representing Messrs. Galbraith and Church, C.E., of Westminster. The detailed work of this viaduct is in charge of Mr. McQueen, Mr. Grainger's engineer. Leaving Holsworthy, the line skirts the villages of Pyworthy and Derrill, and goes on to within half a mile of Bridgerule; then crosses the Tamar near the county boundary. At Merrifield works are in progress with a view to the construction of the only intermediate station throughout the course of the line. At Wolston there is another viaduct, comprising five spans of 50ft. each, and about 60ft. at its highest point. At Helebridge it has been necessary to divert the course of the stream and construct several bridges. Towards the Bude end the line passes along the valley of the Strat to the intended station near the junction of the Stratton and Bude roads, a short fork being taken further on to a point nearer the harbour, so as to serve the traffic to and from the sea.

INSTITUTION OF JUNIOR ENGINEERS.—This institution held the inaugural meeting of its 17th session on Friday night at the Westminster Palace Hotel. Sir Alexander Binnie, the retiring president, was in the chair, and presented the institution premium to Mr. W. R. Beckton for his paper on "The Protection of Buildings from Fire." Mr. H. B. Vorley moved, and Mr. W. J. Hunter seconded, a vote of thanks to Sir A. R. Binnie for the services rendered by him to the institution during his year of office, and this was heartily accorded. Mr. John A. F. Aspinall, M.I.C.E., chief mechanical engineer to the Lancashire and Yorkshire Railway, was then introduced as president for the ensuing session. Mr. Aspinall, who was warmly cheered, delivered his presidential address, the subject of which was "Some Aspects of Railway Work." He urged upon any young man who intended to learn the business of a railway engineer to make the best use of his powers of observation when he was in the workshop, so that he might store up a fund of useful information by the time he was fortunate enough to secure any position of responsibility. His experience had been that those young men who had in the first instance gone to one of the engineering schools and had afterwards gone into the workshop had generally begun at the wrong end. The tendency of the lad who went first of all to an engineering school and acquired some slight knowledge of what could be done upon a lathe or other simple tool was, when his time came to enter a mechanical engineering establishment, to assume he knew a great deal more than he actually did, and to give considerable offence to the workmen among whom he was placed, instead of setting himself patiently and quietly to acquire as much knowledge from them as he possibly could during the short time he would be in the shops. His view was that it was far better for a young man to enter the workshops for one or two years, and after that to go to one of the engineering schools, returning again to the workshops to finish his time. If that was done, he set himself to learn different theoretical subjects with very much greater interest, because he had somewhat definite ideas of the way in which theory could be applied to practice.

LEEDS AND BRADFORD LIGHT RAILWAY.—A scheme has been projected which has for its object the connection of the tramway systems of Leeds and Bradford by means of a line of light railway. The proposal is to construct a double line of electric tramway from the authorised Armley terminus of the Leeds tramways to the termination at Thornbury of the Bradford tramway system. An application is to be made to the Light Railway Commissioners for authority to

carry the scheme into practical effect. The lease of the Bradford Tramway Company will shortly expire, and the Bradford Corporation have in contemplation the reconstruction of the whole system on a 4ft. 8½in. gauge (instead of 4ft. as at present), making the gauges of the Leeds and Bradford system the same, and the adoption of electric traction. The proposed route passes through the parishes of Bradford, Calverley, Calverley-with-Farsley, Farsley, Stanningley, Pudsey, Bramley, and Armley. The idea is to adopt the trolley system with overhead wires. Dr. Hopkinson, who was consulted by the Leeds Corporation during the construction of the Roundhay and Kirkstall electric tramway, is the engineer of the scheme.

Sea Defences.—At a meeting of the Society of Engineers, held at the Royal United Service nstitution, Whitehall, on November 1st, Mr. G. Maxwell Lawford, president, in the chair, a paper was read by Mr. Richard F. Grantham, M.Inst.C.E., F.G.S., entitled "Sea Defences." The author referred to the rapid development of watering-places on the coast, and the large sums of money spent in their protection against the inroads of the sea; and to the loss of land in other parts by erosion. He observed that the sand and shingle freed by this erosion became the most important elements in the defence of the coast line. The removal of the drift for trading purposes therefore should not be allowed, and in many places has been prohibited. The forms of defence against the encroachment or overflow of the sea were divided by the author into three classes:—(1) Embankments of reclamation areas; (2) Upright stone, or concrete walls; and (3) groynes of timber, stone, or concrete. The walls of Canvey Island, which are 16 miles long, were described as typical of the first class. The wall fronting the Thames is four miles long, and its outer slope, the inclination of which is 3¾ and 4½ to 1, is pitched with stone, which at the most exposed portion is 40ft. broad. The top of the wall is 18ft. above Ordnance datum, and the high water of spring tides rises from 11ft. to 12ft. above that datum. The author stated that upright walls ranging in profile were usually built at seaside watering-places. An upright wall caused a lowering of the shore in front owing to the scour induced by the impact of the sea against the wall, which thus gets undermined. Several examples were quoted. The function of a groyne is to deflect the waves, so that the drift may be deposited and retained in the vicinity of the groyne. The object of the deposition and retention is to gradually raise the level of the shore, which thus becomes a defence against the scouring action of the waves. Groynes erected on the Ligurian coast of Italy, and on the Yorkshire and Sussex coasts have stopped the encroachment of the sea without the aid of longitudinal walls. A system of low light groynes recently adopted at Dymchurch and New Romney has been beneficial in raising the level of the foreshore. The points to which especial attention was drawn were the importance of the littoral drift for defence, the necessity of groynes in certain situations, and groynes as the sole means of defence.

A life of James Abernethy, C.E., F.R.S.E., past president of the Institution of Civil Engineers, written by his son, Mr. John S. Abernethy, will shortly be published by Messrs. Abbott, Jones, and Co. It will contain numerous illustrations of the important harbour and other engineering works which the subject of the memoir designed and executed.

On Monday an interesting discovery was made in Mitton churchyard by two local antiquaries—viz., Mr. T. Harrison Myres, F.R.I.B.A., and Mr. Wm. Calderwood, of Ashton-upon-Ribble. These gentlemen were making a careful examination of the sundial, dated 1683. The circular cross contains a representation of the Crucifixion, enriched by mouldings and carved fleur de lis, six in number, on one side, and on the other three carved figures under canopies, which evidently at one time formed the eastern terminal of the church, and was not, as it was erroneously supposed, the upper part of a churchyard cross. The third stone in the yard under examination appeared at first sight to an untrained eye to be the socket or base of a roadside cross. Messrs. Myres and Calderwood dug round this stone, and it ultimately proved to be an octagonal font, in the form of a shaft, 2ft. 6in. long and 2ft. wide, the basal part being square. The bowl is 13in. in diameter and 8in. deep, and with the exception of a defect on one side, is complete. It is thought to be coeval with the Late Norman style of architecture, though without date or ornamentation of any kind.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Art and Sanitation.—Sir Wyke Bayliss delivered an address on "Art" at a *soirée* on Friday night in connection with the autumn exhibition in the Walker Art Gallery, Liverpool. Referring to the connection between art and sanitary science, he asked, What was art but the science of beauty, and what was sanitation but the science of health? Could they not make their great cities more habitable, more lovely? That was the question for consideration, and he would submit six propositions. First, that the progress of art in our country and the further development of some of its characteristics have been arrested, and are now seriously impeded by the foul condition of the atmosphere of our great cities; secondly, that the constructive arrangements and appliances necessary to avoid that evil are not irreconcilable with the laws of beauty; thirdly, that the law of beauty, as well as the law of health, is that things are right only in their right places; fourthly, that if we do nothing better with works of art than to smoke them like flitches of bacon, our artists would certainly not fulfil that law of supply and demand and give us works of art suitable for that purpose; fifthly, that any great scheme for the future of national and historic art is practically hopeless so long as this state of things continues; and, finally, he put it to them that to find a remedy for those evils they must not look to the artist, for the artist looked to them to see justice done. Having referred to the chief forms of art, he suggested that the nation through its representatives should choose the event, and the artists should choose the man who should paint one picture every year of the chief events of the year, or the most noble deed done, or the highest good achieved. That would, indeed, be true historic art—the marriage of art and history.

Devon and Exeter Architectural Society.—At the meeting of this society, held on Tuesday evening in last week at the Athenæum, Exeter, a paper on "Churches and Chapels: their Differences of Object and Construction" was read by the Rev. Oswald J. Reichel, M.A., F.S.A. The Rev. W. Hohl occupied the chair. The address was archæological and ecclesiological in character, and explained, by the light of Early Roman and Byzantine usage, the distinctions between parochial and non-parochial places of worship, emphasis being laid on the fact that the term "church" originally denoted an assembly of citizens, and had only secondarily derived its present application to the building in which the congregation worshipped. Mr. Reichel urged that there was and always had been, in the use of the term church applied to buildings, a broad distinction between public churches and private churches. Public churches or ancient minsters were those provided with a staff of clergy capable of handing down tradition and exercising public discipline. Private churches were praying places for the living, or places for commemorating the dead. Intermediate between public churches and private churches were the village churches, the majority of which were originally private chapels served by itinerant clergy, but were constituted in a certain sense public churches, and endowed with tithes and lands as such by the Norman conquerors between the 11th and 13th centuries in this country. The intermediate character of a village church was therefore represented in its architecture. Instead of a presbytery, apse, and detached altar, the altar was fixed against the north wall, and seats for one, or at most three, clergy were placed on the south side. This construction of a village church has reacted on the construction of the cathedrals.

Edinburgh Architectural Society.—The thirteenth meeting of the session was held on Wednesday in last week, Mr. J. A. Williamson, A.R.I.B.A., President, in the chair. Mr. A. N. Paterson, M.A., A.R.I.B.A., Glasgow, delivered a lecture, entitled "Evolution of the House," illustrated by diagrams. Mr. Paterson first treated of the earliest developments of domestic dwellings, and then described, in historical order, the houses of the Greeks and Romans, the Saxon hall, and Norman castle, the grange and the monastery, the early town house, and the mansions of Elizabethan and Jacobean times. He traced the special Scottish developments from the 15th to the 17th centuries, and gave a short description of the Palladian type of house, and the house of the times of Queen Anne and the Georges.

Sheffield Society of Architects and Surveyors.—The monthly meeting of this society was held at the School of Art on Monday, when there was an unusually large attendance. The president (Mr. R. W. Fowler, F.S.I.) was in the chair. The following new members were elected:—As Associates: Arthur Appleby (student), Frank Barker (student), Henry W. Beale, John H. Chorlton, Sydney L. Chipling (student), Joseph W. E. Clayton (student), Herbert Ogden, George E. Turner (student). As Students: Wm. C. Antcliffe, Charles F. Bond, Herbert S. Hague, Thomas Jowitt. Mr. J. A. Gotch, F.R.I.B.A., F.S.A., of Kettering, delivered an interesting lecture on "Eighteenth-Century Architecture," which was amply illustrated by numerous photographs of buildings. The lecturer said the view of architecture taken in the 18th century was very narrow, being little more than a consideration of the Five Orders. Architectural design was amateurish and artificial, and its professors were far behind the great masters, Inigo Jones and Wren, in ability. The large houses, of which many were built for great nobles, were devised for display rather than comfort. The smaller houses, however, were much more pleasing, and there are few towns which do not possess specimens of the Queen Anne or Georgian house, simple and appropriate in design, and marked with enough character to render it interesting. The interiors of these smaller houses are generally well treated, and the woodwork of the period still furnishes abundant hints to designers of the present day. One inheritance we have from that time which alone would render it memorable, namely, the sash window.

The Architectural Association of Ireland.—The Architectural Association of Ireland held their usual fortnightly meeting in the Grosvenor Hotel, the President in the chair. Mr. T. R. Scott delivered an address on "Furniture," chiefly from a practical point of view. The lecturer illustrated his remarks by a large number of specimens of work, finished articles of the Sheraton and Chippendale periods, and examples of Early Victorian, these last chiefly as specimens of what to avoid in design and construction. Mr. Scott also sketched numerous diagrams on the blackboard. He dwelt on the importance of allowing sufficient time to execute an order in, reminding his hearers that there was no such thing as timber over 3in. thick seasoned fit for immediate conversion into articles of furniture. Hence, he said, architects should design so as to admit of small scantlings being used, and, if necessary, built up to avoid the use of great masses of solid wood. The lecturer strongly advocated the great utility of dowelling as opposed to tenoning for indoor joinery. At the conclusion of the lecture, Mr. Scott answered numerous inquiries. Mr. Moore proposed a vote of thanks, saying he had often been troubled to get a tenon in certain forms of construction which would really hold the work together without cutting away all the stuff, and said dowelling appeared to afford a valuable method of dealing with certain problems. Mr. R. M. Butler, in seconding the vote of thanks, thanked the lecturer for the eminently practical address delivered. He said it was oftentimes a source of difficulty for an architect to know the very best method of construction in every handicraft, and one felt small if some shop foreman pointed out utter impracticabilities in a working drawing. Lectures like Mr. Scott's would do much to tell the members many things that could not be learnt from books. Mr. George Sheridan and Mr. Holloway also spoke. The president, in putting the motion, said many theorists said an architect should first be a craftsman and then a designer. He supposed one should first spend a year or two in a carpenters' shop, then in a forge, another year at a cabinet-maker's, another at a stained-glass works, and yet another at a foundry, and if the architect then had any spare time, he might devote it to picking up something of architecture; but he thought the nearest thing to such a course in these times were lectures like these. It was announced that Mr. A. W. Moore had been appointed joint secretary in the room of Mr. Gleave, resigned; and that Mr. Geo. Sheridan, A.R.I.B.A., had been co-opted a member of committee to fill the vacancy created by Mr. Moore's appointment; and Mr. Joseph Geoghegan had been appointed honorary librarian in the room of Mr. Frederick Hicks, resigned. Mr. Butler announced that he hoped to make arrangements for further practical

lectures on handicrafts, the next of which would be on the 16th inst., when Mr. McGloughlin would lecture on "Wrought Ironwork." Visits would also be paid to the workshops and forges. Four new members were declared elected.

CHIPS.

In the case of the application for discharge from bankruptcy of Henry Foster, of Plymouth, builder, the discharge has been suspended for six months, ending March 22, 1898.

A new Lyric Theatre is about to built at Eccles from plans by Messrs. Campbell and Horsley, of Manchester. It will be Renaissance in style, and faced with red terracotta and Rainhill stone dressings. It will contain over 1,270 seats.

Mr. H. Shaw, an inspector of the Local Government Board, held a public inquiry at the Hall Hotel, Hope, with reference to the application of the rural district council of Chapel-en-le-Frith, to borrow £1,800 for the purpose of providing a water supply for the township of Hope. The plans were explained by Mr. Wm. Sterling, of the firm of Sterling and Swann, engineers. There was no opposition.

A lych-gate, constructed by Messrs. Harry Hems and Sons, of Exeter, has just been placed at the entrance to the churhyard at Hooton Pagnell, near Doncaster. It is of oak, resting on dwarf walls of local masonry, and is covered in by red tiles. It was designed by Mr. E. Bernard Wilson, architect to the Frickley estate, and is Perpendicular in style.

New sewerage works constructed for the urban district council of Thurlestone, near Penistone, at a cost of £5,600, were opened last week. Mr. T. Aird Monroy, of Sheffield, was the engineer, and Mr. Frank Eyre, of the same city, the contractor.

Whilst some quarrying operations were being carried out recently at Messrs. Parker's quarry on the Totnes-road, near Newton, the opening to a large cavern was exposed. It consists of three chambers, the largest about 100ft. in length, and it is incrusted with innumerable stalactites and stalagmites of various shapes and sizes, and of different periods of growth. As yet no attempt has been made to discover the actual size of the cavern, and several passages remain to be explored. Appearances indicate that the cave has never previously been entered either by man or beast.

The chancel of the parish church of Bottesford, near Grantham, which already contains many handsome memorials of the family of the Duke of Rutland, has been further enriched by the insertion of another stained glass window to the memory of the late rector, Canon Norman. The window contains three lights, which respectively portray the texts, "I am the Light of the World," "I am the Bread of Life," and "I am the Good Shepherd." The window, which is very effective, is from the studio of Messrs. Jones and Willis, of Birmingham, London, and Liverpool.

The new sanatorium, Brighton, is being warmed and ventilated by means of Shorland's patent Manchester stoves, with descending smoke flues, and Shorland's patent Manchester grates, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

The burgh commissioners of Langholm, N.B., held a special meeting, on Monday, to consider the Langholm Bridge dispute. A letter was read from Mr. Knox, the contractor, offering to submit the question to Mr. Barbour, architect, Dumfries, and Mr. Burnet, architect to the Duke of Buccleuch, or any other competent person who was not one of the burgh commissioners. He, however, reserved the right to appoint one arbitrator on his own behalf. It was unanimously resolved to allow the matter to be settled in the law courts.

The parish church of St. Mary, Playford, near Ipswich, was reopened on Wednesday week, after the re-roofing of the nave, as a memorial of the Queen's Diamond Jubilee. Formerly the nave was ceiled, and the rafters above had become rotten, so that it was absolutely necessary that the roof should be restored. A plain open roof of oak has now been substituted, the work being executed by Mr. A. Kersey, Great Bealings. New gable crosses have been placed at the east and west ends of the nave, the work being executed by Mr. Stephenson, Woodbridge. This has completed the restoration of the church, for the chancel and organ chamber were entirely rebuilt in 1873 by the Marquis of Bristol, and in the following year the body of the church was filled with oak benches, and a new pulpit was erected.

At the annual meeting of the Newport (Mon.) Town Council, on Tuesday, the Corporation seal was affixed to an agreement with Mr. Baldwin Latham on his appointment as engineer to the Wentwood Water Works. It is reported that the expenditure on the works up to the present is over 100,000.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and Sixpence for every eight words after. *All Situation Advertisements must be prepaid.*

NOTICE.

Bound copies of Vol. LXXII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

SAXON. (We have had quite enough of the correspondence, and we are not going to add fuel to fire by inserting your letter. It is libellous. People who use the word "untruthful" must put names and addresses to their letters if they expect them to appear.)

RECEIVED.—P. P.—G. B. W.—S. T. W. and Co.—B. N. D.—V. L. M.—A. O. A.—R. S.

"BUILDING NEWS" DESIGNING CLUB.

SECOND LIST OF SUBJECTS.

B.—A small coachhouse and stable forming an entrance-way to the grounds of a country house, the coachman's dwelling being included and used as the lodge for this approach. The building is to stand on the frontage line of the property facing a high road. The accommodation is to provide for four stalls and two loose boxes; a coachhouse for four traps or carriages, a harness-room and washing covered space, and a loft for hay and corn. The entrance way to be large enough to drive through. The dwelling to comprise a small parlour, good kitchen, 16ft. by 14ft., and larder, small scullery, and wood shed; three bedrooms, one of which to be reached from loft, for use of groom. A man's w.c. besides that for use of lodge. No limit is placed on the site frontage, which is straight and level, facing N.W. The price will govern the undertaking, and £1,500 is the contemplated outlay. Style to be suited to a stone district, and roof covered with tiles. Picturesque simplicity and grouping is to be aimed at, and fussy, meaningless detail avoided. Scale, 8ft. to the inch. The plans may be 16ft. to the inch if desired. A perspective view of the front is essential, and sufficient elevations and sections to illustrate the design properly.

DRAWINGS RECEIVED. — "Spero," "Check Mate," "Bonum Consilium," "Cobden," "Petticoats," "Bull's Eye," "Wen," "Go," "Dachi," "Orb."

Correspondence.

ENGLISH AND IRISH ARCHITECTS.

To the Editor of the BUILDING NEWS.

SIR,—I am loth to trouble you with another letter, but the statements of "A Ghost who has Walked," in your last issue, are calculated to mislead your readers.

He says the revival of the Architectural Association of Ireland is entirely due to Englishmen. It is only fair to say that this project was first suggested some few years ago by an Irishman now fulfilling a professional engagement in London. Chiefly owing to his departure it remained in abeyance until some twelve months since, when it was revived through the letters of two gentlemen, Messrs. Gavagan and Macnerney, addressed to a daily journal. To them is due the fact that the movement took shape when it did. Beyond the fact of desiring to give credit where it is due the members of the Association are, as far as I am aware, not guilty of the ill-bred impertinence of inquiring into the religious belief and nationality of their fellow-members and of the friends and well-wishers of the Association as "Ghost" would have your readers believe.—I am, &c., R. M. BUTLER.

Dublin, Nov. 8.

Memorial stones of a Wesleyan chapel were laid in Sidney-street, Burton-on-Trent, on Wednesday week. The building will be Gothic in style, will seat 400 people, and will cost £1,300. Mr. C. F. Underhill, of New-street, Burton, is the architect, and Mr. J. Harlow the contractor.

The new hospital at Kettering, built from plans by Messrs. Gotch and Saunders, of that town, was opened on Saturday. It contains 22 beds, and is built of local brownstone, with Weldon stone dressings, the roof being tiled. The two large wards are each 40ft. by 24ft. Mr. A. Barlow, of Kettering, was the builder, and Mr. G. Vinell, of Oxford, the clerk of works. The outlay has been under £6,000.

Foundation stones of Wesleyan schools at Holly Hill, Felling, were laid on Friday. The building is of local stone. A central hall or school room, 57ft. by 30ft., forms the main department, having at the sides halls, book stores, cloak rooms, and four classrooms each 12ft. square, and two larger classrooms, the latter being divided from the school room by movable partitions. Mr. James W. Frazer, of Newcastle-on-Tyne, is the architect, and Mr. Robert Davidson, of Felling, the contractor. The cost will be £1,500.

On Sunday a new pulpit was dedicated at St. Budock's church, Cornwall. The pulpit is of carved oak, standing on a massive pedestal of Breage granite and steps of the same. Mr. Carah, of Praze, executed the work.

Gas and water companies have the privilege of using the subways along the streets of the Metropolis on more favourable terms than other companies. Desiring to participate in these benefits, the London Hydraulic Power Company claimed that the London County Council's charges against them should be reduced to the level of that of a water company. The point having been argued before a Divisional Court of the Queen's Bench on Saturday, Justices Wright and Kennedy held that the Hydraulic Company was not a water company, their duty being not to supply water to the public, but to return it to the river when they had done with it. Judgment was, therefore, given for the County Council.

The Bishop of London visited West Green, Hornsey, on Saturday afternoon, and dedicated the wrought iron chancel screen, stained east window, and lectern, which have just been placed in Christ Church. The window is of five lights, and represents as many incidents in the Life of our Lord. All three additions have been executed by Messrs. Jones and Willis, of Great Russell-street, W., and Birmingham.

The asylums committee of the London County Council will shortly ask the Council to sanction a large expenditure for the provision of temporary buildings for the accommodation of female lunatic patients on the Horton Manor Estate, Epsom. It is on this estate that the Council is about to erect a permanent asylum, but, as this cannot be finished before the end of the year 1900, it has become necessary to immediately provide further accommodation. The Bexley-heath Asylum, which is now being constructed, will not be finished until the beginning of 1899. The primary cost of the proposed buildings, which are designed to be occupied for 15 years and to accommodate 700 female patients, is £147,000. It is proposed to complete the temporary buildings within the next twelve months.

Colonel Hepper, C.E., an inspector of the Local Government Board, held an inquiry on October 28th at Holloway, Derbyshire, touching an application to borrow £850 to remedy a failure of a water scheme put down at a cost of £2,300 a few years ago. The application was made by the Rural District Council of Belper, and it appeared that the whole of the higher portion of the district of Dethick, Lea, and Holloway is without water, and has been so for three months. The scheme laid down was reported upon by Mr. Frith, C.E., and he recommended taking out the two engines used to pump the water to the higher level, and the substitution of others calculated to do the work.

"PHOTO-TINT" by James Akerman 8 Queen Square London W.C.

MESSRS PEACOCK WILLSON & CO'S BANK LINCOLN

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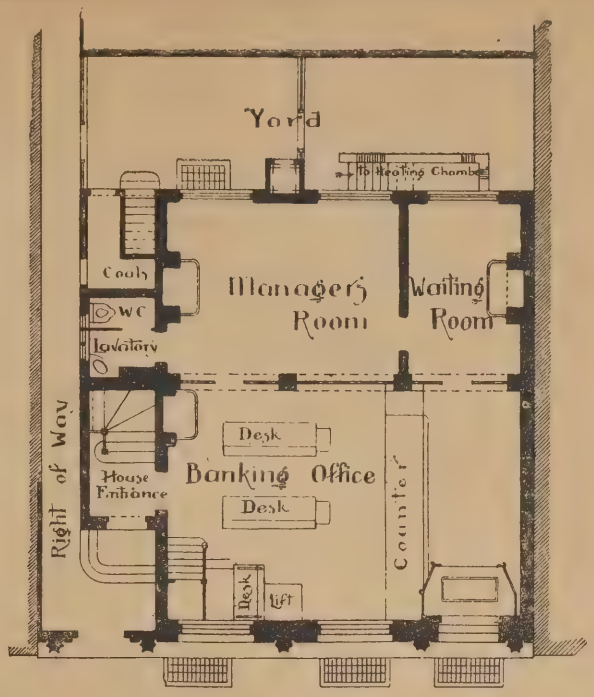
Our Illustrations.

HAMPSTEAD CENTRAL PUBLIC LIBRARY.

Our illustration represents the building, which was opened on Wednesday, the 10th inst., by Sir Henry Harben, who is the donor of £5,000 for its erection. By the plan published, it will be seen that the whole of the original scheme has not yet been completed, the intention being at some future time to use the present lending library as a book store, and to erect a new one, together with a lecture hall, &c. (on the level of the upper ground floor) upon the remainder of the site to the west of the Arkwright-road entrance. The building is faced with Cranleigh red bricks, with Portland stone dressings, and has been carried out in a phase of the Later Tudor style, with large mullioned windows with iron casements, in order to obtain thoroughly good lighting to all parts. The reference library has an open-timbered roof. The news and magazine room roofs, which are partly open, in order to get the largest possible amount of air-space, are finished with plaster between the wooden beams so as to form panels. The two latter rooms adjoin with an arcade of Hopton wood stone between them. The building has been successfully carried out by Messrs. F. Gough and Co., of Hendon, whose tender, amounting to £4,954, was accepted by the vestry. The same firm has carried out the rest of the work, which consists of forming the boundary walls of the same materials as the building, and curved sweeps of York stone steps up to the porch facing Arkwright-road. The central hall and corridor are paved with mosaic, executed by Messrs. B. Ward and Co., of 15, Great George-street, Westminster. The building is heated throughout on the low-pressure system. The upper ground-floor is fitted with a circulation of 2in. wrought-iron pipes and radiators. The electric lighting has been carried out under the supervision of the vestry's electrical engineer. The furniture has been executed in teak, according to the designs supplied by the architect, Mr. Arnold S. Tayler, of 2, The Sanctuary, Westminster.

ALDFORD RECTORY, CHESTER.

This view, which we give with a copy of the ground plan, illustrates this characteristic country rectory from the garden. The copings and dressings generally are of stone, the walls being of brick. A distinguishing feature of the plan is the commodious hall, and a parish room with a distinct entrance is usefully contrived. The architects are Messrs. T. M. Lockwood and Sons, of Chester.



MESSRS. PEACOCK, WILLSON, AND CO.'S LINCOLN BANK.

These premises, which have just been opened for business purposes, have a frontage of 40ft. to the High-street, Lincoln. The basement, lined throughout with glazed brick, contains the strong-room, clerks' cloakroom, store-room, and heating chamber, the latter being approached by steps in the yard at the rear of the building. The ground-floor is occupied by the banking office, manager's-room, waiting-room, and the lavatory, &c., in connection therewith; a lift is provided to convey the ledgers and cash from the banking office to the strong room in the basement, which is also approached by a small staircase descending beneath the platform of the manager's desk. The remainder of the ground-floor is occupied by the entrance and staircase to the manager's house, which entirely occupies the first, second, and third floors, and is also approached by an open stone staircase in the yard at the rear, where a lift is provided to convey tradesmen's goods, coals, &c., to the kitchen. The building is wired throughout for the lectric light, and warmed by hot water on the low-pressure system. The bank office is finished with oak dado, screens, and doors, mahogany desks and counter, and fibrous plaster enriched walls and ceiling, with oakwood block flooring on the clerks' side of the counter, and marble mosaic on the customers' side. The whole of the moulded and enriched work in the front elevation has been executed in Doulton's brown buff terracotta, the manufacturers of the other special works being Messrs. Dorman, Long, and Co. for steelwork. The general contractors were Messrs. Wadsley and Co., of Billingborough, the amount of their contract being £3,900, exclusive of bank fittings. The architects were Messrs. Watkins and Son, of Lincoln.

COURT HOUSE, HALIFAX: SELECTED DESIGN.

We give the plans and elevations of the new Court-house and Police-station, which the corporation are about to erect on the site of the old infirmary, from the designs prepared by Messrs. George Buckley and Son, architects, of Tower Chambers, Halifax. The police entrance is from Carlton-street, and leads into a large entrance hall. The police-offices front to Harrison-road, and are reached by a wide corridor. The charge-room and inquiry office is in close proximity to the entrance hall, and the cells are placed round the parade ground. To these a special corridor leads, commencing with a lobby for the prisoners waiting to be charged. Near at hand is the search-room. To the right of the entrance-hall is a large parade-room, and fine wide staircase leading to the first floor with a large recreation-room, policemen's lavatories, bathrooms, &c., also to the basement and minor offices of this department. The warrant entrance is in Harrison-road, and leads to the inquiry and warrant-office, and the rooms of the magistrates' clerk, chief constable and his clerk on the first floor. The magistrates will enter from Blackwall. On the ground-floor are the magistrates' cloakroom, a small retiring-room, and the lunacy-room. The entrance-hall here is a well-proportioned one, and gives access to a wide staircase leading to the magistrates' retiring-rooms and Court-house. One of the rooms for the magistrates—a large one—may be used as a subsidiary court. The solicitors' entrance stands in Blackwall, too, and their rooms, and those for clients and witnesses front to Ferguson-street. The general public will have an entrance from Ferguson-street, and a large entrance-hall is provided which will meet every tax upon its capacity when, for instance, the Court is cleared. On the ground-floor accommodation is also provided for a gaoler's house and matron's apartments. The Court-house is well-lighted, and has open areas on two sides. Conveniences and cloak-rooms will be provided in every department, and there is a large open parade-ground with a covered portion. A four-stall stable will stand at the back, together with a coachhouse and harness-room, with a hay-loft above. The style of the exterior is Renaissance. We published the first premiated design from the late competition held for this building in our pages for October 29 last.

TOMB OF FILLIPO DECIO AT PISA.

This famous sarcophagus at Pisa, by Stagio Stagi, is in the Campo Santo, and this beautiful tomb of the Cardinal is the chef-d'œuvre of the artist. Among other specimens of his magnificent carving are the candelabra on either side of the high altar in the Duomo of Pietra Santa, a small place north of Viareggio, about 40 miles from Pisa, and in the Duomo at Pisa is an altar-piece from his hand in white marble. Stagio Stagi, like many other Italian artists, seldom did any work far away from his native place and its neighbourhood. A cast of this monument, which we illustrate to-day, is to be found in South Kensington Museum. The work dates about 1530. Our illustration is from a very delicate pencil measured drawing made at Pisa from the original, by Mr. H. V. Lanchester, and the details given of the ornament are most useful and suggestive.

MRS. WALDO'S HOUSE, MADISON AVENUE, NEW YORK.

This handsome building, situated on a corner site in the aristocratic thoroughfare of Madison-avenue, is a somewhat plain adaptation of the French Renaissance style. It is built of stone, and is well-lighted throughout, and in quiet dignity is a welcome relief from the ornate affectations of so much of the American work. Messrs. Kimball and Thomson are the architects. Our illustration is from the pages of the *American Architect*.

Col. Rowlandson, the new Mayor of Durham, is the land agent to the Dean and Chapter of Durham.

HALDEN . 97.

MRS. WALDO'S HOUSE • 728 MADISON AVE.
N.Y.
KIMBALL & THOMSON ARCHT'S.

Intercommunication.

QUESTIONS.

[11835.]—**Parchment Plans.**—I shall be glad to know what is the best substance for mixing with ink and colour to prevent "running" in the preparation of plans on parchment paper.—T. A. W.

[11836.]—**Repairing Drain.**—Where the yard grid of a person's property drains an area common to several properties, and consequently different owners, does not this form a public drain or sewer repairable by the local authority, on the principle that a sewer serving more than one house is termed "public," and, although the owner has been called upon by the local authority to repair and make good same, have at last done it themselves, free of cost?—YORKSHIRE BITE.

[11837.]—**Pavement Slabs.**—Having a quantity of granite chips I wish to make into slabs for paving and other purposes, will some kind reader say whether I shall require a crusher and other machines or cement? If so, what quantities, and how to mix? Any other hints for making concrete landings and steps.—ABERDEEN.

[11838.]—**Measuring-off Works.**—Is it not unusual for an architect of a building to allow the contractor to bring an outside surveyor to check him in measuring-off additions and deductions, either at the completion of the works, or where the contractor has been stopped for negligence and not complying with the terms of the contract?—DOUBTFUL TOMMY.

[11839.]—**Blisters.**—I have a pitch-pine door facing south, made and hung in 1892, which has been painted three times. The outside is painted and varnished, but it blisters where the knots are, also where there are no knots. I shall be glad if any of your readers can say what is the cause, and suggest a remedy.—PUZZLED.

[11840.]—**Measurement of Stonework.**—Which is the best way of measuring stone; should it include labour? Many directions are given, but I should like to know the practice recommended by the best surveyors.—STUDENT.

[11841.]—**Queen Anne Churches.**—Will any reader give me the names of a few good examples of churches built or restored during the period in the neighbourhood of London?—X.

[11842.]—**Artificial Stones.**—Which is the most durable stone of this class for paving, and cost per yard? A reply will oblige—A SURVEYOR.

REPLIES.

[11831.]—**Bright Red Cement.**—Use Venetian red, or any other red oxide of iron, to colour the usual cement the required bright colour.—H. C. S.

[11831.]—**Bright-Red Cement.**—Oxide of iron is usually employed for staining Portland cement, the proportion required being regulated by the tone of colouring required, which is best determined by mixing several samples in varying proportions. The result, as far as colouring goes, is not generally everything that could be desired. Venetian red gives a better shade of colour, but deteriorates the strength of the cement. Brickdust requires to be ground very fine to act as a good staining matter.—THOMAS POTTER.

[11833.]—**Painting Galvanised Roofing.**—Metallic zinc, or iron galvanised with zinc, may be painted on with ordinary paint if the metal be first prepared in one of the following processes:—No. 1.—Dissolve 64 parts (by weight) of water 1 part (by weight) of chloride of copper, 1 part (by weight) of nitrate of copper, 1 part (by weight) of salammoniac, and when these salts have dissolved, add 1 part (by weight) of hydrochloric acid, and brush this over the zinc with a mop or old (but clean) brush, and in 12 to 24 hours proceed to lay on the paint in the usual way. No. 2.—Take some hydrochloric acid, and "kill" (i.e., neutralise) this acid by dropping in pieces of zinc until effervescence ceases, then add an equal bulk of water, and lay this compound (fluid chloride of zinc is highly poisonous to cuts in the flesh) on the zinc surface, and after a short time wash off the compound water or diluted vinegar, and then dry the surface of the zinc and proceed to paint it. If the galvanising is a tin, instead of zinc, coating, the following paint may be used:—Mix together by grinding 30 parts (fluid measure) of linseed oil, 10 parts of oil of turpentine, 14 parts of red oxide of iron, and 46 parts of red ochre (or ammonium boli); reduce, if required) with a mixture made of equal parts of linseed oil and turpentine. Give two coats, allowing the first to dry before applying the next, but do not lay them on too thick, and be sure the metal is free from rust or grease (a wash all over with diluted hydrochloric acid will sufficiently cut the grease to enable the paint to adhere.—H. C. S.

[11833.]—**Painting Galvanised Roofing.**—Galvanised iron is better left a short time, then washed or scrubbed, and painted with one or two coats of Torbay oxide paint, as circumstances permit. The durability of galvanised iron depends largely on the purity of the surrounding atmosphere. In country places it will last 30 to 40 years, in towns it depends upon surrounding conditions. If the air is charged with sulphur fumes the zinc coating is soon destroyed. Owing to competition in prices, galvanised iron is not so good, as a rule, as it used to be.—THOMAS POTTER.

[11833.]—**Painting Galvanised Roofing.**—I should advise "Much Advised" to follow the recommendation of his second friend, to wait some time before painting his galvanised iron roofing—until, in fact, the "salts of the galvanising" are out. To paint it at once would be probably to court failure. My experience of painting galvanised iron roofing has been that after a few months the coating peels off. The boiled linseed-oil coating is no doubt a good preparation, but the oxide of iron paint will be sufficient after the "salts" disappear.—AN ARCHITECT.

[11834.]—**Section of Girder.**—The way to calculate the required sectional area of a rolled iron girder when the load is in a certain position is shown in most manuals. The expression is $M = Wx - \frac{Wx^2}{l}$ = maximum moment of stress, W indicating the load, and x the distance from support. Manufacturers of rolled joists publish tables showing strength of sections they supply, and will give "L. H." all he requires. For structural work, an ultimate strength in tension of 28 to 32 tons per square inch is given. Take for working stress, one-fourth—OTHO.

CHIPS.

At Fazeley, near Tamworth, the foundation-stone was laid on Saturday of a public hall to be given to the village, at a cost of £2,000, by a Burton brewer.

The career and works of Mr. Walter Emden, J.P., L.C.C., the newly-elected President of the Society of Architects, form the subject of a special article in the last issue of the *Era*.

Mr. Astor's huge table, made of a single sectional piece cut out of a Californian redwood tree, has arrived at Clivedon. It was brought by road from London, and reached its destination on Saturday night. The slab weighs 13½ tons, and stands 16ft. high. The journey from London occupied two days, although the trolley was drawn by several horses. There were several mishaps on the road.

The Bishop of Clifton performed the reopening ceremony at the Convent of Mercy Chapel, at Westbury-on-Trym on Tuesday. The church has been decorated in the Italian style by Mr. Hopkins, of Birmingham.

The Bristol Town Council have decided to postpone for the present the scheme for extensive dock extensions at Avonmouth, in order to allow time for further negotiations with the railway companies, whose co-operation is necessary.

The memorial stone of a parish room at Steventon, Bedford, was laid on Thursday in last week. The building will cost £650, and will be of local red bricks with stone dressings. The architects are Messrs Usher and Anthony.

The Bishop of Reading has dedicated a churchyard cross at Glympton, near Woodstock, which has been erected to the memory of the late Mr. Henry Barnett, of Glympton Park. The cross, of Portland stone, consists of a tall column resting on a base of two broad steps. At the top of the column, under a slightly recessed canopy, there is a carving in relief of the Crucifixion, with the attendant figures. The cross was designed by Mr. W. J. Tapper, of Gray's Inn.

At Emmanuel Church, Camberwell, on Sunday, the Bishop of Rochester dedicated an east window. The window is one of three lights, representing "The Adoration of Christ in Paradise by Saints and Angels." It has been designed and executed by Messrs. Powell, of Whitefriars.

The work of restoration in Oldham Church is now accomplished, so far as the first part of the scheme is concerned, which includes the restoration of organ and tower, rehanging of twelve bells, and adding chiming apparatus to eight bells, the reseating of part of the nave, the fitting-up of a choir vestry, and the relighting of the nave. This church was built by special Act of Parliament in 1829. The first stage of restoration embraces half the pews in the centre of the nave, and among the alterations is the removal of an iron grille which was formerly drawn across the aisles to separate the few narrow free seats from the cushioned and carpeted square pews.

A church mission-room has been erected at Fitzhugh, Southampton West. The building is 53ft. by 20ft. The height of the walls, of fair red brickwork, is about 14ft. to the wall plate; and the roof is open-timbered. There is sitting accommodation for 150 persons. The mission-room was designed by the honorary architect, Mr. A. F. Gutteridge, of the firm of Messrs. Mitchell, Son, and Gutteridge, and the erection was carried out by Mr. A. Warden.

Mr. Henry Adams, of Grayingham House, Worthing, and of 250, Camden-road, upholsterer, for many years with Maple and Company, and a director since its formation of the Maple Company (Limited), who died on September 19, aged 72, left personal estate of the value of £92,153.

Sales were not very numerous at the Auction Mart last week, but the results were, on the whole, highly satisfactory. The aggregate realisation as registered at the Estate Exchange was £119,586, which showed a large advance on the amount recorded for the similar period of 1896, when the total was only £49,335.

Arrangements have been made for commencing the extensive alterations and improvements in connection with the Pontefract Workhouse. These consist of developments of the accommodation for vagrants, and extensions of the laundry arrangements. The total amount involved is £7,695. Mr. W. H. Greaves, of Pontefract, is the architect.

The Queen has bestowed the Silver Jubilee Medal upon Professor George Aitchison, A.R.A., President of the Royal Institute of British Architects.

The Midland Railway Company's engineers are at the present time surveying in Sheffield with a view to the widening of the main line between Dore on the south and Masborough on the north, a distance of nine miles. The engineers have also been instructed to report upon the advisability and probable cost of building a new station in a more central part of the city.

At the church of St. Mark, Fitzhugh, near Southampton, built in 1891, an organ has just been erected, and was dedicated last week. It has cost, including the oak case, £800, and was constructed by Messrs. Ginns Brothers, of Merton.

The annual dedication festival of Almondbury Church was marked by the dedication of a marble pavement, and a new screen at the west end. The pavement has cost £250, and the oak screen, fitted with cathedral glass, was carried out by Messrs. Holland, of Huddersfield. The north internal wall has been stripped of plaster, so as to reveal the original stonework, and it is contemplated carrying out this work with regard to the remainder of the walls. The font is to be placed at the west end of the south aisle. It is intended that the verger's house in front of the tower shall be pulled down, so as to open out the west end entrance.

Mr. William J. Akin, assistant to State Architect I. G. Perry, and resident architect and building superintendent of the St. Lawrence State Hospital, died on Oct. 24 at Ogdensburg, N. Y.

The Staffordshire County Council have appointed Mr. K. Walter Gregory as assistant surveyor for the Leek district, in succession to Mr. Kinnison, resigned; the commencing salary is £175 per annum.

At the Central Criminal Court on Friday, the Common Sergeant sentenced a man named Frederick Fenn, who called himself an architect, to five years' penal servitude, for being concerned in a conspiracy to defraud the public by bucket-shop stockbroking swindles under the names of Hartridge and Co. and Frank Tarrant and Co.

The Secretary of State for India has appointed Colonel Sir William Sinclair Smith Bisset, K.C.I.E., R.E., late Secretary in the Public Works Department of the Government of India, to be Government Director of Indian railways, in succession to General Sir Edward Williams, K.C.I.E., R.E., whose tenure of the office has expired.

At Mostyn House School, Parkgate, the Bishop of Chester dedicated last week a new chapel. It is built of Ruabon brick and terracotta facings, is of Gothic character, and is said by local journals to have been designed by the master, Mr. A. G. Grenfell, the work being carried out by Mr. W. Fleming, of Neston. The interior fittings of the church were designed by Messrs. Frazer and Warburton, architects, Warrington. The seating is of polished pitch-pine, while the panelling and framing is of the curly pitch-pine. The seat ends have been carved by Mr. T. A. Allen, of Chester. The flooring is of teak wood blocks, laid to a special design, while the roof is of pitch-pine. The terracotta was supplied by Mr. J. C. Edwards, of Ruabon.

The River Tyne Commissioners considered in committee, on Friday, in Newcastle, a communication from Sir J. W. Barry and Messrs Coode, Son, and Matthews, engineers, London, principally having relation to the damaged North Pier. Several of the members were in favour of the work being carried out by their own workmen, under the supervision of their engineer, whilst others proposed that the responsibility of seeing to the repairing of the damage to the pier be intrusted to the London engineers, and that the work be carried out by contract. After a long conversation, it was decided to adopt the second proposal. The following candidates have been selected from the applicants for the position of chief engineer to the commissioners:—Mr. Jas. Walker, Douglas, Isle of Man; Mr. Alexander Hamilton, Clyde Trustees, Glasgow; and Mr. M. F. S. Wilson, Harbour Works, Dover.

A memorial service was held on Tuesday in the church of St. Cybi, Holyhead, on the occasion of the opening of a south aisle to the chancel, and the unveiling of an altar-tomb, in memory of the late Hon. William Owen Stanley, of Penrhos. The altar-tomb, which is by Mr. Hamo Thornycroft, R.A., is Italian Renaissance in style, and it is executed in white Carrara marble. It consists of a life-sized recumbent figure of Mr. Stanley, with watching angels at the head and feet: the one seated at the head, representing Immortality, holds a wreath; the other, representing Death, holds an inverted torch. The wings of the angels are outstretched, and almost meet above the effigy. The front and ends of the base, immediately below this group, are enriched by panels in low relief, the centre panel containing the inscription tablet, supported by kneeling figures. The architect of the new aisle is Mr. Harold Hughes, F.R.I.B.A., of Bangor, and the builder Mr. Bridgeman, of Lichfield.

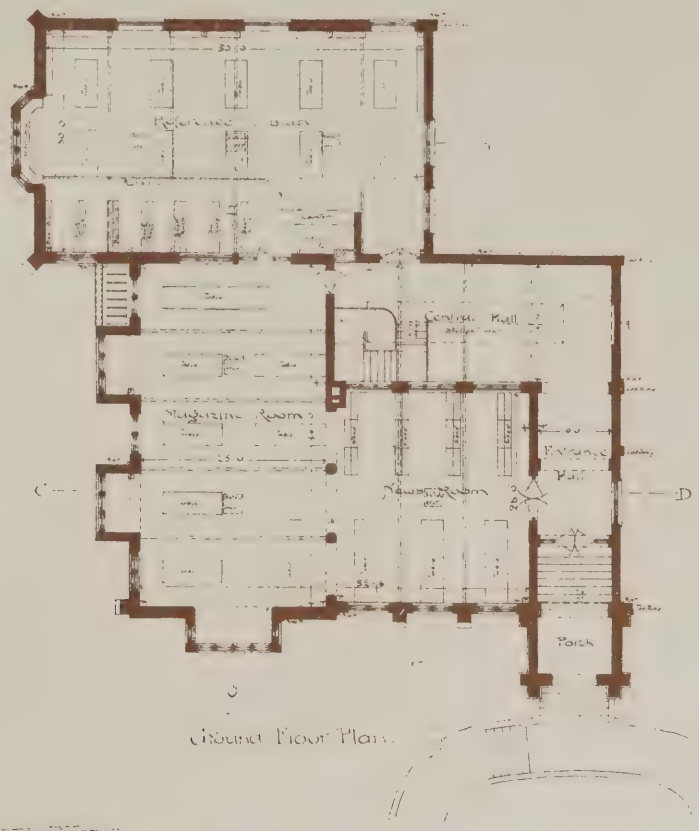
Public Library

Arnold S. Tayle

Lower Ground Floor Plan.

at Hampstead.

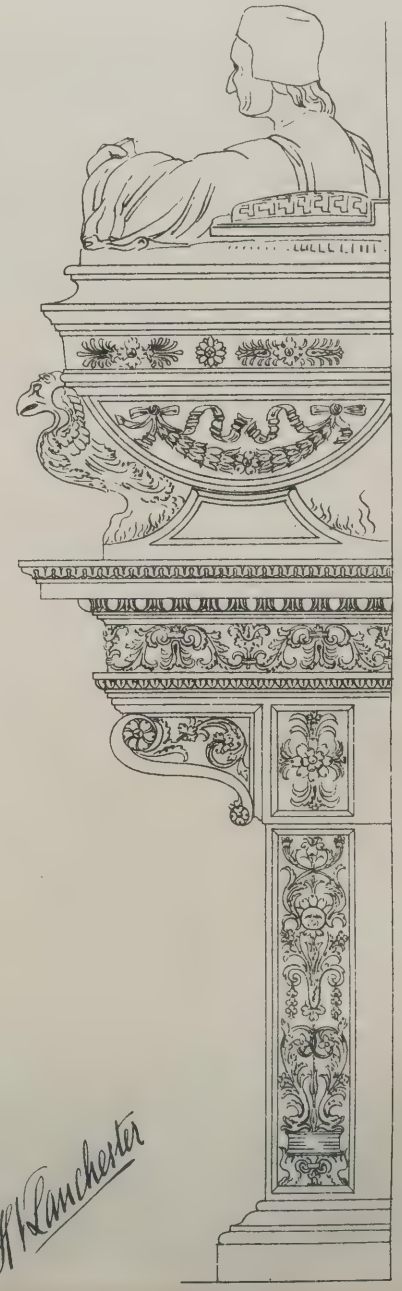
A.R.I.B.A. Architect.



Ground Floor Plan.

Photo Lithographed & printed by James Ackman 6 Queen Square W.C.

Front Elevation



End

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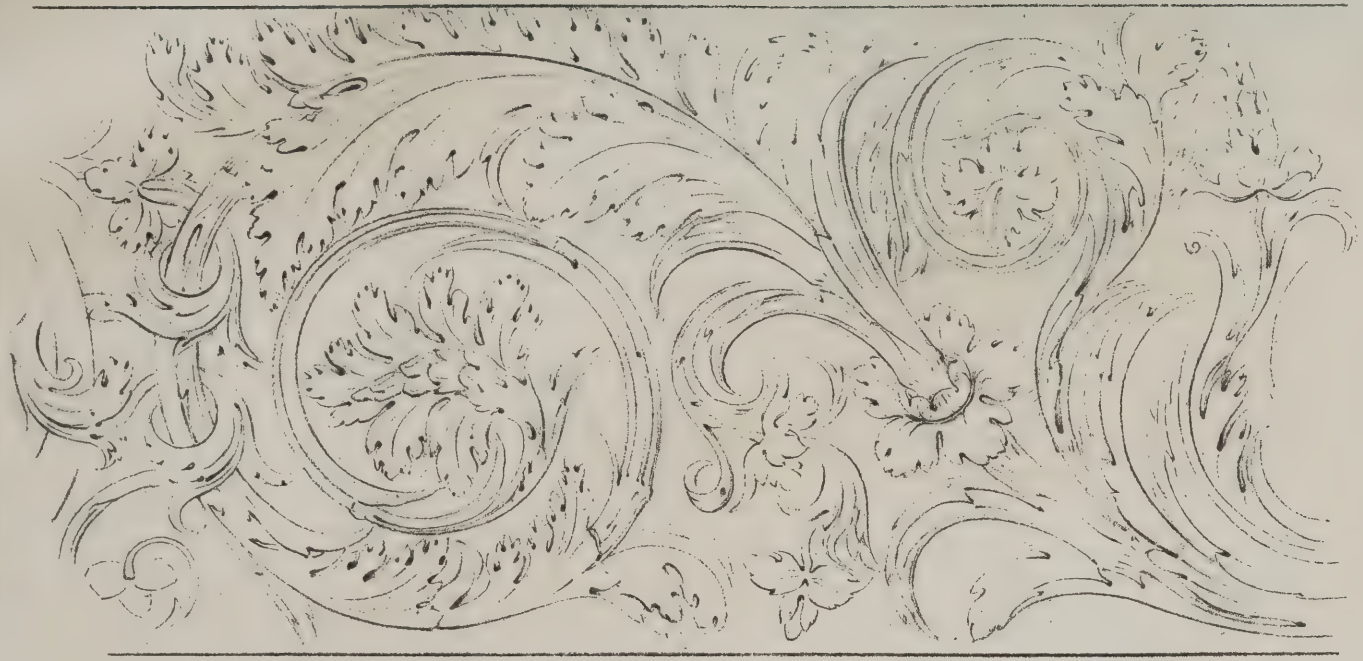
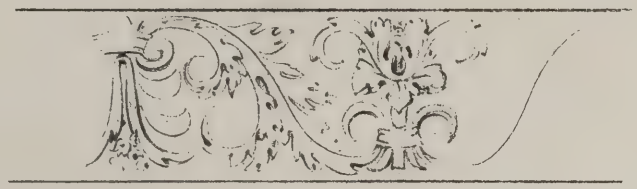
Tomb of Fillipo Decio at Pisa — Italian abt 1530

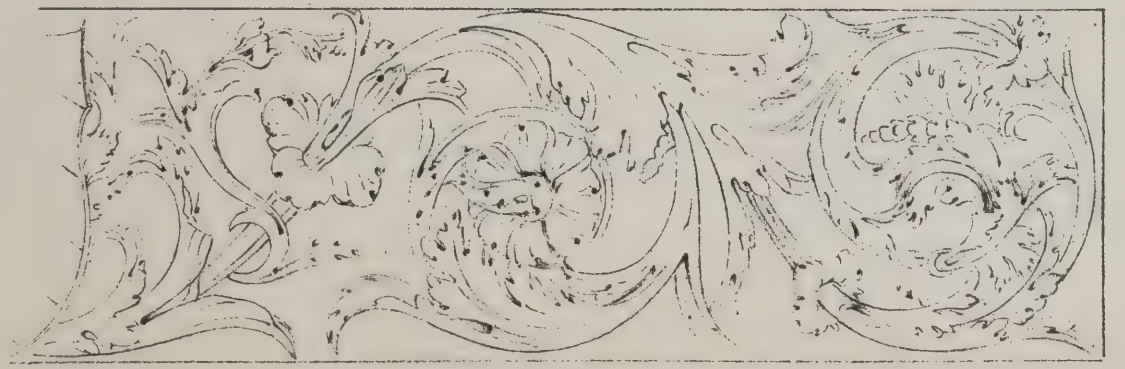
by Stagio Stagi

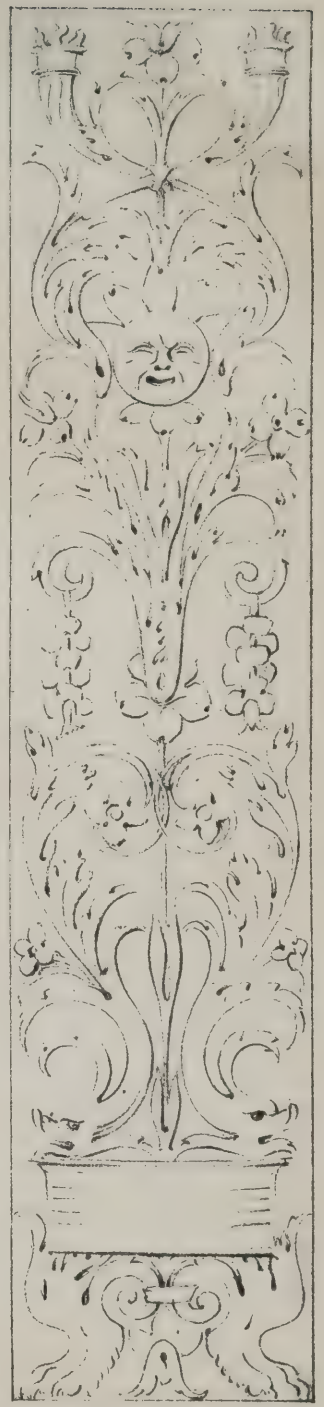




Tomb of Fillipo Decio

Details

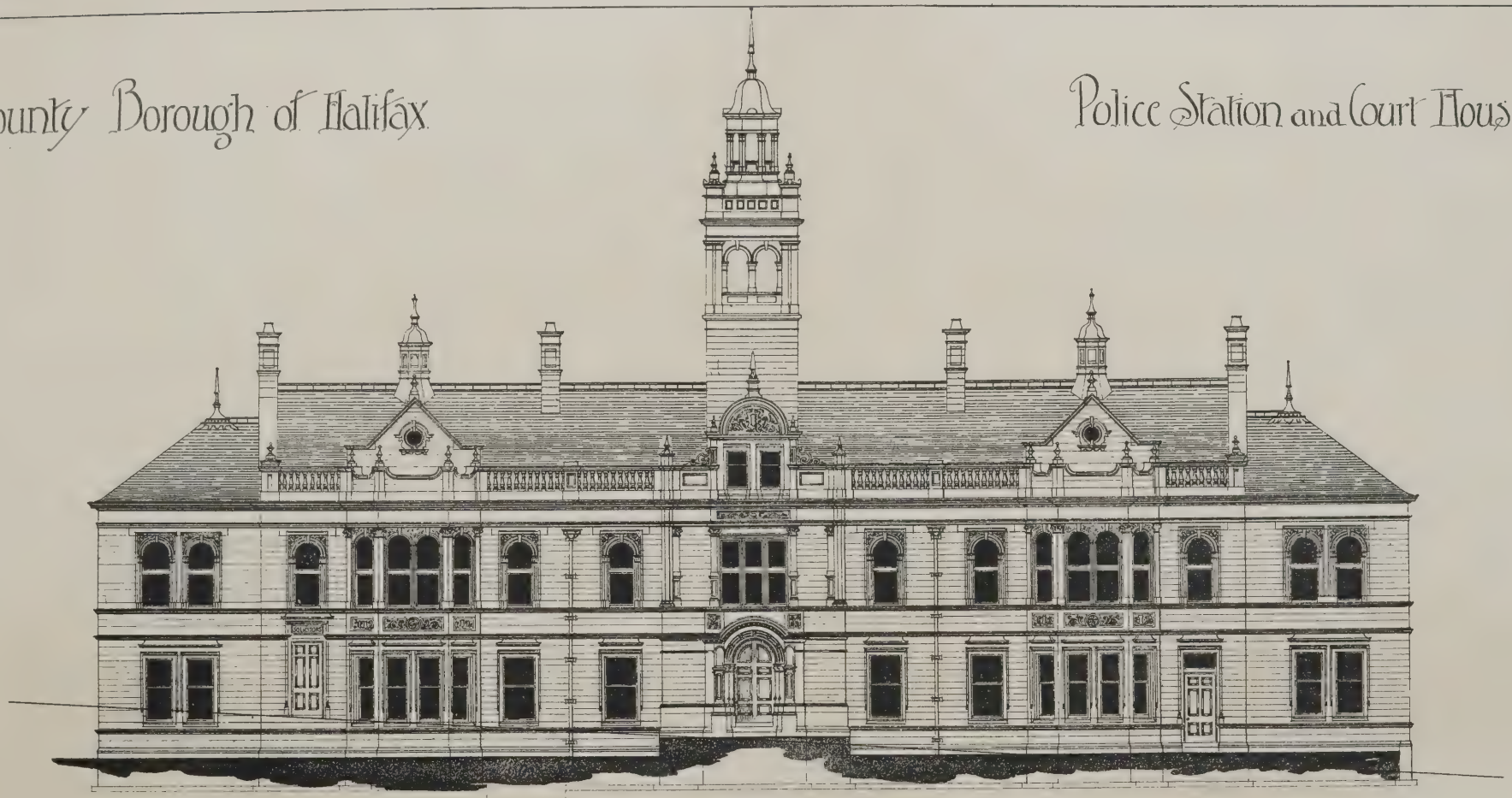




"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.

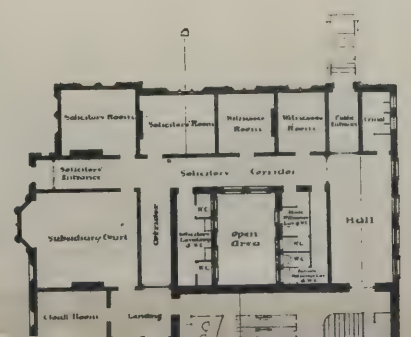
County Borough of Halifax.

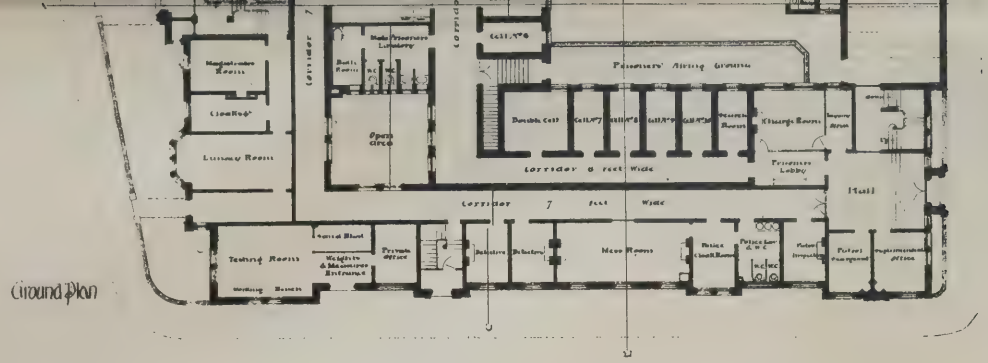
Police Station and Court House.

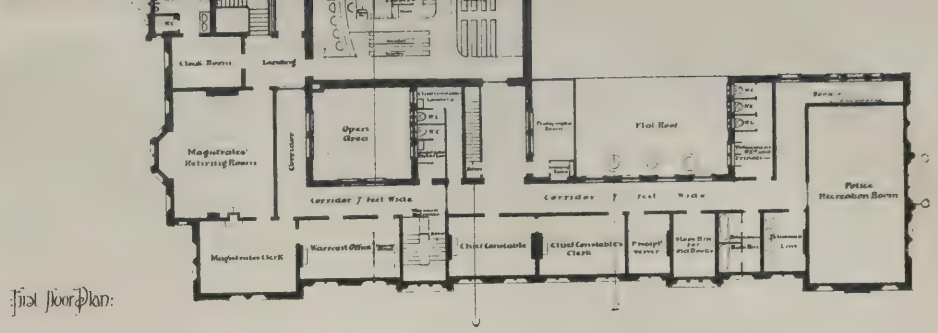


Elevation to Blackwall

Police Station and Court House



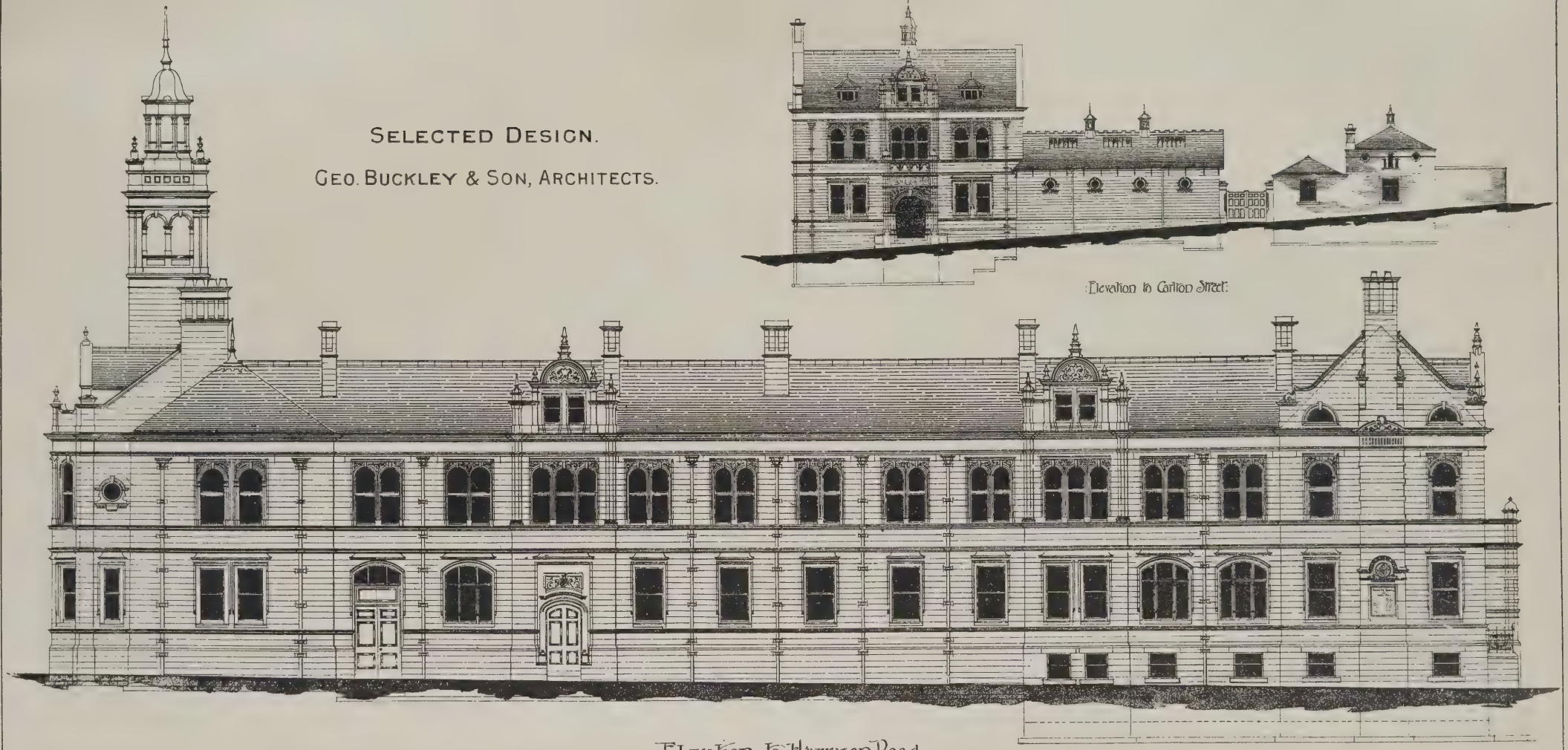




SELECTED DESIGN.

GEO. BUCKLEY & SON, ARCHITECTS.

Elevation to Carlton Street.



Elevation to Harrison Road.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.

LEGAL INTELLIGENCE.

Dilapidations at a Brickfield. — Boyes v. Foxley.—In the Queen's Bench Division on Friday the hearing of the case of Boyes v. Foxley came before Mr. Justice Bingham, sitting without a jury. It was an action by Mr. William Boyes to recover from the defendant, John White Foxley, of Rugby, possession of certain brickfields, known as the Old Coppice, Dean's Manger, Northamptonshire, and £100 for dilapidations. The defendant denied that he was in possession, and paid into court £32 in discharge of the dilapidations. It appeared that the brickyard in question had been leased in 1866 by the plaintiff's predecessor in title to the defendant's predecessor, but the lease had expired, and the defendant's predecessor in title continued to occupy from year to year. The defendant came into possession on the death of Thomas Foxley in 1895, and in 1896 he gave notice to quit at Lady-day, 1897. Thereupon the plaintiff had the dilapidations valued, and supplied defendant with a copy of the valuation; but according to the plaintiff's case the defendant had neither given up possession nor paid the dilapidations. Several witnesses having been examined on both sides as to the dilapidations, his lordship gave judgment for the plaintiff, fixing the amount to be paid by the defendant at £90, with costs. His Lordship said it was a great pity that the defendant had not made arrangements to settle the matter without incurring the costs of litigation.

Discount on Payments Delayed for Architect's Approval of Work.—In the Lord Mayor's Court on Tuesday week, before the Recorder (Sir Charles Hall) and a jury, an action was tried in which Geary, Walker, and Co., of Queen Victoria-street, E.C., sought to recover from Henry Young, builder, of East Grinstead, the balance of a debt incurred for wood-block flooring at an isolation hospital being erected by Mr. Young for the East Grinstead Urban Council. Mr. Glynn appeared for the plaintiffs and Mr. Hodges for the defendant.—Mr. Glynn said the original claim was for £81 1s. 11d. for 295 superficial yards of wood-block flooring laid down at the East Grinstead Isolation Hospital. Two sums had been paid on account, leaving £15 1s. 11d. now sued for. The defendant claimed to be entitled to a deduction of 5 per cent. from the full amount in accordance with the terms of the order, but the plaintiffs contended he was only to be allowed this for a cash payment, and as he had not yet paid he was not entitled to any discount. The work was done in June and the account was rendered on July 28. The defendant claimed that he was not liable to pay until the architect had approved of the work, and such approval had not been expressed when the action was commenced. When the order was originally given, the plaintiffs wrote to Mr. Young on May 6 suggesting the form of an official order, and it was accordingly sent the following day in these terms: "Please proceed at once with 2in. deal flooring at 5s. 3d. per yard, less 5 per cent., the same to be laid to the satisfaction of the architect." Accordingly the work was done and the bill sent in. The defendant should have paid the money and then, if the architect expressed disapproval of the work, he should have brought an action against the plaintiffs to recover back the money he had paid. As to the claim for 5 per cent. discount, it was simply ridiculous and was so explained in the letters. On May 8 the plaintiffs wrote Mr. Young acknowledging receipt of his order at the price of "5s. 3d., less a cash discount of 5 per cent." On June 10 defendant wrote them, "My agreement with you is 5s. 3d., less 5 per cent. for cash, and I am prepared to carry out my part if you will do the same. Unless you send at once to finish the work I shall be obliged to get someone else to do it." On receipt of that letter plaintiffs sent men at once to do the work; but the foundations were then damp and the plaintiffs took their men away again at the request of the defendant. A part of the work, to the value of 12s. 6d. was not done, but this was defendant's own fault, for the hearth tiles had not been set, and the defendant told plaintiffs' workmen they need not trouble—he would see to that little part himself. Now he sought to take credit for this 12s. 6d. On August 5 Mr. Young replied, "I am only waiting for the architect to pass the flooring and I will at once send you a cheque, but I can't think of paying for work you have not done." Included in the demand was one item for £3 13s. 2d., more flooring having been sent down than was required, but this portion of the claim the plaintiffs now abandoned. On August 6 the plaintiffs wrote to Mr. Young, "Our contract is with you and not with the architect." Mr. Young answered the last letter by saying, "I am surprised at your action, as you undertook to do the work to the satisfaction of Mr. Gale, and as soon as his certificate is forthcoming I am prepared to pay." Thereupon the plaintiffs demanded a cheque by return, and defendant wrote, "I have not been able to get the architect here; perhaps you or your traveller (Mr. Mayo) will write him and hurry him on." On September 4 plaintiffs' solicitors communicated with Mr. Young, and on September 6 they received a letter from Mr. W. W. Gale, who wrote that he was much surprised at their threatening Mr. Young with an action, as he (Mr. Gale) had not yet certified that the flooring had been laid to his satisfaction. It was most unpleasant for an architect to insist on a certain firm being employed and then for friction to arise between that firm and the builder. He was going to East Grinstead the next day and if the work was satisfactory he would issue his certificate. Mr. Young next wrote setting forth his objections to the account, inclosing a cheque for £36, and admitting a further sum of £6 18s. 10d. was due to the plaintiffs. He intimated at the same time that the architect could not pass all the plaintiffs' work. The plaintiffs wrote back declining to accept the cheque and saying that unless the balance was paid by return the action would go on.—The Recorder here interposed and said he must decide that both the cash payment and the architect's approval should be within a reasonable period. The defendant was not liable to pay until the certificate was given, if it were given within a reasonable time, and he was then entitled to deduct his cash discount if he paid within a reasonable time.—Mr. Glynn: Your lordship will give me leave to appeal on that point?—The Recorder: No, certainly I shan't.—Mr. Glynn: My clients are desirous of getting an opinion from the Divisional Court, as a large number of contracts are similar to this, and it is a most important point.—The Recorder: I can't give leave to appeal in a case in which I entertain no doubt whatever. It would be a farce to send a case to the Divisional Court on a document which, to my mind, is absolutely clear.—Mr. Glynn: There remains then the question whether the certificate was given within a reasonable time and there is the point with regard to the 5 per cent.—The Recorder: The latter point holds good with the other, having held, as I do, that the work must be done to the satisfaction of the architect. Defendant seems to have taken ordinary means to get the architect there.—Mr. Glynn: You say, then, that two months is a reasonable time?—The Recorder: Yes, I say that; but if you think it worth while, go to the jury on that point; but if the architect says he is not satisfied, it will only date from the day that he is. I don't see what you will get beyond what is paid into court.—Mr. Glynn: I must take the opinion of the jury on the question of reasonable time.—Mr. Hodges: We have no control over the architect. If the architect won't certify we cannot compel him to.—The Recorder: Suppose he withheld his certificate for ten years, do you say you would not have to pay until then?—Mr. Hodges: Certainly I do, and I will give you authority.—The Recorder, having read the case handed up to him, said it clearly took away from the plaintiffs all right to argue as to reasonable time. The defendant was not bound to pay until the architect was satisfied at the way in which the work had been done. There would be a verdict for defendant with costs, leave to appeal being refused.

A Question of Quantities.—At the Bradford County-court on Friday, Alfred Shackleton, butcher, of Bradford Moor, sought to recover £30 7s. 6d. from Joseph Coates, of Vignola-street, Bradford. It was alleged that in certain specifications of excavations for which the defendant contracted, the number of yards required was put at 552 instead of 309, and the plaintiff claimed to recover the amount which he alleged had been overpaid. His Honour (Judge Bompas) held that the defendant had complied with the plans, and was not responsible for any mistake. Judgment was accordingly entered for the defendant.

Alleged Interference with Ancient Lights.—In the Chancery Division of the High Court of Justice, before Mr. Justice Kekewich, the action of "Hall v. Ogden" was heard on Friday and Saturday. It was an action brought by the plaintiff as the owner of a dwelling-house, a shop, and other premises, situate in Leeds-road, Windhill, Shipley, to restrain the defendant from building in that road in such a manner as to obstruct the plaintiff's ancient lights.—Mr. Renshaw, Q.C., in opening the plaintiff's case, said the fact that the plaintiff's lights were ancient was not disputed. The plaintiff not only asked for an injunction to restrain the obstruction, but also for a mandatory order to pull down a piece of wall which had been erected by the defendant. His Lordship had previously granted an interim order restraining the defendant doing what was complained of, but declined to make a mandatory order to pull down the wall that had been erected by the defendant. Since his Lordship had made that order the defendant had done nothing but pull down a few bricks, and had not in any way done anything to abate the interference. The plaintiff complained that the access of light to two of his windows in particular had been interfered with. Down to the year 1894, said the learned counsel, there was near the new wall of the defendant a public pathway. In that year an arrangement was come to with the local authority by the defendant, by which another public footpath was substituted for it, and defendant was allowed to take possession of the ancient footpath.—Mr. Justice Kekewich, in giving judgment, said that the evidence showed that things now remained in precisely the same position as they did when the matter was before him on interlocutory application. The plaintiff complained of the obstruction of access of light to two rooms, one a scullery—a long, narrow, and obviously very badly lighted room. The little light it had originally must have been of great value to it. Upon the evidence it was clear that there had been, by the erection of the wall to its present height, a material interference with the access of light to that window—material in this sense, that there had been a large proportion of that light taken away. As regarded the other room, there was a little more difficulty; but also with reference to that room the defendant's witnesses admitted that there had been some interference with the access of light, but they said it was inappreciable and could not be measured. Putting the evidence of the experts one against the other, he should say that there had been a sufficient interference with the access of light to justify him in giving judgment for the plaintiff. The plaintiff was entitled to an injunction, and the injunction must be both prohibitive and mandatory, so as to prevent the access of light to the two rooms being continued. The wall must be removed, and the defendant must pay the costs.

The Paving of London Forecourts.—At the Southwark Police-court on Saturday, Mr. Slade, the magistrate, dismissed, after four adjournments, a summons taken out by the Bermondsey Vestry against S. G. C. Sansom, the owner of a large property in South London, to compel the paving of the open spaces in front of three houses in New Church-street, Bermondsey. The object of the vestry was to treat these instances as test cases, preliminary to compelling the tenants of a number of other houses in the street to do away with their front gardens. The houses in question are tenanted by the working classes, and were built six years ago under the supervision of the district surveyor and vestry, and are alleged to comply with all modern requirements of construction. In front of each house is a small forecourt, railed in with iron railings, and it was contended by the vestry that the rain percolated through the earth in these forecourts, and found its way into the houses, thereby making them damp. Mr. Bodkin, however, who appeared for the defendant, Mr. Sansom, contended that, inasmuch as there were three courses of footings—a proper damp-course, a bed of concrete 6in. thick under the floors, and a cement plinth between the brick wall and the ground running from the footings more than 1ft. above the level of the ground—it was impossible for damp to get into the houses, and the expert evidence given by Mr. Hewitt, district surveyor of Southwark, Mr. Woodward, district surveyor of Lambeth, Mr. Gruning, surveyor to the London County Council, Dr. Farr, of Kennington, and the evidence of the tenants who had lived in the house for six years, led the magistrate to believe that no grounds existed for saying that there was damp or anything approaching a nuisance "injurious or dangerous to health." The summons was issued at the end of April, 1897, to abate a nuisance "injurious or dangerous to health," and was dismissed six months afterwards, and cost the owner over £100 to oppose, towards which the vestry do not pay a penny.

Builder v. Brickmakers.—"Good, Clean, Well-burnt" Bricks.—At the Stockport County Police-court, on October 23, before Judge Yate Lee, an action was brought to recover £70 12s. 8d., the sum alleged to be due by Denis Mulaney, builder, of Heaton-lane, for goods sold and cartage to the plaintiffs, Moore and Bristow, brickmakers, of Dalston-lane and Norbury Moor. The case had been remitted from the High Courts. Mr. Potts, solicitor, appeared for the plaintiffs, and the defendant was represented by Mr. Wharton, barrister. Mr. Potts said that in March the defendant had an interview with the plaintiffs, asking them to quote the price of 100,000 checker bricks, bricks which were better than common bricks. On March 12 plaintiffs wrote quoting the price as 18s. 6d. per 1,000 net. These bricks were wanted for the construction of twelve houses in three rows of four houses each in Bramall. Plaintiffs' usual price for these bricks was 20s. per 1,000, but as they had a stock in hand, and the job was near by, they gave the lower quotation. On the 17th defendant wrote saying he wanted the plaintiffs to commence sending the bricks which had been quoted. On the 23rd defendant wrote confirming the price of 23s. per 1,000, for "good, clean, well-burnt bricks, not common," delivered, and and asking for the supply to be commenced at once. When the money became due for the first month's supply Mr. Bristow called upon the defendant for the money, but did not get it. Defendant wrote on April 17 saying that he would forward the account the following week-end if found correct. He also wrote calling attention to the bricks they were sending, and stated that he learned they were raking up all the old stuff which they could find about the yard, and the architect had been grumbling about it. That was the first and only complaint received by the plaintiffs, who replied expressing surprise at the complaint. The total amount of bricks supplied to the defendant on this job was 228,800. On May 17 plaintiffs wrote to the defendant stating that as he had slightly exceeded the 100,000, they

could not supply him with any more bricks at the reduced price, and that they would be glad to supply him at the usual price of 20s., less 2½ per cent., and that they could also supply him with a few common bricks at 17s. 6d. In his affidavit defendant described the bricks as spoiled by exposure to bad weather, badly burnt, cracked, and rotten, and yet on May 18 he wrote expressing surprise that plaintiffs intended stopping supply. He made no complaint about the quality of the bricks. In the first instance the quotation had been for 100,000 "or more," but before the acceptance of the contract the quotation was for 100,000. On the last date named defendant wrote that he thought they ought to supply him until the Bramall job was completed, and that it was not fair to break with him now that he had worked up their old stock and they could get a better price for them. The plaintiffs replied that they had not intended supplying defendant with checkers for good, and that they did not think he had had 10,000 of the old stock. They generously offered to continue supplying until the Bramall job was finished. By May 31 he had received 186,500. Mr. Bristow expressed surprise that the defendant had not sent the promised cheque. Defendant regretted not having been able to forward the cheque for the amount due, but said that he would forward it before the week-end. On June 8 plaintiffs wrote that unless they received the cheque per return they would stop the supply. On June 9 he sent a cheque for £80, and wrote saying that he had about 40,000 bricks on the ground. With the defendant it had been simply a matter of procrastination from beginning to end in payment and in everything. The defendant had been supplied with 228,800 checkers. Mr. Bristow was called and spoke as to the contract and the quality of the bricks supplied. John Brown, plaintiffs' foreman, denied that any bricks similar to those produced by Mr. Wharton had ever been sold as checker bricks. They might have been included in the common bricks. Mr. W. L. Atkinson, Lumb-lane, Bramall, builder, said he would not like to say whether it was an unusual thing to allow so large a quantity of bricks to remain about the ground on a job like that at Bramall. Mr. Peter Pierce, architect and surveyor, Stockport, said Moore and Bristow's checkers had been used on the outside walls at the back and gables. They had been used inside as well. About five-sixths of checkers were Moore and Bristow's. There would be about 61,650 bricks used on the outside, of which 50,000 were Moore and Bristow's. It would be impossible to use 109,500 checkers for the outside walls. Moore and Bristow's checker bricks were as good as any in the town. A large number of the plaintiff's checker bricks had been used inside. Some of them were splendid bricks, and others were not fit to be used outside. Mr. Wharton said they did not dispute that 50,000 of Moore and Bristow's bricks were used outside. It was admitted by Mr. Pierce that some of the bricks used on the inside were not fit to be used outside. Those bricks were not according to the terms of the contract, and they wers entitled to reject them. The only question left was as to how many. His client had complained time after time, day after day, and plaintiffs had said they would make the allowance. The witnesses had stated that they had taken the greater part of the bricks from the stack. The defendant wanted "good, hard-burnt bricks," and he had not had them, he contended. Defendant stated that of 7,500 sent to St. George's Vicarage none of them were fit for outside work, and 700 of them were not fit for use. The rest were used as common bricks for inside work. His loss by this would be about £2 12s. 6d. Of 230,000 checker bricks supplied at Bramall 182,000 were bad ones. His loss on these would be about thirteen guineas. He had also to buy 59,000 bricks for the front, at a loss of 1s. 6d. per 1,000. Owing to the wetness of the bricks supplied by the plaintiff, he had to repoint 250 superficial square yards of the outside wall at a cost of 1s. 3d. a yard. He (defendant) had not left the bricks lying about more than was usual. He estimated his loss at £35 8s. 3d., which was rather underestimated than anything, and this amount he had wished to deduct from the plaintiffs' account. He saw Mr. Bristow every few days, and on each occasion he complained as to the quality of the bricks. James Jepson, the architect in connection with the Bramall property, said he had occasion to complain about some of the bricks, as they were not fit for outside use. He did not know where the bricks which he objected to came from. It appeared that £34 4s. 2d. had been paid into court, and his Honour said he would give his judgment after going through the correspondence.

Re Mateo Clark.—Under a receiving order recently made in this case, the debtor being described as of Dashwood House, New Broad-street, railway contractor, it is stated that the liabilities amount to about £100,000, the value of the assets not yet being ascertained. The debtor is stated to have been interested in the construction of railways in South America.

Chalk Removal from a Building Estate.—Hutchins v. The Seaford Bay Estate Company.—The hearing of this case took place before Mr. Justice Stirling on Friday and Saturday. The plaintiff, who recently purchased some building land at Seaforth, sought to restrain the defendants who were developing an estate there, from working and taking chalk on the plaintiff's property in such a way as to materially interfere with his enjoyment of the land. It appeared that some years ago, before the plaintiff purchased the property, the then proprietor granted a license allowing the defendants, under certain conditions, to dig and take chalk from the land for a limited period, subject to his approval, in order to construct a sea wall and for other purposes. The wall was practically completed in 1895. Towards the end of 1896 the plaintiff, having purchased the land, gave notice to the defendants that the license to take chalk would come to an end in April, 1898. When the plaintiff subsequently went down to visit the estate, he found that the defendants had laid down a light railway over part of his land, and was using a locomotive upon it, with the result that they blocked up a road leading to the plaintiff's property. Under these circumstances, the present action was brought. Mr. Buckley, Q.C., for the plaintiff, submitted that, according to the terms of the license, the plaintiff's approval was necessary as to the manner in which the chalk was to be removed, and this had not been obtained. The plaintiff was, therefore, entitled to an injunction. Mr. Butcher, Q.C., for the defendants, said that he was prepared to enter into an undertaking to divert a part of the railway, so as to enable the plaintiff to use the road. But he contended that the defendants were entitled to use a locomotive, as that was the only practical way of removing the chalk. Mr. Justice Stirling, in giving judgment, said as the defendants had given an undertaking as regarded the road, it was only necessary for him to decide what were the rights of the parties under the existing license. He came to the conclusion that the plaintiff had good ground for bringing the action, and objecting to the use of a locomotive, for there were other practical ways of removing the chalk. He should grant an injunction restraining the defendants from using a locomotive in the future, or in taking the chalk in any way not approved of by the plaintiff. The order for an injunction was, however, suspended for a week.

CHIPS.

The newly-founded Sir John Buchanan gold medal of the Royal Society is to be awarded to Sir John Simon, F.R.C.S., for his labours in the interests of public health.

The members of the town council of Tunbridge Wells paid an official visit last week to the Northern Sewage Farm, which has just been extended from plans by and under the direction of Mr. T. W. Mellor, the borough engineer. The total cost expended has been over £30,800, including £12,050 for the purchase of land by compulsory arbitration, £6,244 for a sewer 5ft. in diameter and nearly a mile in length, and £2,000 for a low-level sea.

Colonel A. G. Durnford, R.E., held an inquiry at Morley, on Friday, concerning an application made by the town council for powers to borrow £8,000 for the purposes of public baths, and £550 for works of sewerage and the paving of Corporation-street.

The two local branches of the Associated Carpenters and Joiners have decided to withdraw from the Aberdeen Trades Council. The men declare that it is useless sending delegates to a body which, by its action, misrepresents the views of the general mass of workers on public questions. The case is instanced of the president's position with regard to the litigation over the erection of Westfield School.

The pulpit in St. Nicholas' Church, Harwich, has just been replaced by a new one of wainscot oak, hexagonal in form, and Early Perpendicular in style; it has been carved and executed by Mr. T. Stopher, Falan-street, Ipswich.

A Local Government inquiry was held by Mr. W. O. Meade King at Newport, Mon., on Friday, into the application to borrow £21,000 for extending the town-hall, and some smaller amounts for other purposes.

By a decision of the Bournemouth Town Council, the suburb of Boscombe will shortly possess a piece of open space on the cliff front, Lady Shelley's offer of six acres of foreshore and cliffs having been accepted with some unimportant conditions. This is the first opening out of the overcliff for the public use to the east of Boscombe Chine.

The directors of the Cambrian Railways Company have just formally appointed Mr. Alfred J. Collin, M.I.C.E., of Darlington, to the responsible post of engineer to their railway system, in succession to Mr. George Cowen, resigned. Mr. Collin, who is only 35 years of age, has occupied the position of chief assistant to the divisional engineer of the North-Eastern Railway, at Darlington, for seven or eight years, and is the son of Mr. Thomas Collin, assistant general manager of the Lancashire and Yorkshire Railway Company.

Our Office Table.

The 144th session of the Society of Arts will be opened on Wednesday evening next, when an address on "The Colonies: Their Arts, Manufactures, and Commerce," will be delivered by Major-General Sir Owen Tudor Burne, G.C.I.E., K.C.S.I., Chairman of the Council. Amongst the subsequent lectures to be delivered is one by Dr. Samuel Rideal on "The Purification of Sewage by Bacteria," to be given on Dec. 15, and others arranged for after Christmas are: "Stage Mechanism," by Mr. Edwin O. Sachs; "The Recent History of Papermaking," by Mr. Clayton Beadle; and "Fireproof Construction," by Mr. Thomas Potter. Mr. Cyril Davenport will deliver a course of three Cantor lectures on "Decorative Bookbinding" on Jan. 24, 31, and Feb. 7; and Mr. Hugh Stannus, F.R.I.B.A., will give another Cantor series of four lectures, entitled, "The Principles of Design in Form," to be read on Feb. 14, 21, 28, and March 7.

The Archæological Society of Athens has, it is reported, decided to resume the works for the restoration and strengthening of the ruins of the Parthenon. The English company which is working the marble quarries at Pentelicos has offered, for the purpose, marble blocks of excellent quality and large size. It is declared that the fears which have been expressed regarding the structural solidity of the Olympian Museum, where the famous statue of Hermes by Praxiteles is deposited, are quite groundless.

At Tuesday's meeting of the London County Council, the Fire Brigade Committee reported, with reference to the work for enlarging and altering the Hampstead Fire Station, that four tenders had been received, the lowest of which exceeded the architect's estimate of £4,170 by £785. The work had been offered in July to the Works Department, but the manager was not satisfied with the amount of the estimate. The firm submitting the lowest tender stated in their tender that if the work were carried out under the general conditions for building contracts agreed upon by the Royal Institute of British Architects and the Builders' Society, and adopted by the Central Association of Master Builders of London, the firm's tender would be reduced by 5 per cent. The firm also added that it would require the clause in the form of contract as to payment altered. The architect stated that £100 of the difference was attributable to the rise in labourers' wages which took place in June last, but, having looked over the bills of quantities of the lowest tenderer, he found that some items were priced at rates which, in his opinion, were excessive. The committee recommended that neither of the tenders should be entertained. After some discussion, it was decided to refer the matter back for further consideration, to include the causes which had led to the tenders exceeding the estimate by so large a sum. On the recommendation of the Highways Committee, the Council decided to expend £8,500 on certain junctions and extensions in the tramway system recently purchased from the North Metropolitan and London Street Tramways Companies, and subsequently leased to the first-named company. It was also agreed that it is desirable that the Thames Embankment should be continued from the Victoria Tower-Gardens to Lambeth Bridge, and that it be referred to the Improvements and Bridges Committees to report generally upon the subject.

The annual meeting of the Egypt Exploration Fund was held on Wednesday afternoon at the hall of the Zoological Society, Hanover-square, Sir E. Maunde Thompson presiding. The reports of the treasurer and secretary were presented, and the chairman said the year had produced some remarkable discoveries. The work of clearing the temple of Deir el Bahari was one of which they might be proud, but much still remained to be done there. During the year the artists had continued the work of copying the bas-reliefs, and some progress had been made with the work of repair. In the coming year they proposed to complete the replacing of the blocks of the Punt expedition, to rebuild the columns of the Punt terrace and the wall leading up to the Hathor chapel, and to rebuild the great retaining wall which protects the temple from the *débris* which fell from above. Professor Petrie, after settling Mr. Grenfell and Mr. Hunt at Oxyrhyncus, settled himself on the site of Deshasheh to bring

to light the curious burial customs of the Egyptians of the fifth dynasty. The successes at Oxyrhyncus were remarkable, and the fortunate discovery of the fragment of the "Logia" at once arrested public attention. The wonderful find of papyri, mostly Greek, surpassed the most sanguine expectations. Professor Flinders Petrie said that a large district which was quite unknown archæologically, had been examined this year. He had explored a long district and mapped down all the ancient sites of towns and cemeteries, and finally, settling at Deshasheh, about 20 miles south of Faiyûm, he began to explore the cemetery of the fifth dynasty. The historical results were of the greatest interest for the early history of Egypt. They had found a fine group of statues of the fifth dynasty, and had brought to England one of the two best, which was by far the finest piece of Egyptian statuary that had ever reached this country.

The opening meeting of the Auctioneers' Institute was held on Wednesday evening, Mr. W. E. R. Peck, vice-president, in the chair, at 57, Chancery-lane, when Mr. James F. Field, the president, delivered his inaugural address. He said that the progress of the Institute had been rapid, and its prospects were encouraging. During the twelve months ended Oct. 31 last, 131 new members were enrolled, as compared with 98 in the preceding twelve months, and their income had increased nearly 35 per cent. A lending library had been established, and the examinations had been highly successful for so young an institution. During the past year a much-discussed subject had been that of land registry. He did not think that the Land Transfer Act of last Session was likely to definitely and satisfactorily settle the matter of registration. After mentioning that there was now a better demand for agricultural land than had been the case for some time past, and alluding to the recent increased demand for freehold ground-rents—a class of investment which had risen in value 25 per cent. in the last quarter of a century—he criticised adversely the action of the School Board for London in notifying to those whose property it wanted to take compulsorily that it would not consent to pay the fees of agents or surveyors. A vote of thanks was passed to the president for his address, on the motion of Mr. D. Young, seconded by Mr. R. Appleton. During the evening Mr. George Brinsley was presented with a silver-gilt replica of the president's badge and chain.

The 75th annual report of the Commissioners of Woods and Forests states that the income derived from sales of forest produce in the New Forest amounted in the year 1896-97 to £7,355 4s. 11d., in addition to surface rents amounting to £3,099 11s. 8d., the corresponding receipts in 1895-96 being £7,060 12s. 7d. and £3,014 13s. respectively. In the case of Dean Forest the same sources of income produced £5,305 17s. 7d. and £1,856 12s. 11d., as against £6,539 3s. 10d. and £1,959 6s. 1d. in 1895-96. The mineral royalties of Dean Forest for the year ending March 31 last reached a total of £13,906 19s. 7d., as against £12,332 10s. 8d. for the preceding year. The greater part of the oak woods, the report says, have arrived at an age when the income derived from their thinning may be expected to be less than heretofore for some time to come, and the system of management which was best when the oak was grown specially for the purposes of the Navy, requires reconsideration now that it is no longer devoted to the building of ships. It is suggested, therefore, that it is desirable to produce other kinds of timber for which there is a market, and to utilise the oak already planted according to present-day requirements. As to other parts of the United Kingdom, the report states that Crown property in Scotland produced during the year an income of £24,737 16s. 1d.; in Ireland, £37,954 8s. 4d., consisting mainly of quit rents; in Wales £15,107 12s. 1d.; and in the Isle of Man, £5,654 7s. 5d.

The northern district meeting of the Association of Municipal and County Engineers will be held at Sunderland on Saturday in next week, the 20th inst. After a reception of the members in the Council-chamber by the Mayor, the following papers will be read:—"Notes on the Specifications of Tyneside Roads," by Mr. H. W. Taylor, A.M.I.C.E., engineer and surveyor to the Newburn Urban District Council; and (*a*) "Housing of the Working Classes," (*b*) "Technical Schools," (*c*) "Hospital Pavilion," by Mr. R. Rounthwaite, A.M.I.C.E., borough engineer, Sunderland; "The Sunderland Electric Generating Station," by Mr. F. J. C. Snell, A.M.I.C.E. In the afternoon the visitors will proceed by tram to the Roker Pier Works, cross river by boats to South Docks and view installations of gas-driven pumping machinery at the graving-docks, and thence proceed to the South Pier Works and inspect the concrete and block-making plant, &c. The members will be conducted over these works by Mr. H. H. Wake, M.I.C.E., engineer to the River Wear Commission. They will also drive to the electric generating station, which will be explained by Mr. F. J. C. Snell, A.M.I.C.E., and proceed to the corporation swimming and slipper baths and washhouse in High-street West. In the evening the members dine together at the Grand Hotel.

Mr. James Macdonald, LL.D., delivered the first of a course of Rhind lectures in Archæology at the National Portrait Gallery, Edinburgh, on Monday afternoon. The subject of the series is "The Evidence for a Roman Occupation of North Britain." Dr. Macdonald began by explaining how it had become desirable that the nature and extent of the occupation of North Britain by the Romans should be examined anew. Of late years the study of archæology had been marked by the application to it of more strictly scientific methods. But criticism on long-accepted views of our Roman period was partial and incidental. The evidence naturally fell under two heads—the literary or historical and the archæological. The first literary witness to be called was the historian Tacitus, the merits as well as the defects of whose "Life of Agricola" were pointed out. In the course of his northern campaigns, Agricola advanced beyond the Forth and Clyde isthmus, finishing them A.D. 84 on the battlefield of Mon-Graupius, the position of which was uncertain. The Emperor Hadrian, on his visit to Britain, fixed the northern boundary of the province by raising a barrier along the neck of the land which separated the Solway Firth from the mouth of the Tyne. The reign of his successor, Antonius Pius, saw a Roman army again on the upper isthmus, and the erection there, about 141 or 142, of a second vallum or wall by Lollius Urbicus, then Governor of Britain. With regard to the geography of Claudius Ptolemæus, the lecturer stated that Ptolemy's information regarding North Britain, though wonderfully correct, appeared to be drawn from some unknown source or sources. A comparison of his lists of place and other names in what was now Scotland with those found in the classical writers threw doubt on the general belief that he was indebted for all of them to Roman authorities. Relief was thus obtained from the hopeless task of seeking to connect more than a very few with those to be found in the classical writers.

The Dumfriesshire and Galloway Natural History and Antiquarian Society has concluded a week's excavation on a site on the farm of Raeburnfoot, in the high-lying parish of Eskdalemuir, about fourteen miles above Langholm. It has been matter of local tradition and report that the place in question had been a Roman camp, but there was no satisfactory proof of it, and the society undertook the work of excavation with the consent of the parties interested in the ground. It was not necessary to go to any great depth to obtain clear proof that local tradition was well-founded, as a few feet from the surface various small articles were forthcoming; and, besides, a well-defined road was come across, which was still hard, and gave proofs of its ancient origin. The excavations were carried out under the personal superintendence of Mr. Barbour, architect, Dumfries.

The State Medicine Syndicate of Cambridge University state in their annual report that they have held two examinations within the year. In April last 37 candidates presented themselves—viz., 17 in Part I. only, five in Part II. only, and 15 in both parts. Four passed in Part I., four in Part II., and 13 in both parts. Three of the four in Part II. only, having previously passed Part I., were included in the list of 18 successful candidates. At the examination in October, 33 candidates presented themselves—viz., 13 in Part I. only, five in Part II. only, and 15 in both parts. Five who passed Part I. only, having previously passed Part II., and one who passed Part II. only, having previously passed Part I., were included in the list of 18 successful candidates.

MEETINGS FOR THE ENSUING WEEK.

Monday.—Royal Institute of British Architects. "Notes on Renaissance Architecture in Malta," by A. S. Flower, M.A., F.S.A. 8 p.m.
Leeds and Yorkshire Architectural Society. Address by the President, Geo. Corson. 7.30 p.m.

Tuesday.—Institution of Civil Engineers. Discussion on "The Manchester Ship Canal." 8 p.m.

Wednesday.—Society of Arts. "The Colonies: their Arts, Manufactures, and Commerce," by Major-General Sir Owen T. Burke, G.C.I.E., K.C.S.I., Chairman of Council. 8 p.m.
Edinburgh Architectural Society. lay," by J. F. Matthew. 8 p.m.
Sanitary Institute. Discussion on "The Pollution of Water Supplies by Encampments of Hop-Pickers, Casual Workers, Tramps, &c." To be opened by Prof. W. H. Corfield and by Miss M. A. Chreiman. 8 p.m.

Friday.—Architectural Association. "The Planning of High Schools and Endowed Schools for Girls," by J. Osborne Smith, F.R.I.B.A. 7.30 p.m.

Trade News.

WAGES MOVEMENTS.

Devonport.—The dispute regarding "walking time" between Sir John Jackson and the stone masons engaged at Keyham Dockyard extension works at Devonport was settled on Thursday in last week, and the men resumed work on Friday.

Plymouth.—The master plumbers of the Plymouth district have granted their employés an advance of a penny per hour, thus avoiding a strike.

CHIPS.

On Saturday Lord Durham laid the foundation-stone of the Readhead wing of the Ingham Infirmary at South Shields. The extension is double the size of the present building, and will provide accomodation for forty additional beds. The contract for the new wing was secured by Mr. Goodwin, of South Shields, for £5,928, and an additional sum of £1,500 will be required for furnishing.

The ancient cross standing in the churchyard of the village of Longford, Derbyshire, has just been restored. Messrs. Naylor and Sale, architects of Irongate, Derby, who had been consulted, ascertained what the original cross resembled, and under their guidance it has been restored by Messrs. Hems and Sons, ecclesiastical sculptors, of Exeter. The new portion is a monolith of Hollington stone over 7ft. high, and is carried up off the fracture in the old shaft.

According to the *Sydney Herald*, negotiations are being completed for the lease by the New South Wales Government, of about 2,000 acres of timber land near Jervis Bay. The timber found there is especially suitable for road paving. The concession is to include the construction of a railway to the coast.

An adjourned summons, Islington Vestry v. John W. Heeps, came on for hearing at the Clerkenwell Police-court on Friday. The defendant had been summoned, under the 76th section of the Metropolis Management Act, for deviating from an approved plan for the drainage of a house in Highbury-quadrant, without having given notice to the vestry. The officials of that body admitted that the drain as now laid was perfect. The magistrate, Mr. Horace Smith, expressed strong disapproval of the conduct of the vestry, and finally refused to have the time of the Court wasted any longer, adding, "I will adjourn the case for six months—perhaps for six years."

A new side-chapel which has just been erected in All Saints' Episcopal Church, Brougham-street, Edinburgh, was formally dedicated to St. Mary on Friday. The side-chapel, which cost about £1,300, has been erected from designs by Dr. Rowand Anderson.

One of the most important of recent antiquarian discoveries has just been made at Martres-Tolosane, on the banks of the Garonne. In the course of some excavating operations, several marble statues of exceeding beauty were revealed, and a systematic search has brought to light no fewer than seventeen gods, goddesses, and heroes of the Roman period; and in addition many pieces of mural decorations, bas-reliefs, and glass-work specimens of locksmiths' work, &c. The objects unearthed constitute, in fact, a veritable museum.

Towards the fund for building additions to Charing Cross Hospital on the site of Toole's Theatre and adjoining premises, £34,650 has already been subscribed. It is desired to raise the building fund to £50,000.

LIST OF COMPETITIONS OPEN.

Byfleet—Village Hall and Workmen's Club (£1,500 limit)	25 Guineas	F. C. Stoop, Hon. Sec., Albany House, Byfleet, Surrey	Nov. 13
Southend—St. Alban's District Church	No premium offered; no Assessor named	Rev. E. C. Kimber, Avenue-terrace, Southend-on-Sea	„ 20
Edinburgh—Heating and Ventilating City Fever Hospital	Premium not stated	City Superintendent of Works, Edinburgh	„ 25
Wells City—Public Hall	£25, £15, £10	Reginald L. Foster, City Clerk, 1, Cathedral-green, Wells, Somerset	„ 30
Mexico—Legislature Palace (1,500,000dol. limit)	15,000dol. Mex.	Secretary Public Works, Mexico City	„ 30
Cardiff—Town Hall and Law Courts (A. Waterhouse, R.A., Assessor—£200,000 limit)	£500 (merged), £300, £200	J. L. Wheatley, Town Clerk, Town Hall, Cardiff	Dec. 4
City Corporation—Bronze Diamond Jubilee Medal	£20, £15, £10	Sir J. B. Moachton, Town Clerk, Guildhall, E.C.	„ 6
Nottingham—Laying-out and Planting Basford New Cemetery.	£100, £50	Samuel G. Johnson, Town Clerk, Nottingham	„ 15
Dorking—Workhouse Infirmary (£4,000 limit)	(No first) £15, £5	Geo. Scales, Clerk to Guardians, 35, High-street, Dorking	„ 15
Nottingham—Designs for Basford Cemetery Buildings: Chapels, Crematorium, Lodges, &c.	£100, £50	Samuel G. Johnson, Town Clerk, Nottingham	„ 15
Menai Bridge—Landing Pier (£3,000 limit)	£40	Thos. Hughes, Clerk, Min-y-Den, Menai Bridge	„ 16
Festiniog—Temporary Eisteddfod Pavilion for 10,000 (£900 limit)	10 Guineas	Wm. Jones, Hon. Sec., Pavilion Committee, Blaenau, Festiniog	„ 17
Bootle—Fire Brigade and Police Stations (£14,000 and £1,500 limits)	50 Guineas, 25 Guineas	J. H. Farmer, Town Clerk, Bootle, Lancs	„ 31
Crich—Water-Supply Scheme (3,100 population)	15 Guineas, 5 Guineas	Joseph Pym, Clerk, Belper	(1898) Jan. 8
Carlton, Victoria—Children's Hospital	£100, £50, £25	J. Nicholson, Hon. Sec., Pelham-street, Carlton, Australia	(1898) „ 30
Leicester—Motor Refuse Carts	Corporation	E. G. Mawbey, Borough Engineer, Leicester	(1898) „ 31
Port Elizabeth—Free Library (Assessors, Sir F. Blaine and R. H. Hammersley-Heenan—£20,000 limit)	100 Guineas, 50 Guineas	G. Cettle, Librarian, Port Elizabeth, S.A.	(1898) Feb. 15
New York—Sun Dial (Plaster Model)	500dol., 250dol.	Sec. National Sculpture Soc., 215, West 57th-street, New York	(1898) „ 28
Newcastle-on-Tyne—New Infirmary (local Architects)	(No first) £150, £100, £50	Secretary Building Committee, Newcastle	(1898) Mar. 1
Belper—Sewage Disposal Schemes	50 Guineas, 25 Guineas	Joseph Pym, Clerk, Belper	(1898) May 1
Tottenham—School Board Offices	.....	J. F. Adams, Clerk, School Board Offices, Tottenham, N.	—
Bexhill-on-Sea—Promenade Pier and Garden		Secretary, Pier Co., 7, Sackvill-road, Bexhill	—
Blackburn—R.C. Infant School, Dean-street	(No first) £5	The Rector, 48, Islington, Blackburn	—
Dukinfield—Town Hall (£7,000 limit)	£40, £20	Samuel Hague, Surveyor U.D.C., King-street, Dukinfield	—
Peterborough—Additions to the Guildhall (£2,500 limit)	£35 (merged), £15	The Town Clerk, Peterborough	—

LIST OF TENDERS OPEN.

BUILDINGS.

Swindon—Two Pairs of Semi-Detached Villas, Springfield-road	T. H. Deacon	W. H. Read, M.S.A., Corn Exchange, Swindon	Nov. 13
Hawes—Market Hall	.....	J. P. Kay, Architect, 34, Prudential-buildings, Leeds	„ 13
Llandovery—Residence at Nant-yr-Hogfaen	Thomas Jones	D. Jenkins, F.R.I.B.A., Architect, Llandilo	„ 13
Leeds—Twenty Houses off Harehills-road	.....	D. Dodgson, Architect, 86, Albion-street, Leeds	„ 13
Teignmouth—Steam Laundry, Station-road	S. A. Croydon	Watson and Watson, Architects, 1, Lower-terrace, Torquay	„ 13
Weston-super-Mare—Additions to Iron Church	.....	Rev. T. H. S. Polehampton, Cleveden-road, Weston-super-Mare	„ 13
Mold—Alterations at County Hall Buildings	Standing Joint Committee	Thos. T. Kelly, Clerk to County Council, Mold	„ 13
Salisbury—Offices and Works	Electric Light Company	A. R. Malden, Secretary, The Close, Salisbury	„ 13
Hampton Court—Reconstructing Chapel as Coach-house, Stabling, &c.	.....	Harry Tagg, Thames Hotel, Hampton Court Bridge	„ 15
Hornsey—Central Public Library	Urban District Council	E. J. Lovegrove, Surveyor, Southwood-lane, Highgate	„ 15
Lynton—Cottage at New Mill	.....	G. C. Smyth-Richards, Surveyor, Barnstaple	„ 15
Lancaster—Additions to Girls' School, Middle-street	.....	Austin and Paley, Architects, Lancaster	„ 15
Plymouth—New Markets	Corporation	J. H. Elles, Town Clerk, Plymouth	„ 15
Neath—Smith's Arms Hotel	E. Evans Bevan	J. Cook Rees, Architect, St. Thomas's Chambers, Neath	„ 15
Acton, W.—Fire-engine Station, High-street	Acton District Council	D. J. Ebbetts, Surveyor, 242, High-street, Acton	„ 16
Rawmarsh—Manager's House at Sewage Outfall Works	Urban District Council	J. Platts, Architect, Old Bank Buildings, Rotherham	„ 16
Elgin—Workmen's Houses, Lossie Wynd	.....	A. and W. Reid and Wittet, Architects, Elgin	„ 16
Leeds—Wood Shed at Roundhay	Rural District Council	H. H. Hodgson, Surveyor, 46, Frankland-place, Leeds	„ 16
Chyandour—Three Cottages	J. Henwood Roberts	O. Caldwell, F.R.I.B.A., Penzance	„ 16
Batley—Completing Fourteen Houses, Beaumont-street	Co-operative Society	H. B. Buckley, Architect, Old Vicarage, Batley	„ 16
Hilderthorpe—Four Dwelling-Houses and Two Shops	I. Atkinson	J. Earnshaw, Architect, Bridlington Quay	„ 16
Rotherham—Two Dwelling Houses	Guardians	J. Platts, Architect, High-street, Rotherham	„ 16
Fenwick—Converting Wesleyan Chapel into Parish Rooms	Parish Council	Thos. Latham, Fenwick, Northumberland	„ 16
Coventry—Malting and Stores	Phillips and Marriott	G. Yates Mills, Architect, Irongate, Derby	„ 16
Walton-le-Dale—Engineers' Cottage at Sewage-Disposal Works	Urban District Council	F. E. Dixon, A.M.I.C.E., Engnr, Bank Chambers, Fishergate, Preston	„ 17
Market Bosworth—Board-room at Workhouse	Guardians	R. J. and J. Goodacre, Architects, 5, Friar-lane, Leicester	„ 17
Morley—Eight Houses in Fountain-street	R. W. Slater	George B. Clegg, Architect, 2, Peel-street, Morley	„ 17
Pen Cru Giau—Dwelling House	.....	T. James, Trefwrdanissa, Moylgrove, Cardigan	„ 18
London, S.W.—Flues and Chimneys, South-Western Hospital.	Metropolitan Asylums Board	T. Duncombe Mann, Clerk, Norfolk House, Norfolk-street, W.C.	„ 18
Halifax—Engineers' Tool-Shop, Union-street, South	.....	Arthur G. Dalziel, Architect, 15, Commercial-street, Halifax	„ 18
Luton—Extension of Platform Awning	Midland Railway Co.	James Williams, Secretary, Derby	„ 18
Pyrford—Teacher's House	School Board	George Wheeler, Clerk, Guildford-street, Chertsey	„ 18
Bridlington Quay—Additions to Bon Marché	Marshall and Co.	J. Earnshaw, Architect, Wellington-row, Bridlington Quay	„ 18
Heysham—House	.....	Rycroft and Firth, Architects, Bank-buildings, Bradford	„ 18
Keighley—Stabling and Warehouse, Low-bridge	W. Summerscales and Sons	W. and J. B. Bailey, Architects, Bradford and Keighley	„ 18
Whitbury—Shop and Café, Skinner-street	Jas. Gray, J.P.	E. H. Smales, A.R.I.B.A., Flowergate, Whitby	„ 18
Birmingham—Forming Stabling under Arches, Landor-street	Midland Railway Co.	James Williams, Secretary, Derby	„ 18
Burnham-on-Crouch—Seven Coastguard Houses	Admiralty	Director of Works, Admiralty, Northumberland-avenue	„ 19
Thorne—Renovation of Thorne Wesleyan Chapel	.....	G. W. Spofforth, The Green, Thorne	„ 19
Port Talbot—Police-station and Court	Glamorgan County Council	T. Mansel Franklen, Clerk, County Offices, Westgate-street, Cardiff	„ 19
Ystradygylais—Coelbren Schools	School Board	R. Morgan, Callwyn, Neath	„ 20
Llandryggan—New School and Residence	.....	James E. Hughes, Clerk, Bryncuhelyn, Llanerchymodd	„ 20
Lisnaskea—Alterations in Workhouse Buildings	Guardians	J. O'R. Hoey, Clerk, Board of Guardians, Lisnaskea Union	„ 20
Great Harwood—Stables and Fire-Engine Station	Urban District Council	Briggs and Wolstenholme, Architects, Richmond-ter., Blackburn	„ 22
Redruth—Children's Ward, West Cornwall Women's Hospital	.....	Alfred H. Jenkin, Solicitor, Alma-place, Redruth	„ 22
Ulvaston—Higher Grade School	School Board	J. V. Macintosh, Cornwallis-street, Barrow-in-Furness	„ 22
Brentwood—Extension of Clerk's Offices at Asylum	Visiting Committee	W. P. Gepp, Clerk, Chelmsford	„ 22
Lincoln's Inn, W.C.—Enlargement of Receiving Workhouse, Bear-yard	Strand Union	A. H. Maddocks, Clerk, 15, Henrietta-street, Covent Garden	„ 23
Preston—Auction Mart at Cattle Market	Corporation	H. Hamer, Town Clerk, Town Hall, Preston	„ 23
Lewisham, S.E.—Coroner's Court and Mortuaries, Ladywell-rd.	Lewisham Board of Works	Surveyor's Department, Lewisham Town Hall, Catford, S.E.	„ 23
Shoreditch—Rebuilding Wall and Constructing an Area	St. Leonard's Guardians	Robert Clay, Clerk, 213, Kingsland-road, N.E.	„ 24
Ballyhaise Station—Two Cottages	Great Northern Railway, Ireland	T. Morrison, Secretary, Amiens-street, Dublin	„ 25
Hull—Mosaic Pavement (630sq.yd.) at East Hull Baths	Corporation	A. E. White, City Engineer, Town Hall, Hull	„ 26
Forfar—Post Office	Commissioners of H.M. Works	The Secretary, H.M. Office of Works, 12, Whitehall-place, S.W.	„ 30
Enfield—Additions to Chesterfield-road School	School Board	N. Hepworth, Clerk, Council House, Enfield	Dec. 2
Aberystwith—Chancel and Vestry, Trinity Church	.....	Rev. Prebendary Williams, Aberystwith	„ 4
Reddish—Goods Warehouse and Extension of Platforms at Station	Sheffield and Midland Railway Cos.	Oliver S. Holt, Secretary, London-road Station, Manchester	„ 6
Rodborough—Board School	School Board	W. H. C. Fisher, Architect, 6, Rowcroft, Stroud	„ 6
Kilkenny—Erecting 40 Houses and Repairing 24 Houses	Corporation	William K. Cleere, Executive Sanitary Officer, Kilkenny	„ 9
Buenos Ayres—Central Railway Station (cost, 4,000,000 piastres)	.....	Legation of Argentine Republic, London	„ 26
Copenhagen—Repairing Cemented Walls of Thorvaldsen's Museum	Corporation	F. Meldahl, Copenhagen	(1898) Jan. 1
Leeds—Caretaker's House, Whingate-road School	Leeds School Board	W. Packer, Clerk, School Board Offices, Leeds	—
Armley—Two Houses in Whingate	.....	Ambler and Bowman, Architects, 9, Market-place, Leeds	—
Whitehead, Belfast—Villa Residence	D. J. Lanigan	Thomas Pentland, Architect, 35, High-street, Belfast	—
London—Additions to House at 5, Whitehall Gardens	.....	R. Curwen, A.R.I.B.A., 149, Bishopsgate-street Without, E.C.	—
Aylesbury—Three Shops and Houses, Cambridge-street	H. J. Goodey	W. F. Taylor, Architect, Aylesbury	—
London, E.C.—Three Blocks of Artisans' Dwellings in Moira-place and Plumbers'-place, City-road	Shoreditch Vestry	H. Mansfield Robinson, Clerk, Town Hall, Old-street, E.C.	—
Hillsborough—Two Houses	.....	T. Peckett, 19, Wood-road, Hillsborough, Sheffield	—
Ashton-under-Lyne—Cottages	A. B. Wilkinson	Eaton, Sons, and Cantrell, Architects, Stamford-st., Ashton-u-Lyne	—
Haydon Bridge—Cottage Villas	.....	George Tyzack, Tyne View, Haydon Bridge	—
Carlisle—Offices at Caldewgate	Carr and Co.	Johnstone Bros., Architects, 39, Lower-street, Carlisle	—
Bridlington Quay—Villa	.....	John M. Dossor, A.R.I.B.A., Architect, 2, Manor-street, Hull	—
Aston-cum-Aughton—Additions, Swallow-Nest Schools	School Board	W. Dust, 40, Bank-street, Sheffield	—
Harrogate—Cabman's Shelter	.....	H. E. and A. Bown, Architects, Harrogate	—
Stowe—Small Farmhouse, Lea Heath	Stowe Charity	W. H. Walley, Architect, Queen-street, Burslem	—

THE BUILDING NEWS
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PRINCIPLES, NOT STYLE.

WHAT would be said of a man who cultivated the style of a particular author, but neglected the plainest rules of the language? And yet his case is very like that of many architects of the present day—they are neglecting principles for style or for a particular school. A man who is always studying the outside of buildings, interesting and useful as such a study is as a branch of art—is only learning one half, and that a not very important part, of architecture. A draughtsman may copy an Italian window, dressings and pediment and all, without having the faintest idea of how the proportion of width and height of opening was arrived at, what the architraves are intended to represent, or why such a kind of moulding and ornament are used in its decoration; or an architect may put over his building a roof imitated from a French château, and yet not know why he selected the form of roof except that it is French and is pleasing. He may also apply a kind of ornament and detail that he knows nothing about as to their origin. Such a man is oblivious of first principles, if he understands them at all; he allows his love of mere style to dominate over his common sense, which is what many do. But a man imbued with the principles of his art, who has studied the reasons and motives of design and is a master of the materials, could not possibly do his work in this way. He would go to the foundation and proceed from premises and data which are fixed and universal in their application and evolve something independent of all accidental forms. Taking materials and structural principles based on statical considerations as the very foundation of his design, he would make these subservient to the uses of his building. Questions of proportion and expression would next guide him in the distribution of the solids and voids of his building, and the massing and grouping of the parts, the disposal of suitable forms of detail, mouldings, and ornament.

Unfortunately for architects, first principles have been discredited of late. A number of theorists and faddists have pretended to have discovered certain properties and analogies of numbers and geometrical figures as being universally applicable to buildings; and, owing to this, a suspicion has been aroused that they are misleading. So-called architectural "Gnostics," or knowing ones, have from time to time arisen, presuming to teach something new, and they have generally done so by attacking the citadels of orthodoxy, by declaiming against all traditional teaching, but without proving the soundness of their theories by practical demonstration. The lack of examples to prove the soundness of these ingenious theories has therefore been prejudicial to them. The modern architect likes to see a reason; but if he cannot see it, he is in the habit of rejecting all theories, however good. And, again, in spite of "harmonic ratios," of proportion, and other subtle theories of design, Mr. Gradgrind finds he can get on very well in his profession. If he can design his buildings in Greek, or Gothic, or "Queen Anne," he is quite satisfied, and does not trouble about any occult proportion, or care to know too much about the origin of features he uses. To be an Agnostic in architecture has at least one advantage, that it avoids any great care for scrupulosity in matters of design. Is it not true that those who affect "Dutch" and "Queen Anne" do the most monstrous things in architecture, make doorways of absurd width, narrow windows, introduce pediments without piers, defy altogether the usual proportions of columns and pilasters, make them short and stumpy, or "belly" them ridiculously, and, in short, violate every rule of good proportion. A "know-nothing" of subtleties is happier than the Gnostic; he believes in the saying: "Where ignorance is bliss, 'tis folly to be wise." His indifference to fine theories and laws is very convenient, too; as he can do anything he likes—defy a rule on one occasion, and observe it on another.

Nor can it be said that every subtle theory of proportion is absolutely infallible, or that true principles are to be confounded with certain mysterious numbers or ratios. So far from being the case, we find the best results are often obtained in spite of them. Architects and artists who have produced some of the best designs are often ignorant of these theories, and have relied simply on their own intuitive notions of what is right and pleasing to the eye. And this natural and intuitive idea of good proportion is really founded upon a tacit appeal to first principles. Though the real artist does not know chapter and verse, or cannot express accurately or philosophically the canons of architecture as given by Cesariano, Vitruvius, or other later writers who have tried to show a geometrical basis for every building of antiquity, he has the gift of applying pleasing proportions to his work. It is strange with what pertinacity some authors of imaginative genius endeavour to trace all architecture, and theology as well, back to a symbolic and mystic origin. They show there was a canonical art of building, just as there are canonical robes, hours, and other ecclesiastic rites and forms.

Going back to first principles, the architect would soon learn to reject many of the modern modes of building and architecture. Schools and styles would no longer have so great a hold upon him. And what are "first principles" but axioms or truths founded on laws of nature? It does not admit of any question that pleasing proportions are regulated by certain geometrical and simple ratios, that certain forms and lines suggest agreeable emotions—others harsh and displeasing effects; that there is a law of expression which finds a counterpart in nature. Nor will anyone now dispute that beauty in building depends on the observance of these principles or laws; just as in colour we have particular contrasts and harmonies depending in the laws of the solar spectrum. The painter may be able to produce most pleasing colour effects without a knowledge of the laws of light or spectral colours; but even he does so by unconsciously observing laws of mixture of his pigments, or of primaries and their complementaries; or he may be ignorant of the well-known fact that from a mixture of red, green, and violet all possible colours may be produced. The musician, too, whose music sends us into raptures, may not know anything of the physical law of musical chords, nor of Helmholtz's researches; but his harmonies are nevertheless the result of laws. So an architect sometimes plans a good hall on acoustical principles without knowing the laws of that science. These instances only serve to explain the dependence of good building on laws or principles which underlie all types of excellence, and which ought to be learned.

There are principles of planning, of structure, and of material; but few care to find out or apply the underlying principles which have made all great styles. They are satisfied with these embodiments in the concrete, without discovering the abstract principles. It is so much easier to take examples than work out principles. Only a little observation is required to prove that our greatest architects design their plans on principles, or observe certain points of arrangement that are found to produce the best results. It is needless to show what these are—they are found in every important building, and have been discussed by all leading authorities; but by the majority of the profession they are ignored. Everyone who is master of the subject knows that planning depends on a few principles as much as the design of a roof or a girder; that it is based on certain data as to accommodation. Every room or hall ought to have its proportion of length to width and height; should be lighted according to the use to which it is put, to say nothing of the artistic arrangement of grouping apartments, &c. There are some writers, like Mr. Leopold Eidlitz, who have laid down rules for architects in planning and design, good as far as they go, but for practical purposes of little value. Experience and philosophers like Spencer have taught that we first learn to *do* things before we know *why* we do them, and, in short, the power of intuition precedes scientific reasoning, and this is why our theory is always behind our practice, and that our best architects and engineers had been able to anticipate theory. Certain canons and rules have been learned and practised long before they have been explained by science. Take construction: Stable and well-equipoised domes and vaults had been built long before the theories of the arch were enunciated; yet their builders knew very well certain principles of statics from actual experience and failure. The composition and resolution of forces were practically applied by the builders of our Mediæval structures, who could have known nothing of those propositions. Does the modern professor of architecture do so much? He may follow the examples the Gothic builders have left; but has he employed the same initial motive in his design? Viollet-le-Duc has, in his article "Construction" in the "Dictionnaire Raisonné de l'Architecture, Français," given us a graphic description of the admirably poised vaults of the builders of the 12th century—how they produced equilibrium by opposing forces. How did the builders of Notre Dame, Paris, for example, construct their double-aisles round the apse, and so arrange their supports as to occupy as little space as possible round the chancel, and erect vaults over the outer aisles with level summits? They could not have done so unless they knew the forces of thrust and weight, the equilibrium of vertical and oblique thrusts in order to sustain so great a mass on such slender supports. We see the columns of apse crowned by broad capitals on which strong skew-backs take the vaulting shafts and cross ribs of aisles. These enormous weights were borne on columns vertically by the push of flying buttresses inwards. At Notre Dame, Chalons, we find the same concentration of thrusts and vertical load on the column, and we have equally striking examples at Ely Cathedral. But even in our everyday building mechanical principles cannot be ignored. The common solid webbed or lattice girder has to be designed on first principles before they can be made decorative. To find the proper section and depth can only be done by equating the "moments of stress" with those of resistance. The design for a roof of iron or timber implies at least a knowledge of graphic statics, if we are to do justice to our work. But in all these things precedent and style are followed.

Then, lastly, as to materials. No doubt the want of flavour or character in buildings is very prevalent, and why? Because the old rule of using the local material has been dispensed with, and architects never hesitate to erect brick and timber houses in the very heart of stone districts, because it is sometimes cheaper to use imported materials, so much has modern facilities of transport made us independent of locality. In the same way

the limestones of Somersetshire and the sandstones of Cheshire and Lancashire find their way into London buildings, with little regard to suitability. But there are other principles to observe in designing in stone. Yet how few care about them. We find mouldings and profiles used for granite that were originally intended only for soft freestones; the style is only considered. Or the architect adopts sections and mouldings without any reference to their position on or in the building as to height or light. These are common errors in our modern architecture. In other materials a similar deference to style is seen; but we need not trouble the reader with recapitulating them. The man who knows and feels his work will bring intuitive sense into it; he will not undertake a design unless he knows what he is about, unless he sees a motive and a reason why it should be done so-and-so; who will not think of following a precedent or a style unless he feels it expresses truthfully and fully his intention; and it is only the man who has the gift of imagination who can clothe such an idea presentably. The engineer or utilitarian builder knows what he wants, but has no power to express, and the average architect supplies by style what he lacks in imagination.

NEW ENGLISH ART CLUB.

FOR specimens of what has been termed the "advanced" school of painters in which naturalism and so-called "impressionism" are represented, the New English Art Club Exhibition at the Dudley Gallery, Piccadilly, should be visited. That there are a number of experimental pictures goes without saying; at the same time, there is some thoughtful and straightforward work to be seen. The sketches and "notes"—we cannot call them finished pictures—of Moffat Lindner, H. B. Brabazon, Alfred W. Rich, W. Sickert, Edward Sullivan, and Sir William Eden, Bart., are exceedingly good examples of simple expressive brush-work. Especially worthy of notice are H. B. Brabazon's "Murcia" (7), "Canal near Amiens," in which light and atmosphere are conveyed with precision. These are chiefly notes of colour with the brush. "In Venice" is exceptionally slovenly; there is no drawing—simply dashes of colour. One of the best sketches is "Lewes," by Alfred W. Rich (8), firm and vigorous. A. L. Baldry sends two admirable works, both landscapes. One is a broad sketch of a marsh near Christchurch, "Wind Swept"; and the larger picture, "The Hush of Evening," is warm in tone, and broad in the handling of the open meadow-land fringed by dark trees—a study of autumnal greys and browns. Mr. Alfred W. Rich, in "A Sussex Pasture" (14), adopts the reed-pen-and-wash style of the early aquarellists; and we must notice also Sir W. Eden's clever sketch of "London from Waterloo Bridge." W. Sickert's sketch in ink and colour of the "Church of the Barefoot Friars," showing the sanctuary and high-altar, is very spirited.

The lady artists who contribute to the club do excellent work. Mary Hogarth sends two outline wash sketches of Lincoln (21 and 24)—a view of the Cathedral and a distant view, both displaying a sympathetic touch; and Miss Mary Hector's "A Bit of Barbizon" is a charming study of sunlight, admirable in tone. Miss Mary A. Bell is also sympathetic in her work. Amy Draper's "Fishing Boats" (27), Roger E. Fry's "A Sketch in Venice," C. H. Shannon's medallion design "An Infant Bacchus" (25), Charles Conder's brilliant "Sea View," a bay with high cliffs, seen in a hazy light, are all studies of interest. A luminous and clever picture of seaside life is by W. W. Russell (38). A fresh sea dashing on a pebbly beach, on which two or three little girls in white, with tucked-up skirts, are amusing themselves. Common incident enough; but the painter has imparted life and movement to the scene—strong sunlight on the gleaming surf and white-clad children, also the passing young lady and her charge. Light and breezy freshness and motion are impressed; we lose the commonplace details in the idea of air, light, and movement. William Kneen has also in his "Girl Reading at a Window" (39) given us a pleasing impression of a girl in blue blouse reading a book near an open window, The declining evening light is happily given, vessels in the harbour appear through the open sash, and there is a pleasant dash of colour in the seat and hangings of the semi-darkened room. With the work of Mark Fisher we can always sympathise for its bright and sparkling qualities of light. "A Spring Morning" (60) is, however, spoilt by a spotty effect and want of repose, a defect in some of this painter's work. "An Autumn Evening" (41) also suffers from the same want of breadth. Landscape in its higher qualities comes to us also in the pictures of Wilson Steer, Charles Conder, as in 53, and in the work of Francis Bate, "An Oat Field" and "Through the Trees." There is a freshness in the green foliage, and the long tufts of flowering grass under the trees, the stems of which reflect the sunlight. Arthur Tomson has a pleasing evening effect in his "Walberswick Church" (66), the outline of the noble tower in shadow breaking the sky. "A Summer Night" and "Moonrise" are both studies in the same poetic vein. Alice Fanner's "Study of a Tree," a large chestnut in bloom; J. Buxton Knight's "Mellow Autumn" (72)—the latter a rich-toned wooded landscape—are pictures of merit. As studies of colour and effect we must also mention Bertram Priestman's picture of a cow and boy, called "Green Meat," and Miss Mary Bell's "A Dutch Garden" (74), in which the scarlet flowers, amidst green and blue, make a vivid contrast. "Regatta Day" (84), by Hugh Blaker, is a luminous piece of impressionism; the crowd of people on the pierhead in nautical attire, white dresses, and scarlet sunshades are cleverly painted, and the artist evidently belongs to the new school of French artists—the *plein air*, so well has he realised daylight and breeze. In the place of honour hangs a large picture by J. E. Christie. This time it is the "Wheel of Fortune," an allegorically treated subject sufficiently clever to take its position. Poised on a wheel which she keeps going with her foot, a fairy in gauzy draperies spins along a road flecked with sunshine and shadow. On one side, a crowd of little children throw flowers on her path, others are pursuing their everyday pursuits, and two little girls in the foreground are examining the petals of flowers. There is much of fantasy in the conception, which is well worked out, and in drawing and colour is rich. Last year the same thoughtful painter gave us a similar allegory under the title of "Bubbles." Other figure subjects are two studies by Edward Sullivan, "My Lady in Yellow" (5) and "The Princess," rather experimental colour themes. P. Wilson Steer's "By Lamplight" (45), a head of a girl with auburn hair, is skilfully painted as a study of artificial illumination; his sunlight and mist in "Knaresborough" (97) is also effective. David Muirhead's "Prelude" is a quiet, restful study of a lady at piano (54). "In the Studio," by A. Belleroche, is a model at a window. The light through white curtains falls delicately on the girl half-draped; and we also notice A. S. Hartrick's "Mariana" (90) in a devotional attitude, good in colour, and a nude figure reading (86), by Douglas Robinson, for its modelling and flesh tints, and a clever colour scheme of a fair-haired girl's head against a blue sea, by Mary A. Bell. Miss Lily Blatherwick, R.S.W., sends two charming studies of Nature, "The Butterflies' Playground" (85), a field of poppies, and "A Cottage Window" (94), both masterful treatments of country blossom. The large, boldly-painted "Quarry," by W. Y. Macgregor (98), Nelly Fisher's admirable group of horses, "Friends" (100), Henry Tonk's "Shadow of the Cliff" (106), the flickering sunshine in P. Wilson Steer's "Oak Avenue," Bernard Sickert's "Tea Time" and "St. Ives Harbour" (112), J. Buxton Knight's "Midsummer Hedgerow" (a powerfully-painted landscape), are other pictures on the walls which show much thoughtful and earnest work, if not always of meritorious execution.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE second ordinary meeting for the present session was held on Monday evening, when there was a large attendance of members and visitors, the latter including several ladies. Just as the President (Professor George Aitchison, A.R.A.), was taking the chair, wearing, in addition to the handsome chain of office presented by the late Professor Donaldson, the Jubilee medal just conferred upon him by the Queen, the electric lights were extinguished, and the room was plunged into absolute darkness. Two pairs of candles were brought in, but, as soon as the preliminary announcements had been read by the secretary, the electric lights were renewed as suddenly as they had gone out.

RENAISSANCE ARCHITECTURE IN MALTA.

A paper on this subject, illustrated by numerous large scale photographs of the principal buildings in Malta, specially taken, and by plans, maps, and drawings, was read by Mr. ARTHUR S. FLOWER, M.A., F.S.A., Associate. Small as it was, Malta teemed, the lecturer pointed out, with huge buildings, the product of centuries of activity and ambition. Churches, palaces, castles, possessed a character unusual, striking, commanding, which rendered it one of the most interesting spots in Europe. The island was composed of one solid block of almost perfect building stone, limestone. A house might be built from the stone cut out from its own cellars, a fortress from its own moats, a cathedral from its crypts. Stone was the one material employed in buildings, and was extensively used for other and many novel purposes, trees being singularly scarce and almost confined to carobs. It might be described as a mason's earthly paradise, and, indeed, the inhabitants seemed to be born masons. No higher testimony could be given to the beauty and interest of the buildings than the enthusiasm they aroused in the cultivated and critical mind of the late Dean Church, who thought Valletta one of the most striking specimens of architecture he had ever seen. Besides the ethnological and geological conditions, the politico-religious influence exerted by the Knights Hospitallers had been an important factor in the architectural development of Malta. Its architectural splendours were chiefly due to them. Relics of former rulers—the so-called Phœnician remains, rude stone monoliths, fragments of Greek and Roman structure, various beautiful evidences of Sicilian-Norman influence—the lecturer passed over as belonging more to archæology than to architecture. His purpose was to deal with buildings still in regular occupation and use, belonging to a style most conveniently to be described as Renaissance. These were erected during the palmy days of the Knights of St. John, from the beginning of the 16th to the beginning of the 18th century. In explanation of how they came into existence, the lecturer sketched the history of the Order, and the various vicissitudes it passed through from its foundation in Jerusalem, early in the 11th century, till its establishment in Malta. This happened in 1530, when the Maltese islands, at that time little better than desolate barren rocks, were ceded by the Emperor Charles V. of Spain to the Hospitallers in perpetual sovereignty. Fear of Turkish attacks compelled them to devote their first years to necessary fortifications, nearly all to be reconstructed after the great siege of 1565, when the Turks were finally repulsed. The creation of Valletta, a city which suddenly sprang up on a very unpromising site, never before occupied by buildings, was entirely the work of the Grand Master, La Vallette. The first

ST. PATRICK'S CATHEDRAL, MELBOURNE.

stone was laid on March 28, 1566, at the corner of St. John's bastion, La Vallette taking up his abode in a wooden hut on the spot, and directing operations day by day until his death in 1568. Del Monte, the new Grand Master, took equally great interest in the work, beginning his term by announcing that no one should enjoy his favour who did not promote the building of the city. At La Vallette's death nothing had been built except the outer fortifications. The first house, interesting as forming the nucleus of the present governor's palace, was built by the Grand Master's nephew, Eustachio del Monte, in the centre of the high ground, on the place occupied by one of the Turkish batteries during the siege, and this formed the nucleus of the present governor's house. In the next year, 1570, the designing of all the works, military, civil, and even ecclesiastical, was intrusted to Gerolamo Cassar, a very remarkable man, whom a document, dated May 18, 1581, refers to as the "ordinary architect and engineer of the Order . . . from 1565 to 1581." The most notable of his numerous works was the church of St. John. In 1571 the headquarters of the Order were transferred to the unfinished city.

VALLETTA PRO-CATHEDRAL.

The lecturer then gave a detailed description, illustrated by numerous photographs, of St. John's, Valletta, and other buildings and architectural features of note in the capital and other parts of Malta. The pro-Cathedral church of St. John was built from designs by Gerolamo Cassar, and consists of a wide and low barrel-vaulted nave, 53ft. across (or with side chapels 118ft. wide) and 189ft. in length. On the north side of the west front are sacristies and the treasury, and on the south side the prior's residence and an oratory. Each bay of the nave opens into a chapel devoted to one of the "langues" of the Order, these side chapels occupying the place of aisles. The Great Hospital was one of the first buildings erected by the knights, and is noteworthy as containing the largest ward ever built, 503ft. long by 35ft. wide, with a shorter ward of the same width leading out of it. Valletta alone has 24 churches, besides chapels and oratories. Outside Valletta, in the suburbs and country villages, there are a still greater number of churches, together with almost innumerable detached chapels. The latter are mostly octagonal or circular on plan, and domed, with very graceful outlines. The larger village churches have usually two western towers and a dome at the crossing. The dimensions of two typical churches, both dating from the 17th century, are:—Zeitun church, 153ft. long and 111ft. broad, including side chapels, with a nave 31ft. wide; and Zebbug church, 165ft. by 122ft., and 32ft. across the nave. Città Vecchia, or Notabile, originally the chief city of the island, and the scene of St. Paul's sojourn there, is exceedingly picturesque. Its Romanesque cathedral was destroyed by an earthquake about 200 years ago, and the present building, of which Lorenzo Gafà, a Maltese, was architect, was consecrated in 1702. Noteworthy are the nave, upwards of 36ft. in span; the carved and inlaid choir-stalls, said to date from 1480; and the gorgeous altar ornaments and other treasures which escaped pillage by the French in 1798. The lecturer concluded with a few remarks on the characteristics of the architecture of the Order. The term Palladian, applied to it by Dean Church, he considered inappropriate; it was more akin to Early Florentine Renaissance than to any other type. With regard to a suggestion made by Mr. Ingress Bell some 20 years ago in "An Architect's Notes in Malta," that Spanish architects in great numbers were employed upon the city of Valletta, which he thought accounted for the similarity between the architecture of Malta and that of some of the Belgian towns, the lecturer, while granting the resemblance to Spanish work, particularly in ornament, could find no evidence of the actual presence of Spanish architects. Whencesoever derived, all the buildings of what might be called the heroic age of the Order were exclusively Doric.

A vote of thanks to Mr. Flower was proposed by Colonel Lenox Prendergast, seconded by the Rev. W. K. R. Bedford, and, having been supported by Colonel J. R. Hogg, R.E., late commanding engineer in Malta, and Mr. Thomas Blashill, was carried by acclamation.

ST. PATRICK'S CATHEDRAL, MELBOURNE.

On page 646 *ante* we gave a description of this building, which was opened on Oct. 31. The architect is Mr. W. W. Wardell, F.R.I.B.A., and the cost of the building has been about £150,000. We now give an exterior view of the cathedral, from a photo. by Mr. C. Bayliss, of Sydney, which has been sent to us.

DOVER NEW ADMIRALTY HARBOUR.

The Lords Commissioners of the Admiralty have accepted the tender of Messrs. S. Pearson and Son (Limited), 10, Victoria-street, Westminster, London, S.W., for carrying out the New Admiralty Harbour at Dover. The works, which are estimated at 3½ millions sterling, consist of (1) an extension of the existing Admiralty Pier in an east-south-east direction for a distance of 2,000ft.; (2) the erection of an east arm extending seaward in a south-westerly direction for a length of 3,320ft. from the foot of the headland, at a point situated 200 yards to the eastward of the south-east angle of the convict prison inclosure; (3) the construction of

a breakwater, 4,200ft. long, which, at a distance of about three-quarters of a mile from the shore, will form on the south the outer sheltering arm of the harbour; and (4) the building of a sea-wall 3,850ft. in length, extending from the Castle Jetty at the eastern end of East Cliff-terrace to the root of the proposed east arm. For the purposes of this wall a reclamation will take place covering an area of 21 acres, the foreshore between the back of the wall and the base of the existing cliffs being filled in with chalk quarried on the spot. The works to be executed represent a total length of 13,370ft., or more than two miles and a half. The area inclosed will be 610 acres at low water, and of this water area 315 acres will be situated beyond the five-fathom line, and the anchorage will be sufficient to accommodate twenty first-class battleships, as well as numerous vessels of smaller type. The new Admiralty harbour is, on the eastern side, to inclose and protect the commercial harbour which has for some years been in course of construction. As originally designed by Messrs. Coode, Son, and Matthews, the commercial harbour was intended to cover an area of 56 acres, but this will now be increased to 75 acres. Consequently the water area comprised within the two harbours will be not less than 685 acres. Two of the three enormous sheltering arms—the Admiralty pier on the west and the new pier on the east—will constitute magnificent promenades open to the general public.

There will be two entrances to the harbour—one at the extremity of the eastern arm, the other at the end of the Admiralty Pier extension. The former will have a width of 600ft. and a depth of 42ft. at low water of spring tides, or of 60ft. 9in. at high water of those tides. The south breakwater, which will not be accessible to the public, will begin at the southern angle of this entrance, proceeding first in a curve trending in a south-westerly direction, thence following a straight line west by south, and terminating at a point 800ft. from the end of the Admiralty Pier extension. A second, or southern entrance 800ft. wide will thus be formed between the south breakwater and the Admiralty Pier extension, the depth therein corresponding with that of the eastern entrance—namely, 42ft. at low water of spring tides.

Berths for coaling purposes will be provided for a length of 1,800ft. along the inner side of the east arm, the shallow sea being dredged down so as to maintain a uniform depth of 30ft. at low water of spring tides. The reclamation between East Cliff-terrace and the east arm will be used as a workyard during the construction of the harbour. Each of the three main sea works will be a solid structure of concrete blocks, faced with granite above low water. The blocks used in the Admiralty Pier Extension will, as a rule, weigh 40 tons, while those employed in the formation of the east arm and the south breakwater will be 30 tons in weight. All the blocks will be bonded and keyed, or joggled together so as to render the work monolithic in character, and in every case the foundations will be carried down to the solid chalk or flint composing the bed of the channel. The deep foundations will be protected from erosion arising from current action by aprons of concrete blocks laid and incorporated in the sea bed. The works—which will occupy about ten years in execution—will be begun forthwith, under the direction of Major Henry Pilkinton, C.B., R.E., the civil engineer-in-chief appointed under the Naval Works Loan, and of Messrs. Cood, Son, and Matthews, the chief engineers, by whom the design was prepared.

NOTES ON SURVEYING AND LEVELLING.—VI.

By Walter Tester.

THE ATHLETIC GROUNDS.

THE plan, Fig. 1, shows the original intention for the New Brighton Tower Athletic Grounds. The idea was to have a football field in the centre of the ground, which would be suitable either for the Rugby or Association game. Around the edge of the football field there was to be a running-track, and outside that a cement cycling track, with a grass verge between the two, with grand and popular stands and banked-up standing-spaces, and all the necessary accommodation for a large crowd of spectators.

The cycle track was to be made as large as the amount of ground available would permit in order to get long straights; but at the commencement of the work it was only possible to arrange for a cycle track of $3\frac{1}{2}$ laps to the mile, with a 4-lap running track. To enable him to set out the tracks, the surveyor is furnished with the following particulars:—The width of the football field is to be 258ft.; half-width = 129ft.; and as the length of the running track is measured on a line 1ft. from the edge of the football field on the track, the radius of the semicircular ends is 130ft. on this line. The total length of the running track being a quarter of a mile = 1,320ft., and the length of one semicircular end being 130ft. × 3·1415 = 408ft. − $4\frac{3}{4}$in., the general dimensions of the track measured on the line are—

Length of one semicircular end..	408ft	$4\frac{3}{4}$in.
Length of other end	408	$4\frac{3}{4}$
Length of one straight	251	$7\frac{1}{4}$
Length of other straight.....	251	$7\frac{1}{4}$
Total	1,320ft.	0in.

In the same way the dimensions of the cycle track are arrived at, the radius on the line being 160ft. It is not strictly accurate to say that the ends of the cycle track are semicircles; for, as a matter of fact, there is a portion of the curve at the junction with the straight which is of an elliptical nature; but it is sufficiently near for setting out on the original ground, as all the pegs will be disturbed by the excavations, and the tracks will have to be set out accurately on the formation level. Working on this basis, then, 160ft. × 3·1415 = 502ft. $7\frac{3}{4}$in., length of one semicircular end, and the general dimensions measured on the line 1ft. from the edge on the track are:—

Length of one semicircular end..	502ft.	$7\frac{3}{4}$in.
Length of other semicircular end	502	$7\frac{3}{4}$
Length of one straight	251	$7\frac{5}{8}$
Length of other straight.....	251	$7\frac{3}{8}$
Total length....	1,508ft.	$6\frac{3}{4}$in.

Width of the running track to be 24ft., and the grass verge between the tracks 6ft. wide all round. Cycle-track to be 29ft. wide on the grand-stand side where the races finish, and around one curved end, and to taper from 29ft. to 25ft. on the popular side, increasing round the other curve until it becomes 29ft. again at the junction with the straight. It should be mentioned that in cycle-racing the riders go round with the lower edge of the track next the verge on the left.

Fig. No. 2 gives the finished sections of the cycle track. The level 84·00 (above Ordnance datum) is to be the same all round on the one-foot line, and on the curve where the track attains the full banking, the outer edge is to rise 8ft. 6in. above that level, the section being slightly round. On the straight the outer edge rises 1ft. above 84·00, the section being a straight line. These levels apply where the track is the full width of 29ft. Where it is not, the section is exactly the same, but with a strip cut off at the outer edge.

It will be supposed that when the surveyor comes on to the ground the exact position the tracks are to occupy is not determined, as negotiations are in progress for some of the adjoining land. The surveyor is required, however, to proceed with the sectioning of the ground, which is of an exceedingly irregular and uneven nature, and is almost entirely covered with trees, gorse, and brushwood. He cannot, therefore, in determining the position of his section-lines, take the tracks into account, except to the extent that he can take a series of parallel sections across the ground square off the S.W. boundary of the estate, and as the longitudinal axis of the tracks is to be parallel to this boundary, these lines will also be square off the tracks.

With the object of setting out the sections, the surveyor commences by choosing a base-line, A B (Fig. 1.), in the only portion of the ground which is at all clear. (See site-plan in Article No. 1.) This line he puts upon his survey-plan, making it square off the S.W. boundary, and he can fix the line on the ground near enough for present purposes by scaling dimensions to any stationary objects on his survey-plan, and setting the measurements out on the site. He then marks two points C and D on this line as far apart as convenient, and in such a position that lines square off the base at these points will have as long a length as possible clear of trees. Having set out a right angle at each point with the theodolite, he must continue these lines through towards the lake end of the ground, using the theodolite for producing the lines over ridges and other irregularities of the ground. In order to get the lines through he will require the ground clearing, and it will be supposed that he has authority to remove all the trees and brushwood covering the site of the athletic grounds, and that he has set a gang of men to work at the S.E. end, as he proposes to commence his sections at that point. Having continued the two lines through to the far end, a line E F should be run across any open ground between the two to see that they have been produced parallel to each other. As the length of the two lines D E and C F will not be the same, the length of E F will have to be calculated, as the hypothenuse of a right-angled triangle, the two sides of which are (1) the length of C D, (2) the difference in length between C F and D E.

The four sides of the figure C D E F being accurately measured, E F should come out as calculated if the two lines D E and C F are parallel. A check dimension should also be run out to see that C F is parallel to the boundary, and, if necessary, C F and D E will have to be adjusted. They should be near enough for the ground sections, if the work has been carried out at all accurately. Having set the two lines correct in position and parallel to each other, the surveyor can proceed to put pegs in these lines the distance apart of his sections, making them as close together as the nature of the ground requires, and he should number each peg or cut notches in it to agree with the number of the section. The lines can be ranged out by taking the corresponding pegs in C F and D E, and the surveyor can proceed to take the levels, commencing at the end A B, as this portion of the ground will now be cleared of trees and brushwood, and the men will be in front of him. His first object is to set a series of pegs for back sights to command the whole of ground to be sectioned, and he commences by taking a reading on one of the Bench marks previously fixed on the old entrance gate-post. He then sets a peg at a convenient place to serve as back-sight for commencing his sections, driving it firmly into the ground, and taking the level. Using this peg for a back-sight, he next sets his level in a new position, and as the ground is rising rapidly, he places it so that the crosshair cuts near the top of the staff, when it is placed on the peg already fixed, and he then chooses another point to fix a back-sight peg so as to command a large area of ground, and so that the hair of the telescope cuts near the bottom of the staff, driving the peg into the ground firmly, and taking the level as before. Working from point to point in this way, he sets a series of pegs right across the ground, and when he reaches the far end he should finish up on some fixed bench-mark, and if he has worked accurately, this level should come out the same as before, when reduced from the first B.M. through the whole series of back-sight pegs. If it does not, he will know that there is some mistake, and can soon run the level over the series again. Having satisfied himself as to the accuracy of all the back-sight pegs, he should have them painted a distinctive colour, and numbered for reference, making a list of their reduced levels. He can now proceed to chain the lines and read the levels, always taking the back-sight reading off one of the pegs at every change in position, as the ground is very uneven. Care should be taken in choosing the situations for placing the instrument; otherwise, a great many resettings will be necessitated, and there are one or two points which may be mentioned in this respect. Suppose the section lines cross a sudden rise or ridge, the difference in level between the top and bottom of which is beyond the range of the staff, it will save many resettings if two or three sections are taken together as far as the bottom of the ridge, leaving a peg at a point on the line for recommencing, the instrument remaining in one position. When as many are taken as thought desirable to the foot of the rise, the level can be moved up-hill and placed in such a position as to continue the sections over the high portion, and well down the far side of the ridge. When this part of each section is taken the instrument can be moved down and the lines continued on the other side of the rise, recommencing at the pegs left in temporarily for the purpose.

When working up a sharp rise full advantage should be taken of the length of the staff by placing the level at each change in position, so that the hair will cut as high up as possible on the staff, provided, of course, that a reading can be obtained on one of the back-sight pegs.

It sometimes happens that there is a slight dip

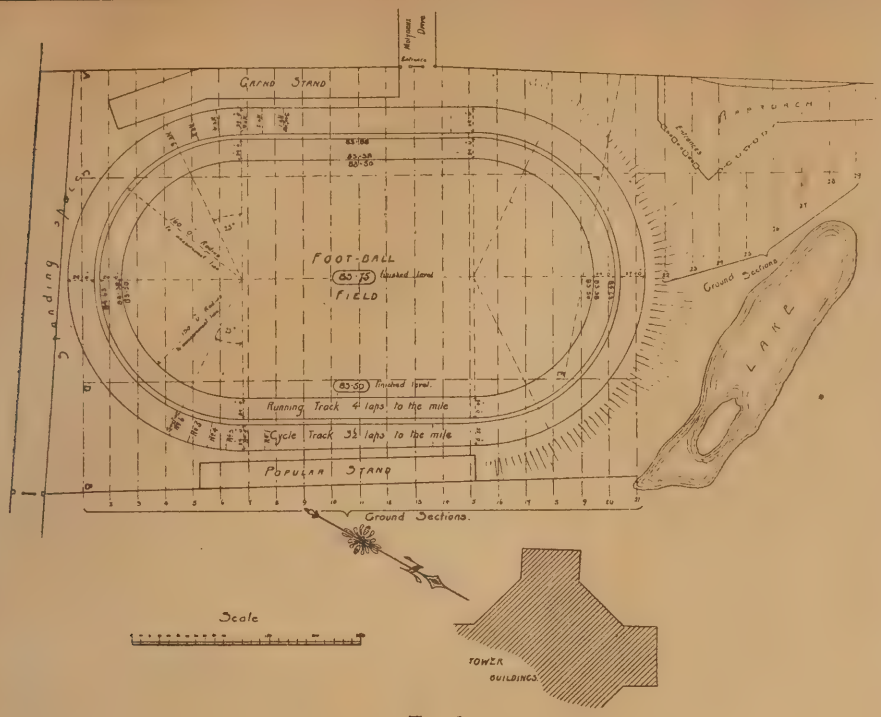


Fig. 1.

in the ground where one or two readings are required, and at which, from the position the level is placed in, the hair cuts above the top of the staff. As the section could otherwise be continued for some distance without resetting, it seems a waste of time to do so for an odd reading or two, and it can be avoided by holding the staff up on a two-foot rule or a short wooden post, and adding the length of the latter on to the reading of the staff. If there are a considerable number of readings which cannot be taken without holding up, or if the dip in the ground is too great to permit the staff being held up at all, the section can be continued as far as convenient on the far side of the valley, missing the readings at the intermediate points, but booking the lengths on the chain, and leaving a peg or arrow to retain the positions where levels are required. The instrument can afterwards be set lower down, and the readings taken, care being used to book them down under the correct back-sight, and not in the blank spaces left when chaining the line, as the readings there are taken from a different setting. The reduced levels may be filled in after they are worked out.

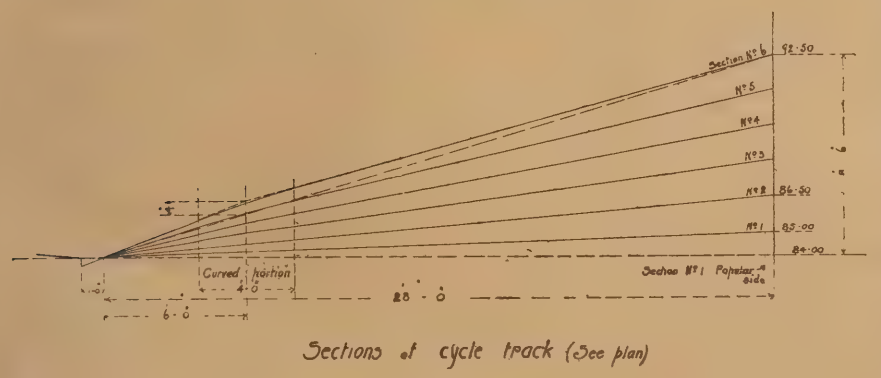


Fig. 2.

It is not necessary to commence each section from the same end, and it will save time to take them each way alternately, as the level placed for finishing one line will serve for commencing the next. They can easily be plotted looking the same way by starting from the right hand or left hand of the scale.

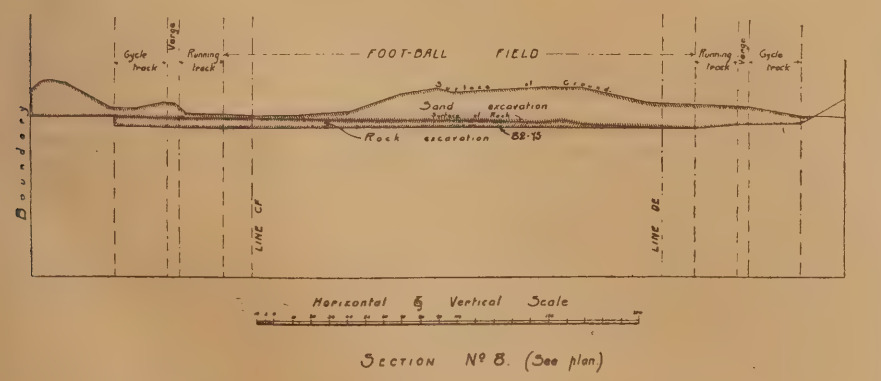
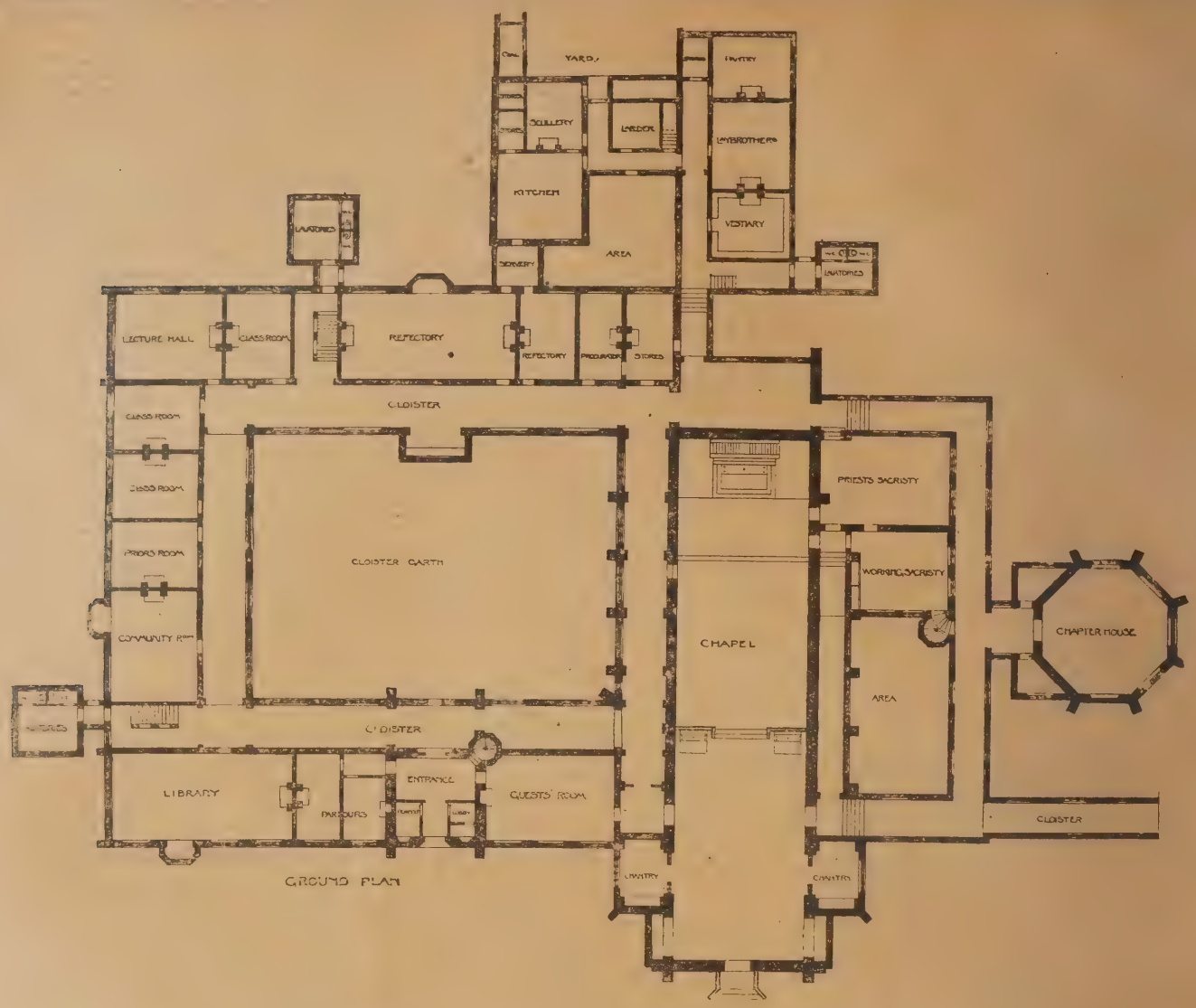


Fig. 3.

In sectioning irregular ground it is easy to over-measure the lengths of the lines if the chain is not always held up perfectly level, and it is as well to let the sections start and finish on a definite straight line, leaving a peg or mark at the ends of each section. In the case of the athletic grounds under consideration, a straight line is fixed on the popular side not necessarily square off the section lines, but better so, at which the chaining of each line starts or finishes, and the length on the chain where the section cuts, each of the lines D E and C F should be noted, and the sections should terminate on the grand-stand side at the boundary of the estate. The lengths between D E and C F should measure the same in each section, and also the distance between C F and the boundary where they are parallel. The length between the line where the sections terminate on the popular side and D E, if they are not parallel, will vary regularly—that is in No. 3 it will be as much more or less as the case may be than in No. 2, as No. 2 is more or less than No. 1. The back-sight reading on one of the pegs should always be looked at twice, once when the level is first set, and secondly just previous to moving to a new position. If the methods above described are followed, there will be little doubt as to the general accuracy of the sections, as the levels of the Bench-marks, the back-sight readings and the chaining of lines will all be checked, and it is very improbable that there can be any serious error. In this way the whole of the ground can be sectioned, and it will be supposed that the surveyor has by this time received instructions as to the position the tracks are to occupy on the site—viz., as shown on Fig. 1. He must at once proceed to set them out, and it will be quite accurate enough for the present purpose if he plots the tracks down correctly in their relation to the section lines, and scales the lengths off the plan to each edge of the tracks along these lines, afterwards setting the dimensions out on the ground. For the extreme ends where the section lines cut the tracks very obliquely, it will be better to use off-sets square off the section lines. The pegs should be painted distinctive colours—say, red for the running track, and white for the cycle track. As the earthworks are being carried out, all these pegs will be either excavated out or buried, and the object they serve is as a guide to the excavator in forming the ground into shape, as, for instance, on the cycle track, he must excavate to something like the right slope required for finishing, allowing, of course, for the pitching and concrete. The surveyor should have a number of trial-holes made at any convenient points on his section lines down on to the rock, and he should take the levels on the surface of same, noting the position of the points on the lines, and he can then get the whole of his sections plotted, putting on both the surface of the ground and the rock (see Fig. No. 3), and assuming some working-level for the football field, he can put on the formation levels for the tracks. He can then make an estimate of the quantity of excavation of sand and rock, and how it is to be disposed of in forming banks for the cycle track and standing space, the question how any surplus is to be utilised being at this time dealt with.

It may be necessary to try several levels for the excavation of the football field before a satisfactory one is arrived at, and pegs should be sunk, or rough screeds fixed up, on the ground at any convenient places, to show the finished surface of the cycle track, in order to see how it will work out on the site. A working-level having been settled, the surveyor can revise his estimate of the quantity of excavation, and he will also be required to give the excavator this level on the ground, which can easily be done by setting off one of the back-sight pegs, adding the reading to the reduced level, and deducting the working level required, giving the reading to which he must set the peg. If operations are to commence in several portions of the site simultaneously, the excavator will require working levels at each place, and the back-sight pegs will be very useful for this purpose, as they command the whole of the ground. The surveyor's next duty will be to replace his section pegs on the formation level as the excavations proceed, and if he can fix any of his lines by marks on any stationary objects, it will be all the better.

All the section lines will be required where there is any rock excavation, and as the surface is bared, the surveyor must take the levels in the same manner as for the original ground. The rock will be required for pitching the running and cycle tracks, and for covering the standing spaces, and any soil on the original ground surface will be used for the football field and verge.



WHEELWRIGHT GRAMMAR SCHOOLS, DEWSBURY.

If there are no sods good enough for the football field, there may be some which will come in for the borders and banks in other portions of the ground, and if so, they will be stripped off and stacked for that purpose. Also many of the trees cut down may be useful for various objects, as for temporary fencing or building rustic bridges or seats. It will be supposed that after the work has progressed considerably, and the ground has been excavated at the south end, that another piece of land is obtained in the south-west corner, and that it is decided to turn the tracks round at right angles with the object of making a larger cycle track. The work done in excavating down to the formation level is not wasted, as the two football fields overlap each other, and it would have been necessary in any case.

QUEEN VICTORIA JUBILEE BOARD SCHOOLS, AND OTHER SCHOOLS, DEWSBURY.

[WITH LITHOGRAPHIC ILLUSTRATIONS.]

OUR illustrations give several schools by Mr. J. Lane Fox, the architect; that of the Queen Victoria Jubilee Board School, Dewsbury, was selected in the late competition for these schools. The accommodation provides for 900 scholars in three departments—300 boys and 300 girls are arranged for in the main buildings, and the 300 infants in a separate building. Each block of buildings have street frontages, the playgrounds being arranged in the centre of the site, which, as will be seen, falls very rapidly from one street to the other. Advantage of this fall has been taken to form a basement floor, in which are arrang d kitchen and lecture-room for cookery work, and which forms the central cookery school to serve all town schools under the control of the school board. The buildings throughout are of stone from the Halifax district, dadoes in all rooms being formed with glazed brickwork. The roofs are covered with Westmoreland green slating, and the whole range of buildings are heated throughout on the low-pressure hot-water principle. The contracts have been carried out by local contractors under the direct supervision of the architect.

THE FALL BOARD SCHOOLS, EAST ARDSLEY.

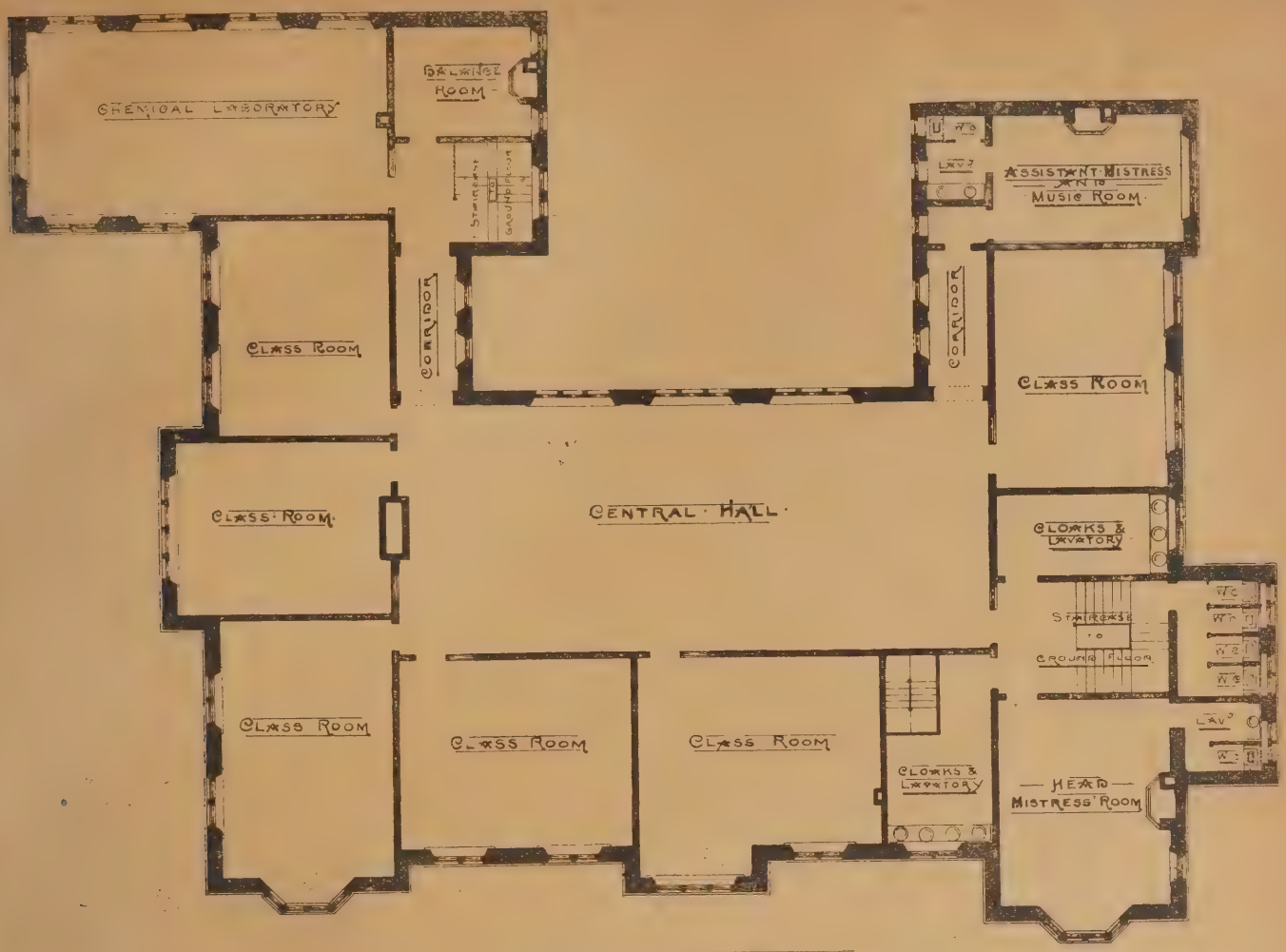
The development of East Ardsley, caused by the erection of engine-sheds, &c., by the Great Northern Railway Company, has rendered it necessary for the school board to erect the block of school buildings shown in our illustration. The site is pleasantly situated about midway between what may be called the old village and the new village. The plan arrangements give provision for 250 girls and 250 infants, with space for boys' department for a similar number of scholars. The boys' school at present now takes up the whole of the old board school, which originally contained the girls and infants, which are now provided for in these buildings. The buildings throughout, and the boundary walls are built of Delph stone. The dadoes in all rooms are in glazed bricks. The roofs are covered with Westmoreland green slates, and the woodwork is in yellow pine, stained and varnished. The heating is on the low-pressure hot-water system.

WHEELWRIGHT GRAMMAR SCHOOLS, DEWSBURY.

This design was selected in a limited competition. The buildings are erected upon a most commanding site on the borders of the town, and quite central for the districts from which the students are drawn. The accommodation provides for 300 students—150 boys and 150 girls. The boys' department is arranged for on the ground floor, and girls on the first floor. In a spacious and well-lighted basement are arranged the cloak-rooms, kitchen, scullery, large dining-room for students, and the requisite store-rooms, &c. In addition to the customary halls and classrooms, private rooms are arranged for head and assistant-teachers and a chemical laboratory with large lecture theatre and attendant rooms are provided in such a position as to render them central for each department. The management of the schools is in the hands of local governors under a scheme of the Charity Commissioners in London. The amount allowed for building by the Commissioners being somewhat small for so large a building, rendered it necessary that the buildings could only be of a plain, but substantial character. The playgrounds are of the highest capacity, provision being made for cricket, football, and tennis. The buildings and boundary walls are entirely of Halifax district stone. The floors throughout are fireproof, and woodwork, yellow pine stained and varnished. The architect is Mr. J. Lane Fox, Bond-street, Dewsbury.

IMPROVED RADIATORS AND BOILERS.

MESSRS. HAYWARD BROTHERS AND ECKSTEIN, LTD., engineers and iron-founders, of Union-street, Borough, E.C., have introduced several improvements in heating apparatus and boilers. Section 8 of their catalogue contains a description, illustrated, of their "Safford" radiators and "Daisy" independent hot-water boilers. Winter is approaching, and those who are thinking of heating their houses or premises will find these radiators and boilers very economical and efficient. The "Safford" screwed-nipple radiators are made in various patterns and sizes—circular and straight, plain and highly ornamented—to suit public buildings, corners of rooms, positions under windows, forming dining-room sideboards or closets.



FIRST FLOOR PLAN.

WHEELWRIGHT GRAMMAR SCHOOLS, DEWSBURY.

A table is given on each page, with dimensions, heating-surface in square feet, and prices of radiators kept in stock, from which every requirement may be satisfied. The "Safford" radiator is tested to 120lb. to the square inch, and is well adapted for public and domestic buildings, hospitals, and churches. For halls it is the best mode of heating, as a small boiler at the back of a dining-room grate, or from kitchen range, can be used. The right-and-left screwed-nipple connections give a perfect joint. Several very artistic designs are shown in the catalogue. The "Florence," "Favourite," the "Perfect," and other designs are illustrated and priced. These are made of several heights—20in. to 38in. We commend this superior type of radiator to architects and builders, also the "Daisy" hot-water boiler. The latter has a large heating-surface, has no fire-brick, and is easily set up. In this boiler several sections are used, each being an independent heater. It is compact, portable, and sightly in appearance, and most economical in construction, as during spring and autumn a small fire is sufficient to heat the system. The boiler sections and smoke-flues are ingenious'y arranged, each section is independently fed, and is employed in the circulation. Full particulars and sections are given.

"A BATTLE ABOUT ARCHITECTS."

THE *Essex Herald* of Tuesday last contains a lively account under the inspiring heading which we quote above. A competition for public baths was held some little time ago at Walthamstow, when Mr. Roland Plumbe acted as referee and awarded the first place to Mr. J. W. Dunford, architect, whose position was confirmed by the District Council, his appointment, we understand, being made under seal. Since these things were done political parties have changed, and the majority now in power seek to nullify the action of the past Council. The only two firms who submitted designs for the baths were Mr. Dunford and Messrs. Spalding and Cross. The referee reported that although the plans of the latter were in some respects superior, the design by Mr. Dunford was far nearer the money limit imposed by the conditions—viz., £7,000—and consequently the author was awarded the work, subject to the approval of the Local Government Board being obtained, which was done. However, nothwithstanding these determinations and resolutions, owing, it would seem, to considerations quite beyond the limitations of the question, such as we have indicated, the obstruction offered to the carrying out of the selected design for the baths has been continued, and at last reached a climax, at least to this extent, by a majority of one on Friday last, when it was resolved to increase the cost of the baths to £8,500, and carry out Messrs. Spalding and Cross's plans. Personalities were freely indulged in as a matter of course, and bad names were called on both sides during a protracted scrimmage which lasted three hours. We do not think the report reflects credit upon the promoters, and it is a matter of regret when architects are concerned in such proceedings. Mr. Dunford's plans we have not seen, and we know nothing of the merits relatively of Messrs. Spalding and Cross's design. On the face of it, however, when a referee has had his award confirmed, we think it is considered a rule among gentlemen to loyally accept such a conclusion as final. As it stands, it would seem that Mr. Dunford has been very badly treated, though, fortunately for him, his appointment, being under seal, cannot so readily be upset by the Highways Committee and their friends. Whatever the legal merits of the case may be, architects and all fair-minded men can have but one opinion on the matter. Professional etiquette is certainly not upheld by such proceedings.

It has been decided to put new roofs on the nave and north and south aisles of Wolvey (near Nuneaton) parish church at a cost of about £600.

PAINT-MIXING.

(*Continued from page* 685.)

YELLOWS AND THEIR ALLIED HUES.

64.—AMBER yellow: 8 parts medium chrome, 5 parts burnt umber, 3 parts burnt sienna.

65.—Bran colour: 40 parts white-lead, 17 parts light chrome yellow, 1 part raw umber, 1 part burnt umber.

66.—Bran: 4 parts yellow ochre, 1 part Vandyke brown.

67.—Bran, antique: 4 parts white-lead, 3 parts medium chrome, 1 part Vandyke brown.

68.—Bronze yellow: 3 parts white lead, 5 parts medium chrome, 1 part raw umber.

69.—Buff: 2 parts white-lead, 1 part golden ochre.

70.—Buff: 88 parts yellow ochre, 12 parts whiting, 10 parts zinc-white, 1 part plaster of Paris.

71.—Buff: Golden ochre.

72.—Buff: 2 parts white-lead, 1 part golden ochre or yellow ochre.

73.—Buckstone tint: 32 parts white-lead, 1 part raw sienna.

74.—Burnish yellow: 16 parts kaolin, 4 parts pulverised soapstone, 1 part Oxford ochre.

75.—Chamois: 50 parts white-lead, 1 part chrome yellow, 2 parts vermilion.

76.—Cream: 160 parts white-lead, 1 part orange chrome.

77.—Cream: Naples yellow.

78.—Cream: 400 parts white-lead, 32 parts Oxford ochre, 1 part raw umber.

79.—Canary tint: 80 parts white-lead, 1 part lemon chrome.

80.—Canary yellow: 6 parts white-lead, 1 part lemon chrome.

81.—Copper colour: 20 parts white-lead, 4 parts media chrome, 3 parts Venetian red, 1 part raw umber.

82.—Citron yellow: 16 parts white-lead, 12 parts lemon chrome, 1 part light emerald green.
83.—Drab: 80 parts yellow ochre, 20 parts whiting, 17 parts zinc-white, 2 parts sulphate of barytes.
84.—Drab paint: 42 parts barytes, 3½ parts white-lead, 2 parts English umber, 5 parts boiled oil.
85.—Dark oak: 60 parts white-lead, 1 part golden ochre.
86.—Dark oak: (groundwork for graining oak) 80 parts white-lead, 1 part yellow ochre.
87.—Flax tint: 100 parts white-lead, 60 parts yellow ochre, 1 part lampblack.
88.—Flax grey: 60 parts white-lead or zinc-white, 1 part lampblack, 1 part lake.
89.—Flesh ochre: 31 parts Oxford ochre, 1 part red-lead.
90.—Gold colour: 30 parts white-lead, 5 parts yellow ochre, 1 part orange chrome.
91.—Gold yellow: 10 parts lemon chrome, 2 parts orange chrome, 5 parts white-lead. Gold tint: 16 parts whiting, 8 parts plaster of Paris, 1 part Dutch pink (for distemper, not oil).
92.—Golden ochre: 9 parts yellow ochre, 1 part medium chrome.
93.—Golden orange: 2 parts orange mineral, 1 part golden ochre.
94.—Hay tint: 45 parts white-lead, 15 parts golden ochre, 2 parts medium chrome green.
95.—Light terracotta (unbaked): 3 parts white-lead, 1 part raw sienna.
96.—Light yellow tint: 31 parts whiting, 1 part yellow (for distemper, not oil).
97.—Limestone tint: 10 parts white-lead, 1 part golden ochre.
97A.—Lemon: 400 parts white-lead, 9 parts medium chrome yellow, 1 part Berlin blue.
98.—Lemon: lemon chrome yellow.
99.—Maple, ground light: 160 parts white-lead, 1 part yellow ochre. Maple, ground dark: 120 parts white-lead, 1 part golden ochre.
100.—Mahogany: 5 parts golden ochre, 2 parts Venetian red.
101.—Mahogany ground: 4 parts white-lead, 3 parts medium chrome yellow, 1 part orange mineral.
102.—Naples yellow: 160 parts white-lead, 9 parts golden ochre, 1 part orange chrome.
103.—Orange: orange chrome yellow.
104.—Orange red: deep orange chrome yellow.
105.—Old gold: 10 parts white-lead, 10 parts golden ochre, 1 part raw umber.
106.—Olive ochre: 7 parts yellow ochre, 1 part raw umber.
107.—Orange tint: 1 part white-lead, 1 part orange chrome.
108.—Primrose: medium chrome yellow white, q.s.
109.—Pale orange:—6 parts white-lead, 1 part medium chrome yellow.
110.—Rich yellow: 6 parts white-lead, 1 part medium chrome yellow.
111.—Roman ochre: 15 parts yellow ochre, 1 part burnt umber.
112.—Straw yellow: 50 to 80 parts white-lead or zinc-white, 1 part medium chrome yellow.
113.—Stone buff: 1 part white-lead, 1 part Oxford ochre.
114.—Sulphur yellow: 1 part white-lead, 1 part lemon chrome, with a trace of Berlin blue.
115.—Transparent yellow: yellow lake or else 8 parts zinc-white, 1 part yellow lake.
116.—Transparent buff: 3 parts zinc-white, 1 part raw sienna.
117.—Topaz: 4 parts white-lead, 1 part yellow lake.
118.—Yellow leaden colour: 20 parts white-lead, 2 parts golden ochre, 1 part raw umber.
119.—Yellow flesh tint: 80 parts white-lead, 1 part light cadmium yellow.
120.—Ash ground or oak: 480 parts white-lead, 4 parts yellow ochre, 1 part raw umber.
121.—Acorn yellow: 1 part white-lead, 1 part raw sienna.
122.—Carriage-body yellow: 1 part medium chrome yellow, 1 part yellow ochre.
123.—Jonquil yellow: 6 parts white-lead, 1 part chrome yellow, deep.

GREEN COLOURS AND THEIR ALLIED HUES.

124.—Apple green: 5 parts mineral green, 1 part chrome yellow, medium.
125.—Apple green: 12 parts white-lead, 12 parts mineral green, 1 part chrome yellow, deep.
126.—Apple green, very light: 20 parts chrome yellow, 1 part Berlin blue.
127.—Bronze green: 6 parts medium chrome yellow, 2 parts burnt umber, 1 part lampblack.
128.—Bremen green: 15 parts white-lead, 1 part chrome yellow, deep; 1 part Berlin blue, 1 part lampblack.
129.—Bottle green: 5 parts medium chrome green, 1 part ivory black.
130.—Brilliant green: 1 part white-lead, 1 part Paris green.
131.—Brilliant green: 4 parts Paris green, 1 part medium chrome green.
132.—Blue green: 7 parts white-lead, 1 part deep chrome green, 1 part cobalt blue.
133.—Brunswick-green paint: 14 parts barytes, 3½ parts Paris white, 28 parts Brunswick green, 4¾ parts boiled oil.
134.—Bronze-green paint: 28 parts barytes, 7 parts middle chrome yellow, 14 parts middle chrome green, 1½ part vegetable black, 7 parts raw linseed oil.
135.—Bronze green, light: 1 part medium chrome gold, 2 parts raw umber.
136.—Citrine green: 160 parts white-lead, 3 parts medium chrome yellow, 1 part ivory-black.
137.—Chrome green, light: 7 parts lemon chrome yellow, 1 part Prussian blue.
138.—Chrome green, medium: 1 part lemon chrome yellow, 1 part Prussian blue.
139.—Chrome green, dark: 7 parts lemon chrome yellow, 6 parts Prussian blue.
140.—Citrine, light: 5 parts medium chrome green, 1 part medium chrome yellow.
141.—Citrine, middle: 5 parts medium chrome yellow, 1 part raw umber.
142.—Citrine, dark: 4 parts medium chrome yellow, 2 parts raw umber.
143.—Citrine: 240 parts white-lead, 7 parts medium chrome yellow, 2 parts lampblack.
144.—Citrine, Egyptian green: 80 parts white-lead, 2 parts light chrome green, 1 part raw umber.
145.—Emerald green tint: 8 parts white-lead, 1 part medium emerald green.
146.—Foliage green: 4 parts lemon chrome, 1 part ivory black.
147.—Foliage green: 4 parts medium chrome yellow, 1 part ivory black.
148.—Foliage green: 1 part lemon chrome, 1 part medium chrome yellow, 1 part ivory black.
149.—Grass green: 6 parts chrome yellow, medium; 1 part Berlin blue.
150.—Grass green (lighter): 40 parts chrome yellow, 40 parts white-lead, 1 part Berlin blue.
151.—Grey-green tint: 3 parts zinc-white, 1 part terra-verte.
152.—Luminous green tint: 1 part white-lead, 1 part deep chrome green, 1 part light emerald green.
153.—Light green tint: 16 parts whiting, 1 part Brunswick green (distemper colour).
154.—Myrtle green: 15 parts white-lead, 8 parts medium chrome green, 1 part lampblack.
155.—Oriental green: 1 part lemon chrome, 1 part raw umber.
156.—Olive green: 5 parts golden ochre, 1 part ivory black.
157.—Olivette green: 5 parts lemon chrome, 2 parts burnt umber, 1 part lampblack.
158.—Olivette green: 1 part medium chrome yellow, 2 parts golden ochre, 3 parts raw umber, 1 part ivory black.
159.—Olivette green: 24 parts white-lead, 3 parts golden ochre, 1 part ivory black.
160.—Pea-green: 48 parts white-lead, 1 part chrome green.
161.—Prismatic green: 30 parts Paris blue, 5 parts white-lead, 1 part lemon chrome.
162.—Pale green: 32 parts whiting, 1 part magnesium green.
163.—Pale green: 32 parts whiting, 1 part zinc-green.
164.—Sage green (light): 60 parts white-lead, 2 parts light chrome green, 1 part raw umber.
165.—Sage green (dark): 120 parts white-lead, 4 parts light chrome green, 1 part ivory black.
166.—Sea-green tint: 30 parts white lead, 1 part deep chrome green.
167.—Sea-green (deeper): 3 parts zinc-white, 2 parts verdigris, 1 part raw sienna.
168.—Stone green tint: 12 parts white-lead, 1 part medium chrome green, 1 part raw umber.
169.—Salmon green tint: 4 parts zinc-white, 1 part medium milari green.
170.—Transparent aquamarine green, 8 parts zinc-white, 1 part ultramarine green.
171.—Water-green tint: 20 parts white-lead, 9 parts raw sienna, 1 part deep chrome green.
172.—Olive green: 2 parts yellow ochre, 1 part lampblack.
173.—Sea green (light): 130 parts white-lead, 13 parts chrome yellow, 1 part Berlin blue.
174.—Saxon green (paint): 16 parts barytes, 4 parts Paris white, 32 parts Saxon green, 5½ parts raw oil, driers q.s.
175.—Saxon green (paint): 30 parts barytes, 4 parts Paris white, 16 parts Saxon green, 5½ parts raw oil, driers q.s.

BLUES AND THEIR ALLIED HUES.

176.—Azure blue: 140 parts white-lead, 1 part Berlin blue.
177.—Azure tint: 40 parts white-lead, 1 part ultramarine.
178.—Bluish white: 110 parts white-lead or zinc white, 1 part indigo.
179.—Blue grass tint: 12 parts zinc-white, 1 part cobalt blue.
180.—Blue-grey tint: 60 parts white-lead, 4 parts Prussian blue, 1 part lampblack.
181.—Blue-water tint: 32 parts white lead, 1 part Prussian blue, 1 part burnt umber.
182.—Bright-blue tint: 24 parts white-lead, 1 part Bremen blue.
183.—Blue-mist tint: 12 parts white-lead, 3 parts ultramarine blue, 1 part golden ochre (oil only).
184.—Blue-black: 32 parts lampblack, 1 part Prussian blue.
185.—Blue-black (for oil or water): 16 parts ivory black, 16 parts Frankfort black, 1 part soluble Prussian blue.
186.—Cornflower blue: 55 parts Berlin blue, 1 part white-lead.
187.—Chromatic-blue tint: 1 part zinc-white, 1 part cobalt blue.
188.—Deep blue: ultramarine blue.
189.—Deep-blue tint: 20 parts white-lead, 1 part Antwerp blue.
190.—Celestial blue (paint): 83 parts celestial blue, 31 parts Paris white, 17 parts raw oil.
191.—Celestial blue (paint): 16 parts celestial blue, 30 parts barytes, 4 parts Paris white, 5½ parts raw linseed oil.
192.—Fog-blue tint: 12 parts zinc-white, 1 part cobalt blue.
193.—Fog-blue tint: 30 parts white-lead, 9 parts ultramarine blue, 1 part burnt sienna.
194.—French-blue tint: 2 parts cobalt blue, 1 part zinc-white.
195.—Intense-blue tint: 50 parts white-lead, 1 part Paris blue.
196.—Light blue: cerulean blue.
197.—Mountain-blue tint: 4 parts white lead, 3 parts cobalt blue, 2 parts rose middle, 1 part ivory black.
198.—New blue tint: 7 parts white-lead, 1 part ultramarine.
199.—Opaque-blue tint: 1 part white-lead, 1 part ultramarine.
200.—Ochre-blue tint: 32 parts white-lead, 2 parts ultramarine blue, 1 part Oxford ochre.
201.—Oriental-blue tint: 20 parts white-lead, 2 parts Prussian blue, 1 part lemon-chrome yellow.
202.—Pure blue tint: 12 parts zinc-white, 1 part cobalt blue.
203.—Pale blue (distemper): 32 parts whiting, 1 part soluble blue.
204.—Pale blue (distemper): 24 parts whiting, 1 part ultramarine blue.
205.—Pale blue (distemper): 32 parts whiting, 1 part blue verditer.
206.—Royal blue tint: 8 parts white-lead, 4 parts ultramarine, 1 part rose-pink.
207.—Rock-blue tint: 32 parts white-lead, 4 parts raw umber, 1 part Prussian blue.
208.—Sky-blue tint: 120 parts white-lead, 1 part Prussian blue.
209.—Solid-blue tint: 6 parts white-lead, 1 part Antwerp blue.
210.—Sapphire-blue tint: 2 parts zinc-white, 1 part Chinese blue.
211.—Stone-blue tint: 48 parts white-lead, 2 parts Prussian blue, 1 part raw umber.
212.—Sea-blue tint: 6 parts zinc-white, 1 part Prussian blue, 2 parts raw sienna.
213.—Sombre-blue tint: 10 parts white-lead, 1 part Prussian blue, 1 part ivory black.
214.—Turquoise-blue tint: 12 parts white-lead, 2 parts cobalt blue, 1 part medium chrome pink.

215.—Transparent-blue tint: 16 parts zinc-white, 12 parts kaolin, 4 parts pulverised soapstone, 1 part cobalt blue. Distemper: nondescript colours and hues.
216.—Asiatic-bronze tint: 12 parts white-lead, 2 parts raw umber, 1 part medium chrome yellow.
217.—Ash-grey tint: 60 parts white-lead, 5 parts vermilion, 1 part deep chrome green.
217A.—Auburn tint: 20 parts white-lead, 3 parts golden ochre, 1 part burnt sienna.
218.—Amber brown: 8 parts burnt umber, 5 parts medium chrome, 4 parts burnt sienna.
219.—Bistre-brown tint: 6 parts white-lead, 5 parts burnt umber, 1 part lampblack.
220.—Brown stone: 12 parts burnt umber, 1 part golden ochre, 1 part burnt sienna.
221.—Bone-brown tint: 4 parts zinc-white, 1 part bone brown.
222.—Bright grey: 60 parts whiting, 32 parts zinc-white, 1 part ivory black. (Distemper.)
223.—Chalk white: 4 parts white-lead, 1 part zinc-white.
224.—Cold white: 400 parts white-lead, 1 part ivory black.
225.—Clay white: 1 part kaolin (China clay), 1 part zinc-white.
226.—Crystal white: 6 parts plaster of Paris, 1 part powdered alum, size q.s. (Distemper.)
227.—Chinese white: 3 parts zinc-white, 1 part whiting, 1 part white-lead.
228.—Calcium white: 3 parts calcic hydrate (slaked lime), 1 part water.
229.—Ammonial white: 17 parts white-lead, 3 parts baryta.
229A.—Chestnut brown: 1 part Prussian red, $\frac{1}{10}$ part lampblack, $\frac{1}{15}$ part vermilion.
230.—Chocolate tint: 10 parts white-lead, 1 part burnt umber.
231.—Chocolate paint: 56 parts purple oxide of iron, 28 parts barytes, 28 parts Paris white, 1 part vegetable black, boiled oil q.s.
232.—Cinnamon tint: 6 parts white-lead, 2 parts burnt sienna, 1 part golden ochre.
233.—Coffee brown: 5 parts burnt umber, 2 parts yellow ochre, 1 part burnt sienna.
234.—Cocoanut brown: 1 part white-lead, 2 parts burnt umber.
235.—Calcimene brown (distemper): 32 parts Paris white, 1 part Spanish brown.
236.—Cold-grey tint: 400 parts white-lead, 8 parts lamp-black, 1 part Prussian blue.
237.—Deep drab tint: 32 parts white-lead, 1 part burnt umber.
238.—Deep stone tint: 16 parts white-lead, 1 part raw umber.
239.—Dark brown: Burnt umber alone.
240.—Deep fawn tint: 6 parts white-lead, 3 parts burnt umber, 1 part yellow ochre.
241.—Deep French-grey tint: 120 parts white-lead, 2 parts lamp-black, 1 part orange chrome.
242.—Dark grey tint: 240 parts white-lead, 4 parts ultramarine blue, 1 part ivory black.
242A.—Egyptian white: 200 parts white-lead, 1 part ultramarine green.
243.—Everlasting white: 2 parts zinc-white, 1 part baryta.
244.—Fireproof white (distemper): 4 parts baryta, 3 parts whiting, 2 parts alum (powdered), 1 part rock-salt.
245.—Fawn tint: 30 parts white-lead, 3 parts burnt umber, 2 parts yellow ochre.
246.—Fawn buff tint: 10 parts white-lead, 1 part burnt umber, 1 part golden ochre.
247.—Foliage brown: 1 part vandyke brown, 1 part orange chrome.
248.—Golden brown tint: 16 parts white-lead, 3 parts yellow ochre, 1 part burnt sienna.
249.—Green-bay drab tint: 240 parts white-lead, 9 parts raw umber, 1 part Prussian blue.
250.—Grey granite ground: 48 parts white-lead, 1 part lampblack.
251.—Grey, pale: 80 parts whiting, 1 part ivory black.
252.—Grey, warm: 160 parts whiting, 4 parts ivory black, 1 part yellow (distemper).
253.—Grey, silver: 320 parts white-lead, 4 parts lampblack, 1 part yellow.
254.—Grey, warm: 160 parts white-lead, 4 parts ivory black, 1 part golden ochre, 1 part Venetian red.
255.—Grey, olive: 160 parts white-lead, 3 parts lampblack, 1 part chrome green.
256.—Grey lustre: 12 parts white-lead, 3 parts zinc-white, 1 part blacklead (plumbago).
257.—Grey lustre tint: 48 parts white-lead, 1 part blacklead.
258.—Grey silver: 1 part white-lead or zinc-white, indigo sufficient to produce shade desired.
259.—Golden yellow: 2 parts of white, 1 part chrome yellow.
260.—Grey: 120 parts zinc-white, 24 parts white-lead, 48 parts whiting, 1 part bone black, 8 parts yellow ochre.
261.—Hamburg white: 2 parts barytes, 1 part white-lead.
262.—Hazel yellow: 60 parts white-lead, 5 parts yellow ochre, 1 part red ochre, 1 part lamp-black.
263.—Hazy brown tint: 9 parts white-lead, 4 parts ultramarine blue, 2 parts burnt sienna.
264.—Indian brown: 1 part Indian red, 1 part yellow ochre, 1 part lampblack.
265.—Jonquil yellow: 6 parts white-lead, 1 part chrome yellow, deep.
266.—Jet black: 3 parts ivory black, 1 part burnt umber, 1 part Prussian blue.
267.—Light drab tint: 96 parts white-lead, 1 part burnt umber.
268.—Light stone tint: 96 parts white-lead, 1 part raw umber.
269.—Light French grey tint: 480 parts white-lead, 2 parts ivory black, 1 part orange chrome.
270.—Lead colour: 80 parts white-lead, 1 part lampblack.
271.—Medium drab tint: 60 parts white-lead, 1 part burnt umber.
272.—Medium stone tint: 48 parts white-lead, 1 part raw umber.
273.—Mahogany tint: 48 parts white-lead, 3 parts Venetian red, 1 part medium chrome yellow.
274.—Mouse colour or tint: 240 parts of white-lead, 9 parts raw umber, 1 part Prussian blue.
275.—Medium French grey tint: 240 parts white-lead, 2 parts ivory black, 1 part orange chrome.
276.—Lead colour paint: 84 parts zinc-white, 260 parts barytes, 14 parts Paris white, 7 parts celestial blue, 2 parts vegetable oil, 3 parts purple oil, linseed oil q.s.
277.—Lead colour paint: 48 parts zinc-white, 350 parts barytes, 77 parts Paris white, 3½ parts celestial blue, 2 parts vegetable black, 3 parts purple oxide, 57 parts linseed oil.
278.—Lead-colour paint, cheap:—168lb. white-lead, 224lb. barytes, 4½oz. vegetable black, 2½ gallons boiled oil, 1½ gallon varnish foots, 6oz. patent driers.
279.—Lead-colour paint: 49 parts white-lead, 368 parts barytes, 49 parts pure white, ⅜oz. lampblack, 4oz. celestial blue, 1½ parts varnish foots, 47 parts (by weight) boiled oil.
280.—Opaque white: White-lead alone.
281.—Orange brown: 3 parts burnt sienna, 2 parts orange chrome.
282.—Olive black: 16 parts Frankfort black, 1 part lampblack.
283.—Opal grey tint: 30 parts zinc white, 2 parts cobalt blue, 1 part burnt sienna.
284.—Pure white: 1 part white-lead, 2 parts zinc-white.
285.—Pearl white: 500 parts white-lead, 1 part cobalt blue, 1 part Indian red.
286.—Pale white: 500 parts white-lead, 1 part ultramarine blue.
287.—Porcelain white: 1 part whiting, 2 parts zinc-white (oil or distemper).
288.—Permanent white: "Floated" barytes—*i.e.*, sulphate of barium precipitated.
289.—Poverty brown tint: 8 parts zinc-white, 4 parts white-lead, 1 part Spanish brown.
290.—Pale brown tint: 72 parts whiting, 1 part burnt umber (distemper).
291.—Purple black: 4 parts lampblack, 1 part rose-pink.
292.—Pure grey tint: 240 parts white-lead, 1 part ivory black.
293.—Pearl grey tint: 40 parts white-lead, 5 parts vermilion, 1 part deep chrome green.
293A.—Purple brown tint: 20 parts white-lead, 4 parts Indian red, 1 part ultramarine blue, 1 part lampblack.
294.—Quaker drab: 5 parts white-lead, 1 part raw umber, 1 part yellow ochre.
295.—Russian grey tint.—48 parts white-lead, 2 parts burnt umber, 1 part ivory black.
296.—Silver white: 1 part white-lead, 1 zinc-white.
297.—Snuff-brown tint: 4 parts white-lead, 1 part orange chrome, 1 part burnt umber.
298.—Stone drab tint: 8 parts white-lead, 1 part raw umber.
299.—Seal brown: 4 parts burnt umber, 1 part golden ochre.
300.—Snuff brown:—1 part burnt umber, 1 part golden ochre.
301.—Siberian brown tint: 10 parts white-lead, 9 parts raw umber, 1 part Oxford ochre.
302.—Stone brown tint: 4 parts white-lead, 3 parts raw umber.
303.—Tan tint: 30 parts white-lead, 5 parts burnt umber, 3 parts burnt sienna, 2 parts golden ochre.
304.—Thrush brown tint: 12 parts white-lead, 3 parts burnt umber, 1 part yellow ochre.
305.—Transparent brown tint: 1 part zinc-white, 1 part brown madder.
306.—Verdant grey tint: 2 parts zinc-white, 1 part terra-verte.
307.—Walnut ground, light (for graining on): 480 parts white-lead, 18 parts golden ochre, 5 parts Venetian red, 1 part lampblack.
308.—Walnut ground, dark (for graining on): 80 parts white-lead, 1 part burnt umber, 2 parts yellow ochre.
309.—Walnut stain (for wood), reddish: 8 parts burnt umber, 1 part burnt Sienna. (Vehicle to mix them with is stale beer, turpentine, or methylated spirit.)
310.—Walnut stain, yellowish (for wood): 4 parts burnt umber, 1 part raw sienna.
311.—Transparent brown stain (for wood): 1oz. Cassel earth, 1½oz. hot water, 1oz. liquid ammonia, make a liquid stain for wood.
312.—Italian brown: 2 parts Vandyke brown, 1 part raw sienna. (Water, spirit, or stale beer is the vehicle in which these solids are ground up, and used to stain wood to represent walnut.)

H. C. S.

CHIPS.

The Stickphast Paste Proprietary, of Sugar Loaf-court, Leadenhall-street, E.C., have sent us a glorification in leather and silver, intended for office or library, to hold safely and ornamentally a bottle of their admirable speciality, which sticks closer than a brother—architect!

At Blackburn County-court, on Friday, Judge Coventry and a jury heard an action brought by John Larkin, of Baxenden, to recover £125 damages from the Nicholl Chemical Company. Plaintiff, a bricksetter's labourer, was engaged in an extension on defendants' works, when a scaffold collapsed through alleged faulty construction. Two men were killed, and plaintiff broke his leg, ankle, and seven ribs, and sustained other severe injuries. The jury found for plaintiff, and assessed the damages at £100.

Colonel Fishwick, president of the Lancashire and Cheshire Antiquarian Society and of the Record Society of Lancashire and Cheshire, is making an effort to form a Lancashire Register Society, for the purpose of printing and preserving all the old registers of the old parish churches in the County Palatine.

Four stained-glass windows have been fixed at Newport-road Church, Cardiff. The three windows in the chancel of the church each comprise three lights, and tracery of a decorative character. Each window comprises one subject. The grouping is carried through the mullions of the lights. The centre window has the subject of "Our Lord Blessing Little Children." The mothers and children are depicted in a very graceful attitude, with foliage and landscape background. The tracery has a representation of "The Sower Sowing the Good Seed." The sinister window, of equal proportions, has for its subject "The Feeding of the Multitude." The tracery contains "The Good Shepherd and Angels" in attitude of adoration. The dexter window, of two lights, also has one subject, being that of "Christ Healing the Sick, the Halt, the Lame, and the Blind." The centre light has for its subject the figure of Christ, with a female figure and child prostrate at His feet; whilst on either side are suppliants for relief from misery and pain. Over the entrance of the church is a very large rose or wheel window, which has been treated with figures in an admirable manner, to avoid an Antipodean effect. In the centre is the subject of "Charity or Love," and in eight openings are the "Fruits of the Spirit," represented by angelic figures. The interstices, or spaces between, are designed and painted by a variety of geometrical patterns. Both as to drawing and colour, the windows make a very handsome and effective addition to the interior of the edifice. The whole of the work has been designed and executed by Messrs. Swaine, Bourne, and Son, of King Edward's-road, Birmingham, under the supervision of the architects, Messrs. Ingall and Son, Temple-row, Birmingham.

OBITUARY.

Sir Henry Doulton died on Wednesday evening at South Kensington. He was born in 1820, and was the senior partner of the well-known firm of Doulton and Co., of Lambeth, which has done so much for artistic pottery and sanitary ware. Sir Henry Doulton was knighted in 1887. His death, which was due to a heart affection, was quite unexpected, the malady having made its presence felt only a few days since.

Mr. J. B. Burgess, R.A., the well-known painter of Spanish landscapes, gipsies, and bull-fighters, died on Friday at his house in the Finchley-road, after a long illness, at the age of 67. His father, William Burgess, was landscape painter to George IV., and the son was brought up to be an artist from an early age, receiving his education in the Academy schools. He early conceived an admiration for the work of John Phillip, and therefore chose Spain for the theatre of his operations, and remained faithful to that land throughout his career. His portfolios contain hundreds of sketches and studies, made on the spot in the course of many visits, of scenes, places, and single figures in Burgos and Madrid, in Seville and Salamanca. These were the foundations of the pictures which have been for the last 30 years or more familiar objects at each Academy exhibition. He was elected an Associate Academician 20 years ago, becoming a full member a dozen years later. He was represented in this year's Academy exhibition by "A Mothers' Meeting in the Country"—a scene of contemporary English working-class life, prosaically treated—which was hung in Gallery III., and last year, in the same gallery, by "Pensioned Off"—a pathetic picture of a melancholy-looking old violinist, who leans on his boy's arm as he hears judgment pronounced in the presence of all the choir by the stern vicar, who is seated in the sacristy. The other work of 1896 was "The Widower," also an aged military-looking man, seated with his three daughters in a church—both Spanish *genre* subjects

Mr. Edwin Thomas, M.Inst.C.E., of Highbury New Park, N., died at Bournemouth on Friday, aged 70. He was the son of Mr. James Thomas, for many years the engineer to the Birmingham Canal Navigation. Mr. Edwin Thomas was for 44 years engineer and general manager to the North Metropolitan Railway and Canal Company (Regent's Canal). During this time he effected several very large and important works, among which may be mentioned the enlargement of the Limehouse basin and the building of a new ship entrance thereto, in the year 1868, at the cost of a quarter of a million.

CHIPS.

General W. W. Duffield has resigned as superintendent of the United States Coast and Geodetic Survey, and will be succeeded by Mr. Henry S. Pritchett, Professor of Physics and Astronomy in Washington University, St Louis, M.

The ceremony of opening a new English Presbyterian church at Rhostyllen, near Wrexham, took place on Sunday. The structure has cost about £1,200, and has seating accommodation for about 400 persons.

Messrs. Sotheby, Wilkinson, and Hodge concluded on Saturday the two days' sale of a portion of the library of the late Mr. George T. Robinson, F.S.A., the well-known architect and decorator, the 563 lots showing a total of £1,365 3s.

Official reports just published at Sydney describe the success which has attended the system of irrigation by artesian wells in the Bourke district of New South Wales, and show that it has already given a great stimulus to agricultural production. The water supplied from the artesian borings exists, apparently, in unlimited quantities, and is obtainable over 62,000 square miles of the interior of New South Wales.

The monthly report of the Labour Department states that, apart from the trades affected directly or indirectly by the engineering dispute, the state of employment shows no falling off. The building trades still continue on the whole well employed. The percentage of unemployed in unions making returns was 1·7, compared with 1·4 in September and 0·9 per cent. in October, 1896. The furnishing trades, though still well employed, are scarcely so active. The percentage of unemployed union members at the end of October was 2·2, compared with 1·4 in September and 1·7 per cent. at the end of October last year.

Building Intelligence.

Aston.—The newly-erected additions to the Aston Workhouse were formally opened on Tuesday. They consist of a block of buildings providing accommodation for aged married couples, and another building for male vagrants, containing sufficient room to enable the guardians to detain the professional tramps two nights, instead of only one as is at present the case. Several other minor alterations and improvements have been carried out at a total cost of £5,803. Mr. W. S. Seamark was the contractor, and Mr. C. Whitwell the architect. The aged people's quarters consist of a two-story building, with accommodation for ten couples—five on each floor.

Birmingham.—St. Mary's Church, Whittall-street, is to be opened for service on Sunday next, the 21st inst., after restoration and renovation, which has literally transformed the interior from a grimy barn to a decent place of worship. The unsightly, cumbrous gallery which surrounded the octagonal nave, save at the chancel entrance, has been cleared away, all but a short section over the main entrance to the church which contains the organ. Light has thus been let into the interior such as it never knew before, and under the direction of Messrs. Bateman and Bateman, the architects, carried out by Messrs. Horton and Son, contractors, of Bristol-street, in the same city, the church has been brightened up, the style adopted being that of Italian work of the 15th century. The decorative works have been executed by Messrs. Jeffery, also of Birmingham. The heavy drooping ceiling is now a handsome dome, painted in panels in classic and conventional designs in three primary colours and graded tones. The walls are of apple-green hue to the level of the old galleries, and above that in cream colour, and the windows are framed in ornament in blue, green, and red. A band of flowing design in yellow and brown runs round the compartments of the ceiling over the aisles, and a conventional pattern is wrought in sage green on the flat portions.

Ealing.—The enlargement of the extensive school buildings of St. John's parish, Ealing Dean, Middlesex, was formally opened by the vicar of the parish on Saturday last. There is increased accommodation for 200 children, making nearly a thousand in all. The entire sanitary arrangements are also being remodelled and modernised. The works have been carried out by Messrs. Foord and Sons, of Brentford, under the supervision of the architect, Mr. Robert Willey, F.R.I.B.A., of 33, New Bridge-street, E.C., and Ealing.

Edinburgh.—Another stage in the decoration of the Catholic Apostolic Church, Broughton-street, by Mrs. Traquair, has been reached. First, the great spaces at the sides of and over the lofty chancel arch were dealt with by this lady, then the south aisle of the chancel was decorated, and now Mrs. Traquair has reached a third stage in her work by the completion of the the painting of the north aisle of the choir. The subject of the first part of the work was the worship of the hierarchy of angels and saints in heaven: in the south chancel aisle was commenced the illustration of the parable of the Ten Virgins, and this story has been continued and completed in a series of decorative panels in the north aisle. Mrs. Traquair has now begun the decoration of the nave. Two broad panels running the length of the nave on each side, under the clerestory windows, have been formed, and in these there will be represented scenes in the life of Christ.

Manchester.—A new concert hall is about to be erected in Oxford-street, next to the offices of the Refuge Friendly Society. The designs have been prepared by Messrs. Mangnall and Littlewoods, of Manchester. The style adopted gives a Spanish Renaissance frontage, the material to be employed being buff terracotta. The building is to be of four stories, the lower one consisting of four shops, whilst the upper one will be surmounted by a centre gable flanked by towers with octagon turrets. The large hall is to be capable of seating 1,500 persons, in the proportion of 1,000 in the body, and half that number in the galleries. The body of the hall can be divided, if necessary, into three parts, and there will be a separate entrance to each class of seats.

Nantwich.—A new cocoa house, in Pillory-street, built at a cost of about £2,000, was opened on Wednesday week. It contains on the ground floor refreshment-room and bar (26ft. by 21ft.), commercial-room (18ft. by 21ft.), entrance-hall, staircase, and gentleman's lavatories; kitchen (15ft. by 15ft.), placed behind the bar, pantries, scullery, and the usual out-offices. There is a separate entrance for the manager at the side, and also a separate staircase. On the first floor there are a billiard-room (18ft. by 21ft.), committee-room (21ft. by 15ft.), ladies'room (21ft. by 18ft.); the two latter rooms are divided by a folding partition. The manager's sitting-room and bedroom, and ladies' lavatory, storeroom, &c., are also on this floor. On the second floor there are five bedrooms, bathroom, w.c., &c. The internal doors and fittings are pitch-pine. Externally the style is Modern Renaissance, the principal feature being the bay windows in the centre of the two main gables, with two smaller gables between. Ruabon bricks have been used for the exterior, with Grinshill stone dressings to doors and windows. Mr. W. Martin, of Haslington, near Crewe, was the builder, and the architect is Mr. C. E. Davenport, of Nantwich, who obtained the work in competition. The plumbing and decorating and gas-fitting work has been carried out by Mr. Jos. Barnett, of High-street, Nantwich.

CHIPS.

Colonel A. J. Hepper, R.E., an Inspector of the Local Government Board, attended on Friday at the offices of the Rawmarsh Urban Council with reference to a loan of £4,000 for the purchase of the Rose Hill Estate for the purposes of a public park.

About twelve months since the members of the Reformed Episcopal Church at Exmouth purchased the old Wesleyan chapel in that town, and altered it to suit their requirements. An aisle, affording accommodation for 100 persons, has now been added, and this was opened on Friday.

A special meeting of the Edinburgh and Leith Gas Commission was held on Friday for the purpose of dealing with the question of the purchase of a new site for the gasworks. Acting on the report of a committee and the engineer, it was decided to promote a Bill next session to remove the works to a site of 106¼ acres to the west of Granton, and with easy access to the North British and Caledonian lines of railway. The purchase price is £124,000, equal to £1,167 per acre.

At the Public Offices, Egremont, on Friday, an inquiry was held before Major-General Crozier, R.E., an inspector of the Local Government Board, into an application by the Wallasey District Council for a provisional order under section 303, Public Health Act, 1875, to alter or amend various Acts of Parliament applicable to the Wallasey Urban District by the granting of £40,000 additional borrowing powers for gasworks purposes; also for sanction to borrow the sum of £8,000 for the purposes of the gas undertaking under the unexhausted borrowing powers conferred by the Wallasey Order, 1896. The plans were explained by Mr. J. H. Crowther, the gas engineer.

The death is announced of Mr. R. E. Nelson, superintending engineer, South-Western Circle, Burma, at the age of 47 years. Mr. Nelson entered the Public Works Department of India in 1869, and became acting superintending engineer at Mandalay in 1894. His services were in the Central Provinces, Assam and Burma. Since December last he had been in charge of the South-Western Circle with headquarters at Rangoon.

A fresh development has taken place in the controversy as to the rebuilding of the church tower at Liskeard. The borough surveyor of that town, Mr. T. McMeikan, has reported it to the corporation as a dangerous structure, and accordingly the peal of bells has been removed. On Sunday the Corporation attended the church in state, when the west entrance was not used, and a barricade was placed across the west end of the north aisle.

At St. Anne's-on-the-Sea on Saturday afternoon the formal opening and presentation of a new convalescent home for Manchester children was performed by the donor, Sir William Agnew, Bart. The home, which has been constructed from plans prepared by Mr. Alfred Steinthal, architect, of Manchester, is situated about a mile from St. Anne's railway station on the high road to Blackpool. It is provided with ground for future extensions, and possesses an uninterrupted view of the sea, although standing some 200ft. from the coast-line. The home has accommodation for 25 patients, as well as for matron, two nurses, and two domestic servants.

The Burgh Schools, St. Andrew's, are being warmed and ventilated by means of Shorland's patent Manchester grates, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

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Our Illustrations.

SCULPTURE FROM THE DRAPERS' HALL.

The Drapers' Company possess some notable sculpture in the large reception-rooms of their Grand Hall in Throgmorton-street, City. On the staircase is located Belt's "Hypatia," a dramatic figure, boldly treated, as will be seen by our illustration. Thorwaldsen, the famous Danish sculptor, is represented by his group of "The Shepherd Boy and his Dog." It stands in front of a silvered-glass panel, thus insuring a double view of the sculpture, as photographed specially for us by Mr. Sandell. The "Venus," which completes our plate, calls for no special remark. We published views of the Drapers' Hall Buildings on July 10 and 24, 1896, the Court-room appearing on December 11 last.

QUEEN VICTORIA JUBILEE BOARD SCHOOLS, DEWSBURY.

See description and plans on p. 718.

PAIR OF VILLAS AT SUTTON.

These houses are about to be erected at Sutton, from the designs of Mr. C. Bridgen. The ground-floor is to be faced in red bricks, the upper story being treated in imitation half-timber work. The roofing is to be of Broseley tiles, and the external woodwork is to be painted a light shade of green.

HOUSE AT BEESTON HILL, LEEDS.

Hard-pressed facing-bricks of the finest quality have been determined on for the walling of this house, Ferndale stone being employed for the mullions and dressings. The oak half-timbering to be dressed with Stockholme tar. Broseley tiles are used for the roofs. Part of the house formed a portion of an earlier building, and the dining-room is tastefully managed with a big circular bay. The entrance to it through the columned recess is ingeniously contrived. Messrs. Hall, Cooper, and Davis are the architects.

ST. MAGNUS, BESSINGBY.

The present church takes the place of a last-century brick building which had become ruinous. The church is faced externally with Whitby stone, with tiled roofs, and a red stone is used for the internal work. The ceilings are decorated in colour, and the fittings are in oak. The contractor was Mr. J. Rennard, of Bridlington. The church is from the designs of Mr. Temple Moore, whose drawings now illustrated were on view at the Royal Academy this year.

ROYAL HOTEL, WEYMOUTH.

This building, adjoining the Royal Arcade on the Esplanade, is built of Bridgewater red bricks and Portland and Corsham Down stone dressings. The hotel is fitted with every modern appliance and convenience, and electric light generated upon the premises. The architect is Mr. C Orlando Law, M.S.A., and the contractors are Messrs. Creaton and Co. The drawing was exhibited at the Royal Academy.

FURNITURE FOR THE HALL.

The Table in the upper part of the page of this sheet of sketches is of capital form. The top is brought over the ends to an unusual length, and, being thin, is strengthened by means of battens on the underside. The bulbous legs, though abhorred by some, nevertheless, in this case, raise the piece out of the region of the commonplace, while the simple form of stretcher adds much to its character. The two Chairs are widely different in style, though both possess front feet of similar pattern, the one with the high back, formed of turned posts and four shaped splads, has a rush-bottom seat, and is much lighter in character than the other, which has leather seat and back pinned to framing with double rows of nails. The Table last on the sheet is a very much more sturdy article, with heavy framing and deeply panelled drawers and rails. Like the other pieces herewith portrayed it would form an excellent adjunct to the hall.

The reservoir constructed near Hawarden for the Hawarden Waterworks Company is, with the exception of the coping, completed. It has a water capacity of 76,800c.ft., equal to 479,000 gallons. Mr. W. D. Simmons, of Wrexham, has been the contractor.

A Local Government Board inquiry was held on Friday at Cheltenham, by Lieut.-Colonel A. C. Smith, R.E., relative to the application of the town council for sanction to borrow £18,385 for the purposes of extending the electric light for street lighting and private customers.

The Lord Chancellor has consented to open, on the 24th inst., the new public library at the corner of Lordship-lane and Woodwarde-road, Dulwich, erected by Mr. Passmore Edwards as a memorial of Edward Alleyn, founder of the College of God's Gift. The foundation-stone of the library was laid by Sir Henry Irving. The building, which was designed by Messrs. Charles Barry and Son, was illustrated and described in our issue of Oct. 23, 1896. Messrs. James Gough and Co., of Hendon, were the contractors, and Mr. J. Birtt was the clerk of works. The cost has been about £6,500. The library is of red brick with Bath stone dressings, and moulded brick stays and cornices. The floors are fireproof, on the system of Messrs. Mark Fawcett and Co., of Queen Anne's-gate, Westminster.

A popular lecture was delivered in the Great Hall of the Merchant Venturers' Technical College, Bristol, on Wednesday evening, by Mr. Whitworth Wallis, the director of the City of Birmingham Art Gallery, who took as his subject "The Art of Sir John E. Millais, P.R.A."

Mr. H. Hayter, the arbitrator in the disputed accounts between the Manchester Corporation and Messrs. Watson and Wilson, the contractors for 17 miles of the Thirlmere watercourse, between Preston and Chorley, has now nearly completed the hearing of the case, and only a few days' sittings will be needed. On Friday, after hearing evidence from Mr. Henry Nicholson, the pipe inspector, the arbitrator adjourned the further proceedings for a month. It is not at all likely that his award will be made until the New Year.

The rector and churchwardens of Oldbury-on-Severn make the following appeal:—"The ancient church of St. Arild, standing on the site of a Roman Camp overlooking the Severn, and whose tower served to guide mariners, has just been utterly ruined by fire following midnight sacrilege on October 31 last. To attempt to restore, as was done in 1886, under the direction of the diocesan architect, we must implore help from outside this poor agricultural parish. £1,100 has been paid by the insurance companies, but another £2,500 is required."

At the meeting on Friday of the Bristol Town Council, the members approved of the proposal with regard to the appointment of a civic estate valuer as one part of the rearrangement consequent upon the death of Mr. Josiah Thomas, the late city surveyor.

Mr. J. Newton, of the Liverpool city engineer's department, has been appointed chief clerk in the city engineer's office, Coventry. The Coventry City Council contemplate executing large public works by their own staff, which has necessitated the appointment of a chief clerk and other officials in the executive departments. Mr. Newton has been six years in the service of the Liverpool corporation.

COMPETITIONS.

Blackford, Somerset.—Under a scheme of the Charity Commissioners it has been decided to erect new dual schools on a site given by the visitors of Hugh Sexey's Hospital, Bruton. The governors met on Saturday to receive and consider plans from five firms of architects, and those of Mr. A. J. Pictor, A.R I.B.A., of Bruton, were selected.

New York Public Library.—The designs submitted in the final competition for the New York library are now in the hands of a jury consisting of three architects (Professor Edgar V. Seeler, of Philadelphia, and Messrs. Walter Cook, of New York, and Cass Gilbert, of St. Paul); the librarian, Dr. J. S. Billings; the secretary of the trustees, Mr. George L. Rives, and two of the trustees, Messrs. Maitland and Cadwallader.

CHIPS.

In the list of candidates reported by the scrutineers as elected Professional Associates of the Surveyors' Institution at the ballot of Oct. 27, 1897, and read to the meeting on the 8th instant, is the name of Mr. Henry James Treleaven Kibblewhite.

At the last meeting of the Dartford Rural Sanitary Authority plans by Mr. G. H. Tait were approved for the erection of chapels, boundary walls, and sexton's house, &c., at the new cemetery at Stone. The land cost about £2,000, and the estimated outlay on the building is another £3,000.

The new buildings of the grammar school at Mottram, Chester, were formally opened on Saturday. The school was founded in 1612 by Robert Garsett, refounded in 1858 by George Whitehead, and subsequently reorganised by the Charity Commissioners. The trustees have spent on the new buildings the sum of £2,311.

The ceremony of opening the New Liberal Club at Crawshawbooth was performed on Saturday. The new premises are situated in Adelaide-street, and have been erected by Mr. Ormerod Ashworth from plans drawn by Mr. A. Coates, and the total cost has been about £2,000.

A memorial bust of the late J. B. Howard, which has just been erected in the vestibule of the Theatre Royal, Glasgow, was unveiled on Friday by Sir Henry Irving. The sculptor is Mr. A. M'F. Shannon, and Mr. Howard is represented in his favourite character "Rhoderick Dhu."

Mr. J. Passmore Edwards has offered £4,000 to Acton to build a free public library and reading-room, on condition that a site is provided and the Free Public Libraries Act is adopted.

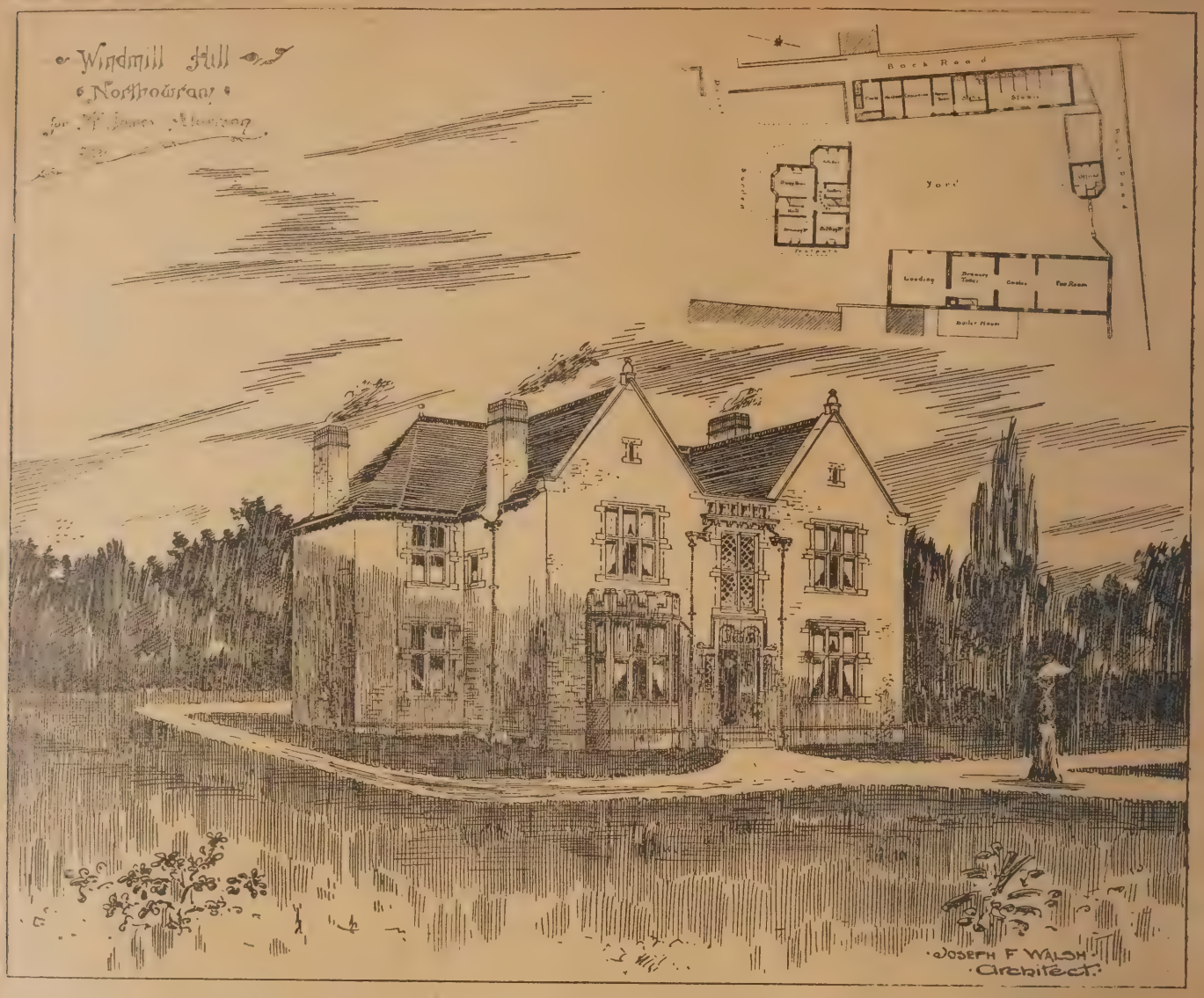
Notice has just been given of the intention on the part of seven local authorities to make application to the Board of Trade, under the Electric Lighting Acts of 1882 and 1888, for provisional orders to supply electricity for public and private purposes. These authorities are the vestry of Bermondsey, the corporations of St. Alban's and Maidenhead, the urban district councils of Willesden, Barnes, East Ham, and Aldershot.

Mr. H. H. Law, Local Government Inspector, held an inquiry at Melling on Friday regarding an application by the West Lancashire Rural District Council to borrow £3,600 for a water supply for the township of Melling. Mr. J. J. Lackland, water engineer to the St. Helen's Corporation, explained the engineering portion of the project, and the analysis of the St. Helen's water was a very favourable one as to quality.

The contractors (Messrs. Webb and Co., of Swansea) for strengthening the Town Quay at Southampton to carry new electric cranes have just began work. The cranes are being built by Messrs. Stother and Pitt, of Bath.

The urban district council of Horsforth having decided to adopt the system of sewage purification on biological principles, as now working at Sutton, Surrey, have instructed Mr. Wm. Spinks, C.E., to prepare plans for the first installation of the project.

The parish church of St. Laurence, Ludlow, has been enriched by the addition of carving, consisting of canopied work over the groined archway of the choir screen, together with the enrichment of the shades on each side. The four original panels over the archway contained dowel-holes, which showed that they had been embellished with canopied work, and these panels have been retained, and form the back of the niches. These niches contain the figures of St. Clara, St. Mary Magdalene, St. Mary the Virgin, and St. Helena. Each figure has two angels in adoration on each side in niches. Above the niches comes a carved and pierced canopy of hanging tracery, carried by seven overrailing arches. The whole is surmounted by a cresting. The work has been carried out by Mr. Lawrence Turner, who has received orders to complete the canopied work on the west and north side of the chancel.



HOUSE AT NORTHOWRAM, NEAR HALIFAX.

THE house, brewery, and stables shown upon plan are now in course of erection at Windmill Hill, Northowram, in the parish of Halifax, for Mr. James Alderson, being situated in close proximity to the well-known flagstone, and within a couple of miles of the Ringby ashlar quarries; they are built of pitch-faced outsides wallstones and ashlar stone dressings. The work is being carried out under a separate contract for each trade, as is the local custom, from quantities prepared by the architect. The internal woodwork of the house is oak and pine, and the mullioned windows are to be filled with metal casements; the roofs will be covered with the best dark green Buttermere slates. In addition to open fireplaces the house will be heated by a system of low-pressure water, with American radiators, the apparatus being placed under the outside washhouse, and also utilised for heat ng the carriage-house and harness-room. The water supply has been obtained by means of an 8in. bore-hole cut through the solid rock to a depth of 90ft., into which are inserted 8in. wrought-iron screw-jointed tubes, the botton 10ft. length only being perforated to avoid any possibility of surface pollution. A pump is placed on the ground-floor of the brewery tower, and the water pumped in a large iron tank, 60ft. above, from which it gravitates to the brewery stables and house. The water has been analysed, and proved to be absolutely pure and a perfect brewing water. A separate system of drainage is provided for the surface and foul water, the latter being passed through settling and filtering tanks with intermittent irrigation. The architect is Mr. Joseph F. Walsh.

The Surrey County Council have agreed to co-operate with the Middlesex County Council in bringing a Bill before Parliament for rebuilding Kew Bridge.

THE POLLUTION OF WATER SUPPLIES.

AT a meeting of the Sanitary Institute, held on Wednesday night at the Parkes Museum, Margaret-street, W., a discussion took place on "The Pollution of Water Supplies by Encampments of Hop-Pickers, Casual Workers, Tramps, &c." The chair was taken by Sir Douglas Galton.

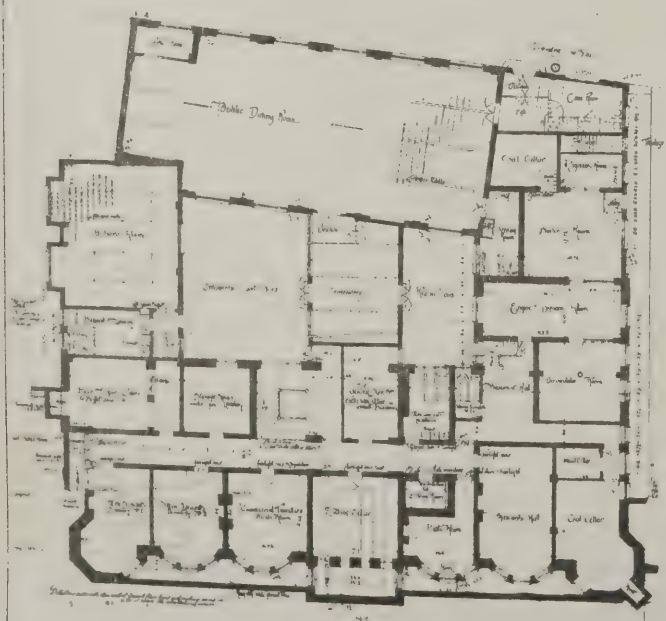
Professor W. R. Corfield, in opening the discussion, dealt with the dangers of pollution of municipal water supplies from a general point of view. He mentioned the diseases that could be transmitted by means of water, and described the epidemics of cholera which had been directly traceable to contaminated water supplies. Passing on to discuss recent typhoid fever epidemics, he mentioned the theories which had been in the past advanced as to the causation of typhoid, and the means of its communication. He mentioned some remarkable instances of the spread of the disease by means of water pollution. Millbank Prison in 1840 was a hotbed of typhoid fever. At that time they used water baled out from the Thames; but when they took to using water from artesian wells the disease ceased, and from that time there was no typhoid except that which had been introduced from outside. That clearly showed the disease to have been communicated by the water. The disease could also be communicated by the pollution of wells and springs, as had recently been evidenced at Maidstone. He read a portion of a letter he had recently received from a medical man at Hildenborough, Kent, who wrote:—"The hop-growing district extends from a little west of this place eastwards to beyond Maidstone, and during the season of hop-picking the county is covered with encampments of people of the least sanitary class frequenting by preference the proximity of streams and rivers for the convenience of obtaining water and of washing their clothes. I hope your discussion will be the means of moving the county sanitary authorities to inquire into the state of the water supply of the rural population, not only of this but of other districts with little or no water supply."

Miss M. A. Chreiman described the state of things obtaining in the Kentish hop-fields at the time of picking, and enforced the urgent necessity for a more effective sanitary control of the pickers. The sleeping-places of the hoppers were overcrowded to a poisonous degree. Their surroundings were such as to readily foster disease, and the streams which were used naturally became contaminated. Some of the wells which were used were in a very bad state, and she knew of one well which was only disused when the frogs and newts had made the stench of the water almost unbearable. The Farleigh reservoir, so well known in connection with the Maidstone outbreak, had not, she was informed on one occasion, been cleaned out for several years, and when it was dead babies were found in it. Such circumstances offered a most fruitful cause for the growth and spread of malarial influence.

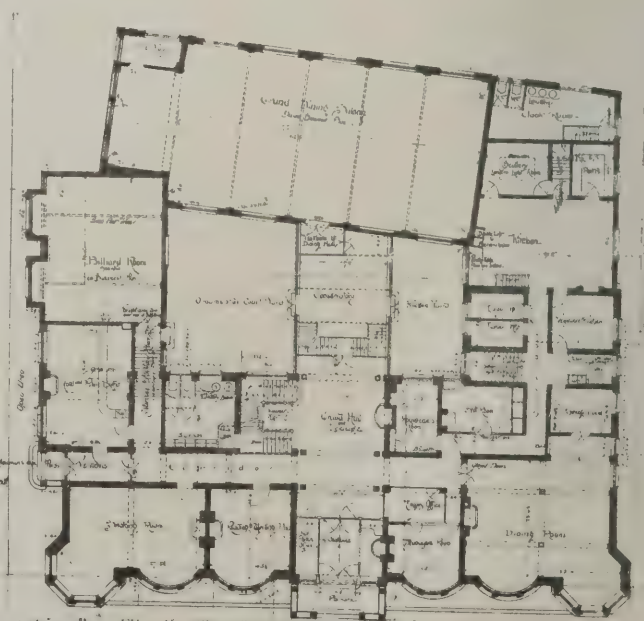
Dr. Fosbroke, of Worcester, and Dr. Tew, medical officer of health for West Kent, having spoken, Dr. Adams, deputy-medical officer of health for Maidstone, described some of the investigations into the sources of the present typhoid epidemic. There were, no doubt, cases which called for serious reform; but there were many cases in which the hop-pickers were well looked after both as to housing, water supply, and other matters. The Rev. E. Thomas (vicar of West Farleigh), Dr. Thresh (Chelmsford), Major Flower, Dr. Porter (Stockport), and others joined in the discussion.

It was resolved at a meeting of the Edinburgh and Leith Corporation Gas Commissioners on Friday to promote a Bill in the coming session of Parliament for powers to purchase 106 acres of ground, half-a-mile west of Granton, from the Duke of Buccleuch, as the site of new central gas-works. The cost is £124,000.

THE ROYAL HOTEL WEYMOUTH C ORLANDO LAW ARCHT



BASEMENT and LOWER GROUND PLAN



GROUND PLAN

Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

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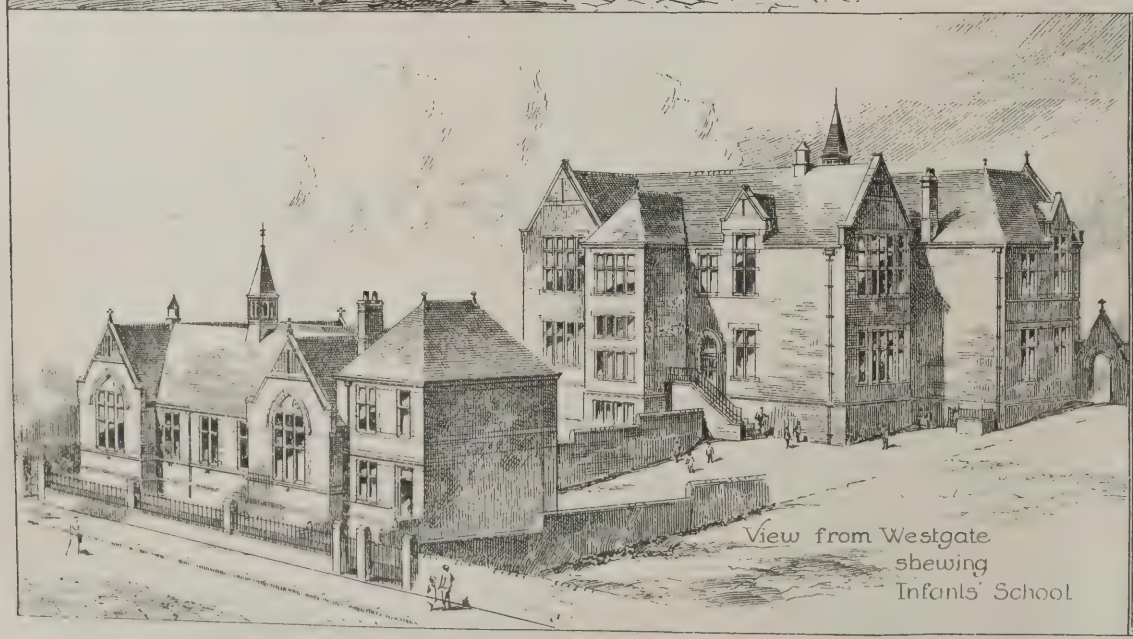
Front to Wellington Road.

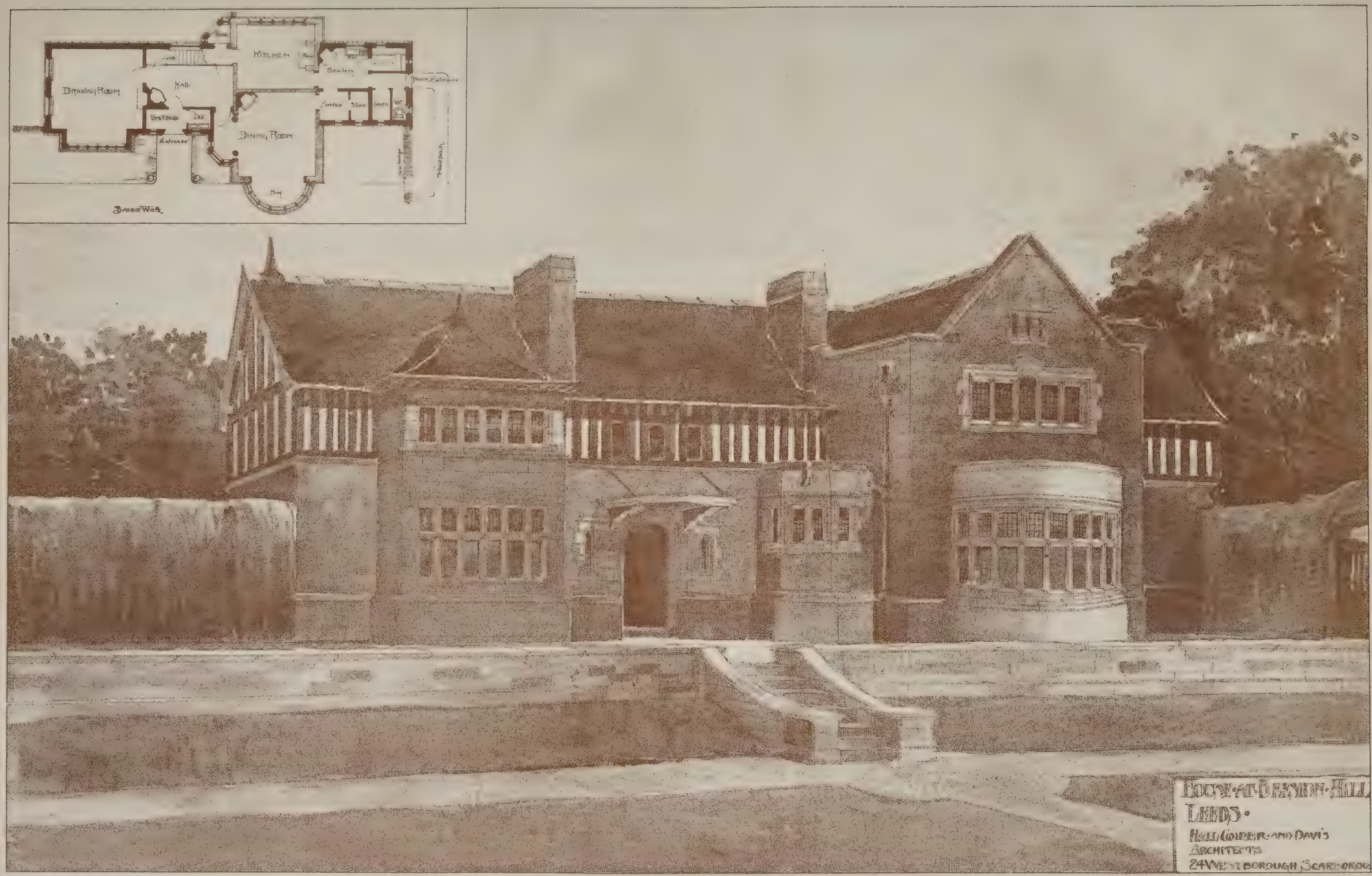


View from Westgate shewing Infants' School

QUEEN VICTORIA JUBILEE BOARD SCHOOLS DEWSBURY

J. Lane Fox Architect Bond Street Dewsbury

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.



"PHOTO-TINT" by James Akerman, 6, Queen Square, London, W.C.

"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.

CHURCH OF ST. MAGNUS: BESSINGBY: YORKS. TEMPLE MOORE, ARCHT.

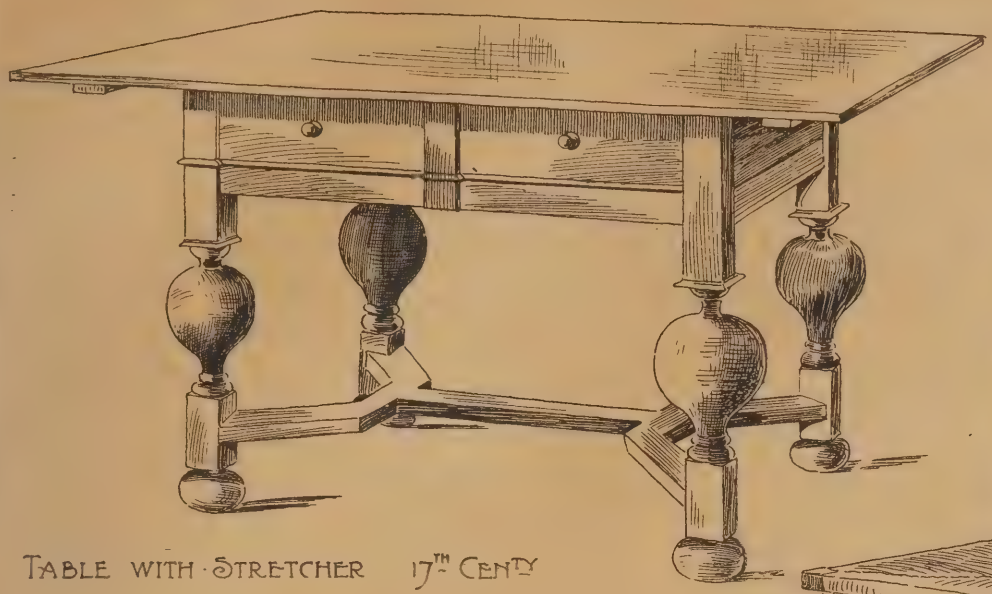
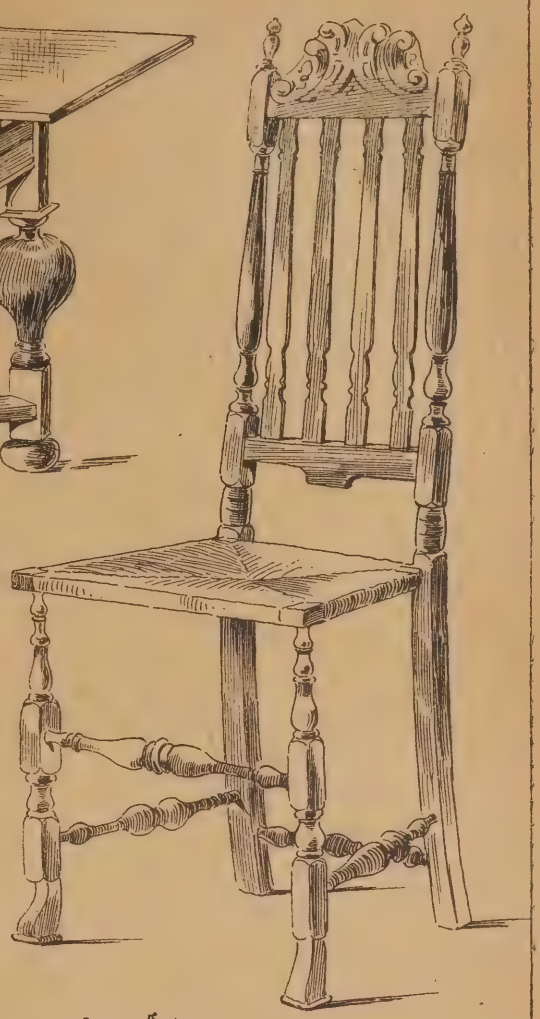


TABLE WITH STRETCHER 17TH CENTY

FURNITURE FOR THE HALL



HIGH-BACK CHAIR
WITH 4 SHAPED SPLADS LATE 17TH CENTY

LEATHER-BACK CHAIR

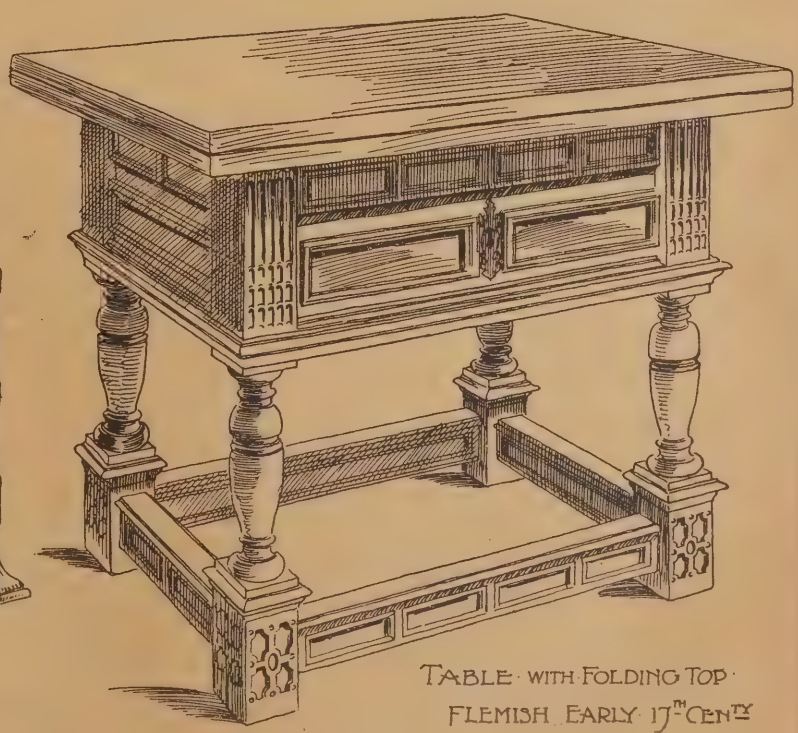


TABLE WITH FOLDING TOP
FLEMISH EARLY 17TH CENTY

A. Smith Chancellor del.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Edinburgh Architectural Association.—The fortieth session of this Association was held on Wednesday evening by a meeting at the Royal Institution, Princes-street, Edinburgh. The president, Mr. Thomas Ross (Messrs. McGibbon and Ross), occupied the chair, and delivered his inaugural address. The programme for the session is as follows, the meetings being held on the second Wednesday evening in each month:—Dec. 15, lecture by representative of the Dundee Institute of Architecture; Jan. 12, "The Abbeys and Cathedrals of Scotland," by Mr. P. Macgregor Chalmers, of Glasgow; Feb. 9, "The Vernacular of the Wren School," by Mr. J. A. Williamson, A.R.I.B.A., President of the Edinburgh Architectural Society; March 9, "The Architectural Antiquities of Leith," by Mr. J. Campbell Irons, S.S.C.; April 6, "Notes on Fever Hospital Structure," by Bailie Pollard; May 4, annual business meeting. Saturday afternoon visits will take place on Feb. 12, March 12 and 25, April 9 and 23, and May 7, and the annual excursion is arranged for Saturday, June 4, when Alloa and Clackmannan will be visited.

Glasgow Philosophical Society.—The new session of the architectural section of the Philosophical Society of Glasgow was opened on Monday evening, when Mr. MacGregor Chalmers delivered his presidential address, which dealt with the history of Glasgow Cathedral. Mr. Chalmers said that St. Mungo's Church was definitely identified at the end of the 12th century. The earliest fragment in the present cathedral was at the time of Bishop Ingeham, 1164, and although it was very small, yet lent its aid in the recognition of the structure dedicated in 1136. Bishop Jocelin added a nave, which, however, he had to stop, as the choir was burned down; but at the end of the 12th century he rebuilt the choir, and of that work the wall of the north aisle remained, and all the south aisle with its walls and vaulting. The old pillar which was retained was carved at that time also. Again the nave was started, and again it was stopped, this time for the erection of the present beautiful choir. Mr. Chalmers described the special characteristics of this work, with the sarcophagi and the effigy at the east end, and said that these, with the 15th-century slab in the churchyard, were all the Mediæval memorials. The sarcophagi he compared with that in Govan, illustrating his comparison by drawings, and he expressed his opinion that the 13th-century bell tower, regarding which interesting documents were preserved, was the north-western tower which was destroyed fifty years ago, and three stones of which were still lying in the Chapter House. Mr. Chalmers was thanked for his lecture, which was illustrated by a number of limelight views.

Leeds and Yorkshire Architectural Society.—The members of this society opened their session on Tuesday night by a smoking concert at the Queen's Hotel, Leeds. Prior to the concert the president (Mr. George Corson) delivered the annual address. The society, he said, was formed in December, 1876, and the membership had now reached 115. Twenty years ago, as the first president, he had referred in his address to the old Coloured Cloth Hall, a building which had an industrial and a political history. After many attempts, the local authorities succeeded in securing those premises, together with the Quebec Buildings adjoining, and upon the site the Government had erected the new post-office, which, though commodious, could hardly be said to be picturesque. He was not alone in thinking that the architect, in designing the front elevation, had lost a splendid opportunity. Still, the colossal new premises presented a striking contrast to the small and abject building at the foot of Albion-street, where for some 30 years or more the postal business was carried on. The opening-out of the City-square had considerably enhanced the value of property in the vicinity, and at the recent sale of the old Post-office site it realised about £75 a yard, or nearly £50,000 in all. Of late there had been a revival of the dead bones in matters of street improvements and the erection of new buildings in the city. Prices of property, especially in business thoroughfares, were constantly increasing, and the corporation had now to pay two or three times as much to acquire it as they would have been asked to do 20 years ago. He would not enlarge upon the buildings which within the last twenty years had added to the architectural aspect of Leeds, but merely call attention to the Yorkshire Penny Bank, the National Provincial Bank, Brown's Bank (now in course of erection), the Prudential Assurance Buildings, the new Medical School, and the extension of the Infirmary. So long as Leeds continued to grow in population at the rate of 7,000 a year, so long would its needs in every direction extend, and his successor in that chair 20 years hence would, no doubt, have ample scope for chronicling a Greater Leeds. There were several directions in which the municipal government of Leeds might effect reforms. The last Improvement Bill gave powers to the corporation to "regulate" hoardings and the bills with which they were covered. Nothing had been done in that respect. A regulation might be made that no hoarding should be allowed which did not leave a space between each board, say, of 6in. This would put a stop to the disfigurement of our streets by the advertising bills which now covered these erections. It seemed to be forgotten that the people of the city passed most of their lives in and about the streets, and that they were entitled to have their surroundings made as quiet, as orderly, and as comely as lies within the power of those whom they have elected to rule over them. Mr. W. E. Thorp proposed a vote of thanks to the President. The resolution was seconded by Mr. G. W. Bulmer, and was carried with acclamation. During the evening the society's prize of £2 2s. for measured drawings was presented to Mr. W. Driffield; and Mr. C. W. Tomlinson was the recipient of the President's prize of £2 2s. for sketches of old work.

Northern Architectural Association.—The 39th session of this society was opened on Wednesday night at a meeting held at Newcastle-on-Tyne, by an inaugural address from the president, Mr. Frank W. Rich, who, in his introductory remarks, graphically sketched the changes that had taken place in the Association since he last occupied that chair as President fourteen years ago. He then proceeded to review the changes that had taken place in Newcastle during the sixty years of the Queen's reign. He showed that two broad circumstances had accounted for its increasing prosperity and marvellous growth—the mineral wealth of the district, and the birth of the railway system. He declared that to-day Newcastle would hold its own among the cities of England and Scotland, either for architecture, administration, or cleanliness.

Perth Architectural Association.—The inaugural meeting of this association was held in the lecture-room of the Natural Science Society at Perth on the 9th inst., Mr. G. P. K. Young, A.R.I.B.A., the president, in the chair. The opening address was delivered by Mr. Hippolyte J. Blanc, R.S.A., Edinburgh. The chairman, before introducing the lecturer, explained the purpose for which the association had been formed. It had been originated and formed entirely by the young men in the district who were interested and actively engaged in architecture and engineering. With a view to carry out their desire of improving their knowledge in these subjects, they had combined together to obtain better facilities of study. The means they proposed to adopt were working classes, in which certain subjects would be given out for study and discussion under the guidance of one or two of the practising architects in the city. The society also proposed to give a few lectures during the season on special subjects, a course of interest to architects, and of information to the general public. The working class had already been formed, and the attendance was good, and the enthusiasm displayed most gratifying. They hoped by the end of the session to hold an exhibition of the work the students had done. Mr. Hippolyte Blanc said he wished the members success for the sake of those launching the association, as well as for those who might arise to attach themselves to it. There could be no doubt that the banding together of members of the same profession tended to the maintenance of professional etiquette. Yet he would remind them that, with all the advantages accruing to such associations, their influence for good was weakened unless there was a recognised freemasonry—a fraternal and confident co-operation—among its members. He desired to impress upon them that the enthusiasm of their beginning should be maintained as much as possible throughout their association. Such an association as this should be raised upon the concrete of a fraternal communion with a superstructure of unaffected love for the profession. Another requisite was devoted study towards knowledge; but it must be patient, persistent, and consistent. All knowledge acquired would never make an artist; but it would at least prevent the errors and anachronisms which betrayed the untutored hand. To Ruskin's mind, there were two qualities which distinguished great artists—imagination and industry. Imagination was a high gift, though it could not be boasted that many artists possessed it. But industry had promised to it great rewards, and its exercise was within the power of all. What concerned them in this Association was the manner in which it could be made helpful primarily to young members of the architectural profession, and also to the public who interested themselves in art matters. There was knowledge which would not be useful to the architect, but it was not intended that an architect should be expert in all. He should, however, have such experience of all branches that in the interests of the public he, calling himself an architect, should prove himself competent to design a building that would at least be sound in construction and healthful without extravagant waste of material. How were all the requirements to be most readily attained by the student? The only way was, first, by a course of well-directed study, and second, by concurrent office practice during a specified number of years. He recommended five years at least. Mr. Blanc then reviewed the system of teaching on the Continent. Looking at home they found an absence of State aid, and the burden was, in consequence, laid upon communities to establish the necessary ateliers and larger schools for the architectural student. The actual defect of their system was the too great ease with which one could enter the profession, and after three or four years at very mechanical work in an architect's office, and without special study of any kind, commence the commercial pursuits of an architect. An association of this kind should exist primarily for instruction. It should be a nursery and training room for all entering the profession. In conclusion, he strongly advocated a careful study of perspective. A vote of thanks was accorded to Mr. Blanc on the motion of Mr. David Smart, architect, seconded by Rector Chambers. Mr. Blanc, in responding, dwelt on the advisability of instituting a library in connection with the Association, and offered as a nucleus gift Volumes I. and II. of the "Edinburgh Sketchbook."

The National Association of Plumbers.—The half-yearly meeting of the National Association of Plumbers was held on Friday at Bradford. Delegates were present from 80 towns in England and Wales. The chair was occupied by Mr. John Beal, of Hull, the president, who was supported by Mr. W. Jaffrey (Manchester), Mr. A. E. Biggs (Leicester), Mr. R. W. Cooke (Newcastle), Mr. W. Skerrow (Leeds), and Mr. H. Blackburn (Dewsbury). The reports of the secretary (Mr. W. H. Smith) and the hon. secretary (Mr. J. Peattie, Oxford) were adopted. Mr. A. E. Biggs (Leicester), the organising officer, reported that he had visited Darlington, Middlesbrough, and Stockton. He had made very satisfactory progress in this district, but in Northampton he had met with little success. In Bristol, Cardiff, and Swansea he had done good work, and members who had joined had sent in their subscriptions. Mr. R. W. Cooke (Newcastle) said that the association was acquiring strength in that neighbourhood. Mr. W. Jaffrey (Manchester) reported in a similar strain, and he was supported by Mr. W. Skerrow (Leeds) and Mr. H. Blackburn (Dewsbury). Mr. Thomesson (London) said that in their district they had found that the best course was to appoint a paid secretary, and this had resulted in a considerable accession of membership. The secretary's report, which was adopted, showed that the association had been duly registered as a limited liability company. Several complaints had been received against masters, most of which had been settled to the satisfaction of the members concerned, and there had been small disputes with operatives at Bradford and at Derby, which the association had done its best to bring to a satisfactory conclusion.

In the case of Frederick Cook of Great Yarmouth, builder, the application for discharge from bankruptcy has been refused.

Engineering Notes.

G.W.R. Extensions in North Wales.—A new branch of the Great Western Railway Company from Brymbo to Coedpoeth and Minera was opened for passenger traffic on Monday. It is an extension of the passenger line from Wrexham to Brymbo. The new route to Mold from Wrexham, *viâ* Brymbo, Llanfynydd, and Coed Talon, is expected to be opened early in the new year. The new line, for which the Great Western Railway Company recently obtained Parliamentary powers, from Wrexham to Rhos, has been pegged out, and active operations will be commenced as soon as the specifications can be prepared. The doubling of the Great Western line between Ruabon and Corwen is being rapidly pushed on, as are also the new station buildings and platforms.

CHIPS.

The Berlin Bismarck Monument Committee have definitely intrusted the erection of the monument to Herr Reinhold.

The Earl of Jersey and Colonel Boughen, two of the commissioners appointed under the Light Railways Act, 1896, sat in the Manchester Town Hall on Friday to hear an application for an order to construct a light railway between Barton-upon-Irwell and Chorlton-cum-Hardy, through Trafford Park.

An inquiry was held at the Stroud Urban District Council's offices on Friday, by Lieutenant-Colonel A. C. Smith, upon the application of the urban council for sanction to borrow £600 for the renovation and purchase of the Stroud Baths. It was stated that the baths originally cost between £1,000 and £2,000.

The Esher Jubilee Memorial will take the form of a pedestal supporting a figure of Britannia standing upon the globe, and it will be erected in a prominent part of the village. The design is by Mr. F. J. Williamson.

A sub-committee appointed to consider the proposals for the reconstruction of portions of the Royal Infirmary at Glasgow have recommended for adoption plans prepared by Mr. James Thomson, of that city.

Mr. James Walker, consulting engineer to the Isle of Man Harbour Commissioners, has been appointed as chief engineer to the Tyne River Commissioners, out of 44 applications. The post is worth from £1,500 to £2,000 a year. Mr. Walker has carried out many important harbour works in the Isle of Man.

The newly-appointed health committee of the Liverpool Corporation, at their first meeting, have declined to grant an application for the retention of a sky-sign which had been erected in the heart of the city without permission for the same having been first obtained.

It has been decided to perpetuate the memory of the late Sir Isaac Pitman by placing a portrait of the deceased knight in the National Portrait Gallery, and a replica of the bust presented to him ten years ago in some prominent public building in the United Kingdom.

The newly-formed urban district council at Newport Pagnell have intrusted Mr. D. Balfour, M.Inst.C.E., F.G.S., of Newcastle-on-Tyne, to report on the existing pumping machinery at the waterworks for the town supply.

The scheme for the mural decoration of the Royal Exchange was advanced a further stage on Nov. 8, when the third painting was unveiled by Sir Faudel Phillips, who thus brought to a close his official connection with London as Lord Mayor. The subject of the latest panel is the demand of Charles I. for the surrender of the five Members of Parliament at the Guildhall, and this historical episode has been portrayed by Mr. Solomon J. Solomon, A.R.A.

Lady Jersey, laid, last week, the memorial-stone of public offices for the Southall-Norwood Urban District Council, to be built on a site given by Lord Jersey, at Southall, in commemoration of her Majesty's Jubilee.

At Eye, Suffolk, Mayor's Day was signalised by setting in motion the new Jubilee clock, which the outgoing mayor (Mr. C. Tacon) has presented to the town. A new turret has been added to the tower of the town-hall, from the design of Mr. G. W. Leighton, Ipswich. Mr. H Skuffham built the tower and carried out other incidental alterations. The four dials of the clock are 4ft. 10in. in diameter, and are made of cast iron, in one casting, being closed up with opal glass for the purpose of illumination by gas, supplied by an automatic apparatus, worked by the clock.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the Building News, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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The charge for advertisements for "Situations Vacant" or "Situations Wanted" is One Shilling for Twenty-four Words, and Sixpence for every eight words after. *All Situation Advertisements must be prepaid.*

NOTICE.

Bound copies of Vol. LXXII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Received.—W. V. L.—O. W.—L. T. S.—D. C. B.—M. R. and Son.—A. L. P. Co.

"BUILDING NEWS" DESIGNING CLUB.

Drawings Received. — "Auld Syne," "Pantile," "Eldon," "Vim," "Spark," "Suburb," "Pen and Ink," "Chess," "Gib," "Crow," "Ant," "Grip," "Inexperienced," "Spectator," "Medusa," "And Co.," "Nowhere," "Derige," "Bantam," "Pup," "Eric," "Byd," "Simplicity," "Ivy," "Oak," "Microbe," "Hubert," "Phantom," "Gossip," "Wessex," "Spinningdale," "Centaur," "Strax," "Bow-Bells," "Wun-Hi," "Olliwops," "Bee," "Hotspur," "Industry," "Ard," "Turret," "Klondyke," "Chuckle," "The Man in the Moon," "Solo," "Don," "Chameleon," "Stone," "R W. P.," "Kirby Hall," "Bernard," "E. G.," "Vita."

Cobden. (You can use your own judgment whether the lodge is to be placed one side of the arch and the stables the other.)

Correspondence.

RE GEARY, WALKER AND CO. v. HENRY YOUNG.

To the Editor of the Building News.

Sir,—Your last issue contained a report of this trial, and no doubt all who have read the same will have been struck with the extraordinary decision given against us. If such a decision is to stand, it will practically make it impossible for sub-contractors and specialists, such as ourselves, to do business. In this case a discount of 5 per cent. was quoted for *cash*, and it was stipulated that the work should be done to the satisfaction of the architect. It has been held, however, that an architect cannot be compelled to say he is satisfied; that if he is so disposed he can take ten years or longer before expressing any opinion whatever, and, presuming that at the end of ten years he does give an opinion that the work is satisfactory, the 5 per cent. *cash* discount could still be claimed!

We should like to have the opinion of specialists and sub-contractors on such a decision, which, of course, we intend to contest at the first opportunity, as it strikes at the root of all business transactions between builders, sub-contractors, and architects.—We are, &c.,

Geary, Walker, and Co.

IRISH AND ENGLISH ARCHITECTS.

Sir,—I regret the fact that Mr. Butler has gone out of his way to misread—wilfully or otherwise—my letter.

I did not say that the revival of the Architectural Association of Ireland was entirely due to Englishmen. I said it was left to an Englishman to start it, and Mr. Butler knows as well as I do that the Association would not be so far advanced, or even in existence, had not an Englishman come to the rescue and set it going.

I did not say that the Association pried into the religious belief and nationality of its members. When dealing with the subject of "wire-pulling," I was speaking generally, as a reference to my letter will show.—I am, &c.,

A Ghost That Walked.

[This ends the discussion, which has become a mere personal wrangle.—Ed.]

CHIPS.

To meet the increased demand for their patent fireproof floor Messrs. Mark Fawcett and Co., of 50, Queen Anne's Gate, Westminster, have doubled the Nottingham output of "tubular lintels." New kilns and drying-sheds have been erected, more storage ground provided, and a large stock is now being kept, so that they can be obtained at short notice.

The ancient parish church of Duffield, near Derby, has been restored, a new side aisle has been added, and a stained-glass window erected. The work has been done by Mr. Bridgeman, of Lichfield, and has cost several thousand pounds. The church was reopened on Saturday afternoon.

A meeting of art masters, representative of the counties of Forfar, Fife, Perth, and Aberdeen, was held in Dundee on Saturday, to consider the question of forming an association of art teachers for the north-east of Scotland. Mr. T. Dalgetty Dunn, Dundee, took the chair. The proposal to found an association was adopted, and Mr. Dunn was appointed president; Mr. J. Lessel, Montrose, vice-president; Mr. W. R. Smith, Dundee, secretary and treasurer; and Messrs. W. Wilson, Kirkcaldy; R. Ogg, Aberdeen; H. T. Wyse, Arbroath; D. S. Murray, Dundee; J. Smieton, Perth; and J. Robertson, Dunfermline, a committee.

At St. Oswald's Church, Askrigg, on Friday, the Bishop of Richmond dedicated a new peal of six bells. The three old bells have been recast, and three heavier ones provided by Messrs. Mallaby and Sons, of Masham.

A new Roman Catholic church is in course of erection in Ferry-lane, Goring-on-Thames. It will consist of sanctuary, nave, belfry, sacristy, and porch, the sanctuary being 19ft. by 14ft., and the nave 44ft. by 21ft. internally. The accommodation will be for 105 people. The style is Perpendicular Gothic. The first portion to be erected will consist of the sanctuary and one-half of the nave. The contract price for the whole of the work amounts to £1,265. The contractor is Mr. E. McCarthy Fitt, and the architect Mr. W. Ravenscroft, F.S.A., both of Reading.

At a meeting of representatives of the building trade in Halifax on Wednesday night in last week, it was decided that the necessary steps be taken for the formation of a Builders' Exchange at Halifax. It was also agreed to alter the market-day to Wednesday. Mr. Firth, president of the Master Builders' Association, occupied the chair, and there was a large attendance.

Last week at the Estate Mart, Tokenhouse-yard, was not marked by any interesting features, the entire supply, with one or two unimportant exceptions, consisting of a very moderate class of properties. On one day only was any activity displayed, the result being that the aggregate realisation was only £66,521, as compared with £83,063 registered in the corresponding week of last year.

The partnership hitherto subsisting between E. A. Johnson and C. R. Williams, architects, civil engineers, and surveyors, of Merthyr Tydfil, under the style of Johnson and Williams, has been dissolved.

The Great North of Scotland Railway Company have found it necessary to add another station to their recently-constructed branch line from Ellon to Boddam, and have instructed their engineers to survey the route from Boddam to Peterhead with a view to the extension of the branch from Boddam on to Peterhead. The new station is to accommodate the granite traffic which proceeds from the Murdochhead district, and be constructed at the Bullers o' Buchan.

Intercommunication.

QUESTIONS.

[11843.]—**L.C.C. Office.**—Can anyone inform me through your columns what the competitive examinations consist of to get into the London County Council engineer's or architect's department? Thanking you in anticipation.—A. D. B.

[11844.]—**Water in Coach-House.**—I have this summer completed a coach-house. The floor is composed of 6in. cement concrete with a 1in. trowelled cement face; the walls are 9in. thick, with asphalte damp-course, and the floor throughout is above the ground level. The subsoil is sand. There is a plaster ceiling, and the room is heated with hot-water pipes. Yet, whenever the weather is cold or damp, pools of water appear all over the floor. I shall be glad if any of your readers can tell me what is the cause of this nuisance, and what remedy I can adopt. —CENTRIAN.

[11845.]—**Speculative Building.**—Can anyone recommend a handbook relating to speculative building as a temporary investment, or to the purchase of house property as a permanent investment?—X.

REPLIES.

[11833.]—**Painting of Galvanised Sheeting.**—As a practical engineer, with 30 years' special experience of galvanised corrugated sheeting, I would strongly recommend "Much Advised" to use a mordant or primer called "Uniter," for the first coat, and to afterwards apply a coat of oxide or lead paint. "Uniter" is a preparation whose special virtue is to induce perfect adhesion between the galvanised sheeting and the paint, which otherwise easily peels off if applied directly to the sheets. It is also a capital preservative to the zinc coating, as it prevents oxidation. My experience is that all preparations with copper or acid as one of the ingredients should be avoided, as a chemical action is at once set up which destroys the zinc. "Much Advised" will soon see this for himself by applying some of the first solution recommended by "H. C. S." to a small amount of the sheeting, when he will see the zinc coating turn black and be almost instantly destroyed. By the way, I am surprised to observe that this receipt mentioned by "H. C. S." is given in a well-known leading book on "Building Construction," and all architects and engineers should be warned of its destructive properties. — CHAS. THOMAS, Bristol.

[11835.]—**Parchment Plans.**—To prevent ink and colours "running" on parchment, first sponge the surface with beef-gall, and allow same to dry. The gall should be prepared before use as follows:—Put into an enamelled saucepan 45 parts (by weight) of beef-gall, with an equal quantity of water, and boil it for ten minutes or so; then add 2 parts (by weight) of alum; stir the mixture for half an hour, and, when cold, filter; then mix with the decolourised gall one-eighth part of proof spirit (anhydrous spirits of wine—*i.e.*, alcohol free from water); let the mixture stand two days, then pour off the supernatant liquid; the alum, in crystals, will remain in the vessel. Use the clear fluid as directed above.—H. C. S.

[11837.]—**Pavement Slabs.**—A perusal of the articles on "Artificial Stones" in a recent number will give "Aberdeen" all the information required.—H. C. S.

[11838.]—**Measuring Off Works.**—It is not unusual for a contractor to be represented by his own surveyor in checking the architect's measurement of additions and deductions. Of course, the terms of the contract have something to do with the question of measuring up. Two surveyors, one representing the architect and the other the contractor, are often employed in such works at the adjustment of accounts. The quantity surveyor generally acts for the architect and builder, he having for his guidance the deposited bill of quantities and the schedule of prices deposited. The best way is for the quantity surveyor to obtain from the architect, or his clerk of works, and the builder a list of works claimed as extra on contract. Sometimes the surveyor and architect or clerk of works meets the contractor and his surveyor, and they go through the items, which are then admitted as extras or not by the surveyors, and measured. The omissions are also gone through at the same time, and set against the extras. Differences of opinion and of rates ought properly to be made and settled between the two surveyors, and so avoid a reference.—G.

[11839.]—**Blisters.**—The peeling of the paint on blisters over knots in wood is due to the exudation of resinous matter out of the knot itself. This is one cause; another cause is due to the "patent knotting," which has been dabbed over the knot in the wood previous to painting it. This compound is a mixture of shellac in methylated spirit, and consequently there is no adhering surface for the paint where the shellac has dried. In the case of blisters occurring where there are no knots, it will probably be found that such blisters are due to the accumulation of water gathered up out of the fibre of the wood which, by accumulating under the paint, bulges it up. While the water is being gathered up in little heaps like this, the paint remains soft, and if painted will allow water to exude from beneath. When the accumulated water cannot escape from the exterior surface by the paint, it will in time be reabsorbed by the wood, and consequently the skin of paint that has been bulged up will become dry and chip off at the slightest touch.—H. C. S.

[11840.]—**Measurement of Stonework.**—Many surveyors object to describe stone as including all labour, and they follow the old-fashioned mode of measuring stone in rough blocks and then measuring the labour in detail. One objection to the measurement of stone including labour is that the items are not clearly distinguished, and the builder hardly knows the exact kind of labour included, or the quantity of it. When the labours are measured separately, the stone is taken per foot cube, including waste, hoisting, &c.; the beds and joints are then taken per foot super.; half-sawing at the super. foot circular beds and joints, sunk beds, &c., each kind being measured according to the rules given in text-books. The London practice of measuring stonework follows this rule. All faces are measured except beds and joints, in which one face measured represents two faces. In all cases of "stone and labour," state what faces are rubbed, tooled, or otherwise treated. I should advise "Student" to consult Mr. Leaning's "Quantity Surveying" for examples.—G. H. G.

[11842.]—**Artificial Stones.**—See reply to "Pavement Slabs" above.—H. C. S.

CHIPS.

The Painters' Company offer a travelling studentship of £50 for the encouragement of the study of decoration. It is open to competition by students between the a ges of 20 and 25 in any recognised school of art or other institution devoted to the study of applied art in any form and situate within the limit of the larger Metropolitan postal area. Full particulars can be obtained from the clerks, Painters' Hall, 9, Little Trinity-lane, E.C.

The Jubilee Memorial Convalescent Home Committee at Bristol have been informed that Mr. E. P. Wills intends to contribute £20,000 towards that object. With this addition the total donations up to the present amount to £80,000.

The statue of the Queen which Mr. Bernard Tolhurst is presenting to Southend-on-Sea is on its way to that town. The statue has been executed by Mr. J. M. Swynnerton in his studios at Rome. It has been carved from a solid block of Carrara marble, and weighs seven tons. It will stand, with the pedestal, about 20ft. in height.

As the result of the preliminary examination made by Colonel Sir Thomas Holdich, the well-known head of the Indian Survey Department, whose services were lent to the Ceylon Government last winter by the Government of India, a new survey is to be made of the island. The cadastral survey will be on a scale of 10in. to the mile and the topographical on one of 1in. to the mile. The triangulation and topographical survey will be completed in five or six years; but considerations of expense will cause the cadastral survey to be spread over a period of 25 years, and to be restricted to Crown lands and lands of doubtful ownership. The existing maps of Ceylon are full of errors, and for every grant made out of Crown lands a special and expensive cadastral survey of the locality had to be executed.

In consequence of the rebuilding of their offices, Messrs. Eastwood and Co., Ltd., have removed to temporary ones at 61, Temple Chambers, Temple-avenue, Victoria Embankment, E.C.

The new buildings which have been added to Elswick Wesleyan Church, at the cost of Alderman W. H. Stephenson, J.P., to be used as ladies' parlour and vestries, were formally opened and handed over to the circuit on the 13th inst. They have been erected by Mr. Thomas Hutchinson, from the designs of Mr. John D. Dyson, architect, of Newcastle.

On Monday, the 15th inst., the first sod of the new Cottage Hospital, Nuttall-lane, Ramsbottom, was cut by Mrs. Aitken, of Holcombe Hall, who is defraying the whole of the cost and presenting the building to the town. The contract has been let to Messrs. Platt and Castle, of Ramsbottom, and the work is from designs and under the superintendence of Messrs. Haywood and Harrison, architects, Accrington and Lytham. The cost is about £3,000.

The Glasgow joiners' officials have posted notices in all the shops intimating that no man is henceforth to hang doors or deal with any manufactured joinery imported from the United States. Speculative builders at Glasgow, it is stated, have lately been importing all classes of manufactured wood from America.

Plans have been completed for the new Parliament Houses in Perth, Westralia, the estimated cost of which is £150,000. Another contemplated pile, which will cost a similar amount, is the new Law Courts, also in Perth. Contracts for both of these important undertakings will be invited early in the new year. In addition to these Government buildings, there are numerous contemplated erections of considerable magnitude, both in Perth and Freemantle, which will keep the builders of Westralia busy for some time to come. Contracts for three new railways in the colony have just been placed with Messrs. C. and E. Millar. Of these railways one is from Kalgurli to Menzies, 81 miles; another is from York to Greenhills, 14 miles; and the third is from Kalgwili to Kanowna, 12 miles.

The Red Lion Hotel at Debenham, Suffolk, has been enlarged and partially remodelled from plans by Mr. Frank Brown, of Princes-street, Ipswich. Mr. H. Gooding, of Debenham, was the builder.

Colonel Albert J. Hepper sat at the urban council offices, Hebden Bridge, on Friday, to take evidence on behalf of the Local Government Board with regard to an application made by the urban district council of Hebden Bridge to borrow the sum of £2,750, for the provision of a refuse tip. Mr. Shaw, for the council, stated that the land proposed to be acquired contained an area of 3½ acres, for which the council had agreed to pay £730, including the timber on the land.

LEGAL INTELLIGENCE.

OWNERLESS DANGEROUS STRUCTURES.—"The owner" of the premises No. 55, St. George's-street, E., was summoned to the Thames Police-court, at the instance of the London County Council, for alleged offences under the Dangerous Structures Act. Mr. Godfrey, in support of the summons, was about to open his case, when Mr. Biron, counsel, said he appeared for Mrs. Farrow, the original owner of the property, who had disposed of the lease to Mr. Nye. Mr. Hodson, barrister, denied that Mr. Nye was the person who should have been summoned. A discussion having ensued, Mr. Dickinson said under the recent judgment the time of the Court had to be occupied in holding a preliminary inquiry as to who was the owner. The Council had to see dangerous structures were not permitted to exist, and if they were allowed the public would quickly raise an outcry, and he would see they were protected as much as possible. Mr. Augustus W. Turner, district surveyor for St. George's, said he surveyed the premises on Sept. 8, and found them dangerous. The back wall and upper part of the front wall were dangerous, and up to one o'clock that day nothing had been done. The place was eminently dangerous, and might fall down while the learned counsel was discussing the matter. The case was adjourned. Mr. Godfrey remarked there were about 1,500 of the summonses during these year.

A STREET-MAKING ACTION.—His Honour Judge Ingham was occupied a long time at Rugby County Court, on Friday, in deciding whether Mr. Thomas Hall, contractor, Rugby, had made two streets—Worcester-street and Essex-street—in accordance with specification. Mr. Hall, who figured as plaintiff, claimed from Mr. T. W. Millard, architect, Rugby, the sum of £70 6s., balance of the contract, £997, while Mr. Millard counter-claimed for £1,200 for breach of contract and cost of putting the streets into proper order. For the plaintiff, Messrs. J. T. Eayres (Birmingham), W. Willmott (surveyor, Birmingham), W. Purnell (assistant borough surveyor, Coventry), and other experts gave evidence to the effect that the metalling was of the thickness required after allowing for compression caused by steam-rolling; while, on the other hand, the defendant and numerous witnesses declared that it was several inches too thin, and the urban district council had refused to take to them in consequence. His Honour gave judgment for the defendant on the claim, and for £200 on the counter-claim.

BUILDER V. BRICKMAKER.—MOORE AND BRISTOW V. MULLANEY.—In this case, tried at the Stockport County Court, and reported in our last issue on p. 709, his Honour Judge Yate Lee has given his decision. The plaintiffs are brickmakers, of Stockport, and they sued Dennies Mullaney, a builder in the town, for £70 12s. 8d. for bricks supplied. The chief point at issue had reference to the quality of the bricks supplied, the contention raised on behalf of the defence being that about 60,000 of them were of an inferior kind, necessitating the purchase of bricks elsewhere. For these defendant had to pay a higher price than for which he bargained with the plaintiffs, and he estimated the loss he had thus sustained at £36 8s. 6d. He had counter-claimed for that amount, but the claim was not entered in time, and therefore had to be abandoned. His Honour, in delivering judgment, reviewed the evidence at some length. The statement that the plaintiffs supplied the defendant with 60,000 or 70,000 inferior bricks seemed incredible. Another question on which the credibility of the case turned was this. The plaintiff Briscoe said he saw the defendant twice during the period occupied in the delivery of the bricks, extending over some five months. The defendant, on the other hand, swore that from March to July he saw the plaintiff every two or three days. It was obvious that there was the most gross perjury on the one side or the other. The question was, which of the statements was true? The defendant could give no particulars of his interviews with the plaintiff, and, therefore, he (the judge) could not believe what he said. It appeared to him the defendant had failed to make out any definite number of bricks which were bad, beyond the 500 which were admitted on the part of the plaintiff. His Honour put the value of these 500 at 11s. 6d., and taking that off the claim, there remained a balance of £70 1s. 2d., for which he gave judgment, with costs. Special costs incidental to the remission of the case from the High Court were allowed.

BIG ARBITRATION CASE AT MANCHESTER.—At the Grand Hotel, Manchester, an arbitration to assess the compensation to be paid by the Great Northern Railway Company to Messrs. Samuel Gratrix, jun., Brother, and Co., Ltd., in respect of the acquisition and demolition of their premises in Alport Town, Manchester, was begun on Tuesday, before Mr. James Green, surveyor, of London, sitting as umpire. Mr. Freeman, in laying the facts before the umpire, described the properties in question, which consist of extensive business premises and a public-house known as the Black Horse. It had been agreed, counsel said, to keep the cases separate,

and that relating to the business premises would first be proceeded with. These premises had been occupied by Messrs. Gratrix for many years in the conduct of their business as lead, glass, oil, paint, and colour merchants, brass founders, metal workers, sanitary plumbers, and electrical engineers. The site consisted of 2,601 sqare yards, exclusive of the public-house. At the end of 1894, having learnt that the railway company were proposing to take the area on which their premises stood, Messrs. Gratrix purchased a site in Quay-street, upon which to erect new premises, and to these new premises the business would be removed before the end of March, 1898. Counsel went into the particulars of the claim, and said that the total sum in round figures worked out to about £111,600. Evidence in support of the claim was given by a number of witnesses. The inquiry is expected to last till Wednesday or Thursday in next week.

CHIPS.

Next week the Bridges Committee will recommend the London County Council to authorise them to proceed forthwith with the construction of the Greenwich Tunnel, the estimated cost of which is £70,500.

A new church is about to be erected in Horton Grange-road, Listerhills, near Bridport, from plans by Messrs. T. and H. Healey, of the latter city.

A stained-glass window was dedicated to St. Joseph's Roman Catholic Church, Swansea, last week. The subject is the Ascension, and the artist Mr. Westlake.

St. Mark's Parish Church, situated in Groves, Hull, was reopened by the Archbishop of York on Friday. The interior of the church has been entirely restored and new clergy and choir vestries built, at an aggregate cost of £1,000.

Henry Taylor, living in Colville-road, Acton, has been remanded on a charge of falsifying accounts and detaining the books of the Wandsworth Branch of the General Union of Operative Carpenters and Joiners. The prisoner was secretary to the Wandsworth branch of the union. He absconded in the early part of the year, and although the warrant was granted as far back as January last, he could not be traced until Wednesday in last week, when he was arrested.

Sitting as a Deputy High Bailiff at the Westminster Town Hall, on Nov. 11, Mr. Troutbeck and a special jury heard the case of Mellor's Trustees v. Her Majesty's Office of Works, a claim being made for £28,000 as compensation for the freehold interest in premises occupied by the Aërated Bread Company at the corner of Parliament and Great George streets, Westminster. Among the claimants' expert witnesses were Alderman Sir Whittaker Ellis, Bart., Mr. Tewson, and Mr. Bousfield; while Mr. R. Vigers, Mr. Galsworthy, and Mr. Horne gave evidence for the Crown. The jury returned a verdict for £26,000.

Colonel C. H. Luard held a Local Government Board inquiry at Leamington, on Friday, into the application of the corporation to borrow £900 for works of street improvement.

At Trevordo Viaduct, on the Cornwall Railway, between Liskeard and Menheniot, a new five-arch viaduct of granite is being built by Messrs. Pelf and Sons, contractors. On Monday, while one of the wooden ribs was being fixed, upon which the brickwork of an arch would afterwards rest, the rib overturned, precipitating William Cotton and Richard Toms to the ground, nearly 80ft. below. Cotton, 19 years of age, was killed instantly, and Toms, an ex-naval seaman, aged 32, expired while being borne to the Liskeard Cottage Hospital. At the inquest on Wednesday "Accidental Death" was returned; but the jury added that in their opinion there should be more careful supervision in works of so dangerous a character.

The ceremony of unveiling a bust of Michael Faraday was performed at the Michael Faraday Board School, Faraday-street, Walworth, by Sir J. Crichton Browne, F.R.S., on Monday. The bust, which is of white marble, was presented to the school by the managers of the Royal Institution of Great Britain, and is a copy of the original bust executed by Matthew Noble. It stands upon a pedestal of Aberdeen granite, 4ft. in height, and has been placed in the boys' hall of the school. On the wall immediately below is a brass bearing an inscription.

At the meeting of Oxford Convocation on Tuesday, a decree was unanimously passed authorising the Drapers' Company to erect a new building for the Radcliffe Library, on a site facing the South Park's-road, Oxford, and constituting a wing of the museum corresponding to the Clarendon Laboratory, from designs from Mr. Jackson, R.A. The Master of Pembroke reminded the house that this decree was simply consequential upon the acceptance last summer of the great liberality of the Drapers' Company.

WATER SUPPLY AND SANITARY MATTERS.

Tonbridge.—On Friday afternoon, by invitation of the directors of the Tonbridge Water Company, the members of the urban district council inspected the new storage reservoir, which is being constructed close to the pumping station at the works. Though close to the town, and immediately on the banks of the Medway, the works are believed to be free from any contaminating influence. The reservoir was designed by Mr. James Lees, the company's engineer, and, in digging out the space required, several trunks of trees had to be removed, showing that at one time the site was part of the great forest, in the centre of which Tonbridge, with its castle, was situate. The new reservoir is upwards of 20ft. deep. The walls are composed of concrete 4ft. wide at the bottom, tapering to 2ft. at the top. The roof is built on piers, and arches of white enamelled bricks, with cement and spandrels and springers from the arches. Mr. T. Langridge was the contractor.

The partnership, heretofore subsisting between A. Marshall and G. Turner, of Nottingham, architects and surveyors, under the style of Marshall and Turner, has been dissolved by mutual consent.

Herr Wilhelm von Riehl, Professor at the Munich University, died in Berlin on Tuesday, aged seventy-four. In 1853 Riehl was appointed by King Maximilian II. of Bavaria Professor of Munich University, and in 1885, while retaining his professorship, he became Director of the Bavarian National Museum and Conservator General of the Monuments of Art and Antiquities in Bavaria.

The Local Government Board have sanctioned the application of the Southend Corporation for a loan of £3,418 for sea defences.

The workmen in the employ of Messrs. Fred. Bennett and Co., of Ipswich, who have been engaged in rebuilding the premises occupied by Mr. E. W. Gilbert, draper, 10, Tavern-street, in that town, were entertained at dinner last week. The work is being carried out under the direction of Mr. J. Shewell Corder, of Ipswich.

In the Queen's Bench Division on Tuesday, before Mr. Justice Mather and a special jury, Thomas Oakley Bennett, surveyor, of Burton, Somersetshire, and chairman of the local parish council, was sued for damages for alleged slander by Thomas Carhart, formerly proprietor of the Blue Bell at Burton, and Mrs. James Carhart, his wife. The slander was to the effect that plaintiff was alleged to have informed one of the firm of brewers owning the Blue Bell, that Mrs. Carhart had insulted him, and forbidden him the house. The jury found a verdict for the plaintiffs, and assessed the damages at £250.

A new channel has been constructed at Teddington Weir by the Conservators of the River Thames. This work will in wet seasons have a beneficial effect by providing a greatly increased outlet for flood waters. Sir F. D. Dixon-Hartland, M.P., the chairman of the Board, will open this channel on Monday afternoon next.

The parish church of Sible Hedingham has been restored. A carved oak screen has been placed across the chancel aisle, a new roof has been placed over the nave, new windows with stained glass have been put in, the floor has been laid with tiles, and the insides of the seats have been laid with blocks of pitch-pine, while the middle of the nave has been reseated. The contractors for the work were Mr. Parmenter, of Braintree, and Mr. W. J. Elsdon, of Sible Hedingham. Mr. Walter Clark, of Halstead, executed the oak screen.

At Sunderland on Monday, Mr. Maynard held an inquest on the body of Geo. H. Humble, surveyor to the Sunderland Rural District Council, whose dead body was found in a field on Saturday morning. He had been missing about a fortnight, and had evidently committed suicide by drinking carbolic acid, a 6oz. bottle which had contained that poison being found by his side. The body was badly disfigured, the ears and face having been gnawed by rats. A verdict of "Suicide whilst temporarily deranged" was returned.

The markets committee of the Leeds Corporation appointed on Monday a sub-committee to obtain tenders for the erection of a Wholesale Dead Meat Market and Abattoir on ground at Harper-street, York-street, at the estimated cost of £18,000. The plans were prepared by Mr. Walter Hanstock, architect, Leeds and Batley.

The widening of the Great Northern Railway from King's Cross to Huntingdon is rapidly proceeding. The company's engineers on Sunday performed a remarkable feat in reconstructing the old iron bridge south of Hatfield, and over which run four lines of railway. Traffic was temporarily suspended, and with every necessary appliance in readiness, the old bridge was removed and replaced by a new iron-girder bridge, the work being accomplished in about fifty minutes.

Our Office Table.

The *Daily Chronicle* of Saturday last blundered in connecting Burgess's name with a nonsense verse (made for studio amusement only) by Dante Rossetti. Apart from its literary form, as printed in that paper, which, says the *Pall Mall Gazette*, is so slovenly as to make Rossetti's ghost shudder, the original referred to "a builder named Burges"—in fact the architect, William Burges, A.R.A., quite another artist, whose rather infantile manner lent point to the final line of the original, which run thus:—

There is a young builder named Burges;
From childhood he scarcely emerges.
If you were not told
He's decidedly old,
You would offer a bull's-eye to Burges.

It was also a studio joke to call Burgess "Pretty Burgess," to distinguish him from Burges, whose appearance was more homely than that of the painter.

The imperative necessity for widening Lower Thames-street between Botolph-lane and Fish-street-hill was brought before the City Commissioners of Sewers on Tuesday by the Improvement Committee, who reported that in this portion of Lower Thames-street the width between the houses varied from 28ft. to 30ft., the carriage way from 17ft. to 18ft., being only sufficient for two vehicles at a time. Consequent upon the recent construction of Monument-street a small portion of Thames-street had been widened to the extent of 40ft. They submitted plans for making the thoroughfare from Botolph-lane to Fish-street-hill 40ft., 50ft., and 60ft. wide respectively. The cost would be either £151,500, £171,100, or £190,000. The existing accommodation was utterly inadequate to the requirements of business. But before coming to any decision they recommended that the plans and estimates should be submitted to the London County Council, and their views invited in reference to the alternative schemes. The report was unanimously adopted.

Mr. A. Creer, the city engineer of York, met with an accident while inspecting the septic tanks at Exeter last week with a view to the possible adoption of the system in York. While Mr. Creer was in the septic chamber observing the chemical action set up in the sewage an explosion took place, with the result that he sustained severe burns and a shock to the nervous system. He has since been confined to bed at Exeter, and has been attended by Dr. Cattley, the medical officer of health for York, and nursed by his wife. It is stated that a precisely similar accident happened a few weeks since to the city surveyor of Belfast in the same chamber at Exeter.

During the past week the second, third, and fourth of the present course of Rhind lectures have been delivered at the Scottish National Portrait Gallery, Edinburgh, by Dr. James Macdonald, the subject of the series being, as we noticed last week in a *résumé* of the first address, "The evidence for a Roman Occupation of North Britain." In his second discourse Dr. Macdonald dealt with the literary evidence of the occupation, referring at considerable length to the narrations of Herodian Xiphilia (Dio) and Spartian, concerning the expedition of Severus against the Caledonians, *circa* A.D. 210. The evidence of Gildas, Bede, and Nennius was dealt with by the lecturer, and brief references were made to the statements of Mediæval chroniclers and of later writers down to Horsley. The appearance of the forged treatise, "De Situ Britanniæ," was shown to have had a most mischievous effect. General Roy and others, long regarded as authorities, were led by their belief in its genuineness to promulgate opinions that had no foundation in fact. In his third lecture Dr. Macdonald prefaced the archæological evidence of the occupation, to which he now passed on, by a short account of the means the Romans took to shelter their soldiers when in an enemy's country, and to protect their frontiers from attack. This was followed by a brief sketch of the organisation of the Roman army under the Empire. In North Britain the most important Roman field work was the Pius Vallum on the Forth and Clyde isthmus. Recent excavations by the Glasgow Archæological Society had revealed to us the structure of its different parts, which was imperfectly known before. It consisted of a military way; a wall, built to a

large extent, at least, of sods, prepared and laid by the hand, a ditch of the V-shaped type, and the outer mound. The more important antiquities found at or near the Pius Vallum were, for the most part, distance slabs and altars dedicated to various deities.

In his fourth lecture, Dr. Macdonald dealt with those rectilineal entrenchments classed by the older writers as Roman stations. Apart from the forts of the Pius Vallum, there were at present only seven such localities that could be shown by the remains of antiquity found within or near them to be the sites of Roman permanent examples. These were Birrens, in the south-east of Dumfriesshire; Cappuck, near Jedburgh; Newstead, near Melrose; Cramond and Inveresk, both on the Firth of Forth; Camelon, west of Falkirk; and Ardoch, north of Dunblane. Birrens had lately been thoroughly excavated by the Society of Antiquarians of Scotland with fruitful results. Below the grassy sward there had long lay concealed the foundations of a military station planned with the utmost precision. The number and extent of the several buildings were ascertained almost to completeness. Several altars, most of the fragments of a large tablet bearing the date A.D. 158, a quantity of Roman pottery, and many small objects were dug up. After describing the Roman antiquities discovered at Cappuck, Newstead, Inveresk, Cramond, and Camelon, the lecturer proceeded to give account of recent excavations by the Society of Antiquaries at Ardoch, the north-east quarter of which was examined. The holes and trenches there found filled with black dust proved the former existence of wooden buildings resting on posts and planks, one of which must have been the prætorium. There were also met with specimens of pottery and small pieces of two inscribed tablets. The lecturer discussed the claims of five other forts classed as Roman stations by General Roy—Strageth, north-west of Ardoch; Castledykes, near Carstairs; Bertha, at the junction of the Almond and the Tay; and Burghead, on the Moray Firth. Excavations at Raeburnfoot within the past fortnight by Mr. James Barbour, for the Dumfriesshire Antiquarian Society, had resulted in the finding of pieces of coarse pottery and some other indications of a possibly temporary Roman occupation. Summing up, the lecturer said he thought it proved that in the eastern lowlands of Scotland, from the Border as far, at least, as the lower valleys of the Forth and Clyde, there were certain Roman camps of occupation, generally some distance apart, which were evidence that the Romans had for a time more than a passing hold on that part of the country.

At the last meeting of the city council of Bristol the discussion was renewed on the proposal of the visiting committee of the City Lunatic Asylum at Fishponds to extend the buildings under the supervision of a clerk of works at an estimated cost of £45,000. Mr. Terrett moved that the resolution approving of this action be rescinded, and pointed out that it was contrary to business usage to undertake so large a scheme as this without the assistance of a professional architect. He had figures which went to show that the sum intended to be spent was excessive. At Birmingham work averaged out to £125 per bed; Essex, to £125; Hull, £110; Hanwell (under the London County Council), £80; Glamorgan, £171; Herts, less than £200; Croydon, under £210; Winnick, £145; Hants (an extension), £82. It was said the beds at their own asylum would work out to £210 apiece, but that was based on the estimate of £31,000. And, now that the cost was going to be £45,000, the average per bed would be raised to £280. Mr. Bastow, builder, seconded the motion, but it was opposed on the ground that matters had gone too far for the committee to reverse their action, and on a division Mr. Terrett's motion was rejected. The chairman of the committee offered to subject the plans and elevations to the city surveyor for approval, and this was agreed to, although it was pointed out that that official is not an architect.

A curious state of affairs is reported with regard to Kilmallock Castle, a reputed residence of the Desmonds, which some few years ago would have been demolished but for the intervention of the County Limerick grand jury. The structure is now in a dilapidated condition, and, overhanging as it does the public road to Limerick, is dangerous to traffic. The necessary repairs, however, cannot be executed owing to the action of a tenant who is in possession of the basement of the tower, using it as a smithy, and who refuses to quit the premises unless he gets £500 compensation. The tenant will accordingly have to be evicted unless—of which there seems no likelihood—he can be induced to give up peaceable possession. The Board of Public Works will, it is understood, take charge of the ruin, which is interesting only from its historical associations.

Mr. James Paton, curator of the Glasgow Corporation Art Galleries, delivered, on Tuesday night, in the Corporation Galleries of that city, his third weekly address on Italian art, dealing on this occasion with "Botticelli and His Contemporaries." Mr. Paton referred to the condition of Italy in the early 15th century—to the decline of religious zeal and general culture. Literature had fallen away from the eminence of Dante, Petrarch, and Boccaccio. There was no political stability in the land, which was split up into numerous small States, republican cities, and paltry despotisms, in which there was incessant change, treachery, warfare, rapine, cruelty, and murder. The general anarchy caused longings to arise after the national strength and unity of classical times, which led to the study of ancien history and literature, and finally to a Classical revival in sculpture, architecture, and pictures. Mr. Paton then referred to the contemporaneous introduction of the printing press and painting in oil. The use of oil and varnish in painting was equivalent to a new instrument in music. It gave the artist a better range, produced greater brilliancy in tone, and increased the possibility of finer and more delicate modulations in colour. Previous to the introduction of oil the principal form adopted was fresco, but this was now changed to the panel picture. Mr. Paton concluded by dealing specially with the works of Botticelli, Signorelli, and Ghirlandajo.

MEETINGS FOR THE ENSUING WEEK.

Monday.—Surveyors' Institution. "The Manchester Ship Canal Compensation Cases," by J. D. Wallis, F.S.I. 8 p.m.

Tuesday.—Institution of Civil Engineers. "Central Station Electric Coal Mining Plant in Pennsylvania," by W. S. Gresley. 8 p.m.

Wednesday.—Society of Arts. "Progress of Metallurgy and Metal Mining in America during the last Half-Century," by Prof. Jas. Douglas. 8 p.m.

St. Paul's Ecclesiological Society. "Variations of Material for Altar Linen" and "The Beginning and Growth of the Usage of a Second Gospel at Mass," by Cuthbert Atchley. 8 p.m.

Thursday.—Sanitary Institute. "Sewerage and Sewage Disposal," by Prof. Henry Robinson, M.Inst C.E., Parkes Museum. 8 p.m.

Birmingham Architectural Association. "Repairs and Restoration," by Thackeray Turner. 6.45 p.m.

Friday.—Architectural Association Conversazione and Musical Play, Matina Theatre, Langham-place. 8 p.m.

The Society of Architects.

Founded 1884. Incorporated 1893.

The FIRST ORDINARY MEETING of The Society of Architects for the Session 1897-98 will be held at the Rooms of the Society, at St. James's Hall, Piccadilly, W., on THURSDAY, November 25 h, 1897, at Eight o'clock p.m., when the OPENING ADDRESS will be delivered by Mr. T. WALTER L. EMDEN, J.P., President.

ELLIS MARSLAND, Hon. Sec.
MONTAGU BALDWIN, M.A., Sec.

The organ in the parish church of Inveresk, N.B., will be reopened to-day (Friday) after enlargement carried out by Messrs. Lewis and Co., of Brixton, S.W.

Rosewell Parish Church, N.B., after having been closed for seven months to permit of extensive alterations, costing fully £700, was reopened on Sunday. The architects for the renovation were Messrs. Hardy and Wight, George-street, Edinburgh.

The trustees under the Birmingham Churches Act, 1897, are now negotiating for the sale of the site of Christ Church, together with the building materials, but exclusive of the internal fittings of the church. The property is to be sold subject to all rights of light and other easements, and to the condition that no licensed house, nor licensed place of public entertainment, shall at any time be erected on the site. The catacombs will be sold with the church, and in the early part of next year the bodies will be removed. That of John Baskerville, the celebrated painter, will be removed to the churchyard of St. Philip's Birmingham, where it will rest beside that of his wife; the stone which marks her grave is a well-known feature of the churchyard.

LATEST PRICES.

IRON, &c.

	Per ton.		Per ton.
Rolled-Iron Joists, Belgian	£5 15 0	to	£6 0 0
Rolled-Steel Joists, English	6 0 0	„	6 10 0
Wrought-Iron Girder Plates	5 15 0	„	6 10 0
Bar Iron; good Staffs	7 0 0	„	8 0 0
Do., Lowmoor, Flat, Round, or Square	17 0 0	„	17 0 0
Do., Welsh	5 15 0	„	5 17 6
Boiler Plates, Iron—			
South Staffs	7 17 6	„	8 5 0
Best Snedshill	10 0 0	„	10 10 0

Angles 10s., Tees 20s. per ton extra.
Builders' Hoop Iron, for bonding, &c., £6 15s. 0d. per ton.
Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.

Galvanised Corrugated Sheet Iron—	No. 18 to 20. Per ton.		No. 22 to 24. Per ton.
6ft. to 8ft. long, inclusive gauge	£10 15 0	...	£11 0 0
Best ditto	11 5 0	...	11 10 0

	Per ton.		Per ton.
Cast-Iron Columns	£6 0 0	to	£8 10 0
Cast-Iron Stanchions	6 0 0	„	8 10 0
Cast-Iron Sash Weights	—	„	4 2 6
Cast-Iron Socket Pipes—			
3in. diameter	5 10 0	„	5 15 0
4in. to 6in.	5 5 0	„	5 10 0
7in. to 24in. (all sizes)	4 15 0	„	5 5 0

[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]

Pig Iron—	Per ton.
Cold Blast, Lilleshall	105s. to 110s.
Hot Blast, ditto	57s. 6d. to 62s. 6d.

Wrought-Iron Tubes—Discount off Standard Lists f.o.b.			
Gas-Tubes	75p.c.	Fittings	77½p.c.
Water-Tubes	70	„	72½
Steam-Tubes	62½	„	65
Galvanised Gas-Tubes	60	„	62½
Galvanised Water-Tubes	55	„	57½
Galvanised Steam-Tubes	45	„	47½

	10cwt. casks. Per ton.		5cwt. casks. Per ton.
Sheet Zinc, for roofing and working up	£22 0 0	to	£23 0 0
Sheet Lead, 3lb. per sq. ft. super.	15 12 6	„	16 12 6
Pig Lead, in 1cwt. pigs	14 2 6	„	15 2 6
Lead Shot, in 28lb. bags	17 10 0	„	18 10 0
Copper Sheets, sheathing and rods	60 0 0	„	61 0 0
Copper, British Cake and Ingot	50 10 0	„	51 10 0
Tin, Straits	63 11 3	„	64 11 3
Do., English Ingots	67 0 0	„	68 0 0
Spelter, Silesian	18 7 6	„	19 7 6
	Per ton.		Per ton.
Cut Clasp Nails, 3in. to 6in.	£8 15 0	„	£9 15 0
Cut Floor Brads	8 10 0	„	9 10 0

Wire Nails (Points de Paris)—

0 to 7	8	9	10	11	12	13	14	15	B.W.G.
8/6	9/0	9/6	10/3	11/0	12/0	13/0	14/9	16/9	per cwt.

TIMBER.

Teak, Burmah	per load	£14 0 0	„	£15 10 0
„ Bangkok	„ ...	10 10 0	„	15 0 0
Quebec pine, pitch	„ ...	—	„	—
„ yellow	„ ...	2 12 6	„	4 12 6
„ Oak	„ ...	5 5 0	„	6 5 0
„ Birch	„ ...	4 7 6	„	6 2 6
„ Elm	„ ...	4 5 0	„	5 10 0
„ Ash	„ ...	3 10 0	„	4 15 0
Dantsic and Memel Oak	„ ...	2 2 6	„	3 2 6
Fir	„ ...	2 0 0	„	4 0 0
Wainscot, Riga p. log	„ ...	2 2 6	„	3 7 6
Lath, Dantsic, p.f.	„ ...	4 10 0	„	5 10 0
St. Petersburg	„ ...	5 0 0	„	6 10 0
Greenheart	„ ...	8 0 0	„	8 5 0
Box	„ ...	4 0 0	„	15 0 0
Sequoia, U.S.A.	per cube foot	0 1 8	„	0 1 10
Mahogany, Cuba, per super foot 1in. thick		0 0 5	„	0 0 6½
„ Honduras	„ ...	0 0 5	„	0 0 6½
„ Mexican	„ ...	0 0 4	„	0 0 5
Cedar, Cuba	„ ...	0 0 4	„	0 0 4½
„ Honduras	„ ...	0 0 4	„	0 0 4½
Satinwood	„ ...	0 0 6	„	0 1 1
Walnut, Italian	„ ...	0 0 3½	„	0 0 7

Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 11in.:—

Quebec, Pine, 1st	£20 10 0	to	£26 10 0
„ 2nd	15 0 0	„	17 10 0
„ 3rd	7 10 0	„	11 0 0
Canada Spruce, 1st	10 10 0	„	12 0 0
„ 2nd and 3rd	8 0 0	„	9 0 0
New Brunswick	7 10 0	„	8 0 0
Riga	6 10 0	„	7 10 0
St. Petersburg	8 10 0	„	12 10 0
Swedish	9 0 0	„	15 10 0
Finland	8 0 0	„	8 10 0
White Sea	9 15 0	„	16 5 0
Battens, all sorts	5 0 0	„	20 0 0
Flooring Boards, per square of 1in.:—			
1st prepared	£0 8 6	„	£0 15 6
2nd ditto	0 7 0	„	0 12 0
Other qualities	0 5 0	„	0 6 6
Staves, per standard M:—			
Quebec pipe	—		—
U.S. ditto	35 0 0	„	42 10 0
Memel, cr. pipe	230 0 0	„	240 0 0
Memel, brack	200 0 0	„	210 0 0

OILS.

Linseed	per ton	£14 12 6	to	£15 2 6
Rapeseed, English pale	„ ...	27 5 0	„	27 15 0
Do., brown	„ ...	25 10 0	„	26 0 0
Cottonseed, refined	„ ...	14 5 0	„	15 5 0
Olive, Spanish	„ ...	28 0 0	„	29 0 0
Seal, pale	„ ...	23 10 0	„	24 0 0
Cocoanut, Cochin	„ ...	27 10 0	„	29 0 0
Do., Ceylon	„ ...	22 0 0	„	22 10 0
Palm, Lagos	„ ...	21 15 0	„	22 5 0
Oleine	„ ...	18 15 0	„	19 15 0
Lubricating U.S.	per gal.	0 6 3	„	0 7 6
Petroleum, refined	„ ...	0 0 4½	„	0 0 4¾
Tar, Stockholm	per barrel	1 2 9	„	1 5 0
Do., Archangel	„ ...	0 12 6	„	0 15 0
Turpentine, American	per ton	21 0 0	„	23 10 0

LIST OF COMPETITIONS OPEN.

Southend—St. Alban's District Church	No premium offered; no Assessor named	Rev. E. C. Kimber, Avenue-terrace, Southend-on-Sea	Nov. 20
Edinburgh—Heating and Ventilating City Fever Hospital	Premium not stated	City Superintendent of Works, Edinburgh	,, 25
Wells City—Public Hall	£25, £15, £10	Reginald L. Foster, City Clerk, 1, Cathedral-green, Wells, Somerset	,, 30
Mexico—Legislature Palace (1,500,000dol. limit)	15,000dol. Mex.	Secretary Public Works, Mexico City	,, 30
Cardiff—Town Hall and Law Courts (A. Waterhouse, R.A., Assessor—£200,000 limit)	£500 (merged), £300, £200	J. L. Wheatley, Town Clerk, Town Hall, Cardiff	Dec. 4
City Corporation—Bronze Diamond Jubilee Medal	£20, £15, £10	Sir J. B. Moachton, Town Clerk, Guildhall, E.C.	,, 6
Nottingham—Laying-out and Planting Basford New Cemetery.	£100, £50	Samuel G. Johnson, Town Clerk, Nottingham	,, 15
Dorking—Workhouse Infirmary (£4,000 limit)	(No first) £15, £5	Geo. Scales, Clerk to Guardians, 35, High-street, Dorking	,, 15
Nottingham—Designs for Basford Cemetery Buildings: Chapels, Crematorium, Lodges, &c.	£100, £50	Samuel G. Johnson, Town Clerk, Nottingham	,, 15
Menai Bridge—Landing Pier (£3,000 limit)	£40	Thos. Hughes, Clerk, Min-y-Den, Menai Bridge	,, 16
Festiniog—Temporary Eisteddfod Pavilion for 10,000 (£900 limit)	10 Guineas	Wm. Jones, Hon. Sec., Pavilion Committee, Blaenau, Festiniog	,, 17
Bootle—Fire Brigade and Police Stations (£14,000 and £1,500 limits)	50 Guineas 25 Guineas	J. H. Farmer, Town Clerk, Bootle, Lancs	,, 31
Crich—Water-Supply Scheme (3,100 population)	15 Guineas, 5 Guineas	Joseph Pym, Clerk, Belper	Jan. 8
Carlton, Victoria—Children's Hospital	£100, £50, £25	J. Nicholson, Hon. Sec., Pelham-street, Carlton, Australia	,, 30
Leicester—Motor Refuse Carts	Corporation	E. G. Mawbey, Borough Engineer, Leicester	,, 31
Port Elizabeth—Free Library (Assessors, Sir F. Blaine and R. H Hammersley-Heenan—£20,000 limit)	100 Guineas, 50 Guineas	G. Cettle, Librarian, Port Elizabeth, S.A.	Feb. 15
New York—Sun Dial (Plaster Model)	500dol., 250dol.	Sec. National Sculpture Soc., 215, West 57th-street, New York	,, 28
Newcastle-on-Tyne—New Infirmary (local Architects)	(No first) £150, £100, £50	Secretary Building Committee, Newcastle	Mar. 1
Belper—Sewage Disposal Schemes	50 Guineas, 25 Guineas	Joseph Pym, Clerk, Belper	May 1
Tottenham—School Board Offices		J. F. Adams, Clerk, School Board Offices, Tottenham, N.	—
Bexhill-on-Sea—Promenade Pier and Garden		Secretary, Pier Co., 7, Sackvill-road, Bexhill	—
Blackburn—R.C. Infant School, Dean-street	(No first) £5	The Rector, 48, Islington, Blackburn	—
Dukinfield—Town Hall (£7,000 limit)	£40, £20	Samuel Hague, Surveyor U.D.C., King-street, Dukinfield	—
Peterborough—Additions to the Guildhall (£2,500 limit)	£35 (merged), £15	The Town Clerk, Peterborough	—

LIST OF TENDERS OPEN.

BUILDINGS.

Thornton Heath—Additions to Branch Polytechnic	Croydon Town Council	E. Mawdesley, Town Clerk, Croydon	Nov. 20
Reddingmuirhead—Additions to Wesleyan Church Manse		James Strang, Architect, 102, High-street, Falkirk	,, 20
Ystradygylais—Coelbren Schools	School Board	R. Morgan, Callwyn, Neath	,, 20
Lazonby—Primitive Methodist Chapel		I. Longrigg, Castle View, Lazonby	,, 20
Ashton-under-Lyne—Alterations to Town Hall Chambers	Corporation	E. Garside, Town Hall Chambers, Ashton-under-Lyne	,, 20
Bangor, Ireland—Repairs to Parish Church		H. Seaver, Architect, 128, Royal-avenue, Belfast	,, 20
Alderley Edge—Engine House and Drying Shed	Urban District Council	Walter Cobbett, Clerk, Council Offices, Alderley Edge	,, 20
Bradford—Eighteen Houses, Barkerend-road		G. C. Gamble, Architect, Parkinson's Chambers, Bradford	,, 20
Leeds—Additions to Scott Hall Glueworks	Wm. Oldroyd and Sons	Richard Wood, Architect, 3, Park-lane, Leeds	,, 20
Harwood, N.B.—Alterations to Farm Steadings		Sir Thomas Thornton, Son, and Co., Dundee	,, 20
Wooler—Pair of Houses, Glendale-road	G. Gallon	W. R. Hindmarsh, Jun., Architect, Alnwick	,, 20
Llandrygaen—New School and Residence		James E. Hughes, Clerk, Bryncuhelyn, Llanerchymodd	,, 20
Lisnaskea—Alterations in Workhouse Buildings	Guardians	J. O'R. Hoey, Clerk, Board of Guardians, Lisnaskea Union	,, 20
Leeds—Twelve Houses and Shops		H. Boston, 9, Reservoir-street, Leeds	,, 20
Portsoy, N.B.—Clubhouse at Bowling Green		J. Wilson, Architect, 181A, Union-street, Aberdeen	,, 20
Great Harwood—Stables and Fire-Engine Station	Urban District Council	Briggs and Wolstenholme, Architects, Richmond-ter., Blackburn	,, 22
Redruth—Children's Ward, West Cornwall Women's Hospital		Alfred H. Jenkin, Solicitor, Alma-place, Redruth	,, 22
Swansea—Additions, Plasmarl School	School Board	A. W. Holden, Clerk, Dynevor-place, Swansea	,, 22
Thornton—Pair of Villas		W. Pickels, Architect, Thornton	,, 22
Ulverston—Higher Grade School	School Board	J. V. Macintosh, Cornwallis-street, Barrow-in-Furness	,, 22
Leeds—Three Pairs Semi-Detached Villas, Victoria Park Estate		John Jackson, M.S.A., Barry-street, Bradford	,, 22
Brentwood—Extension of Clerk's Offices at Asylum	Visiting Committee	W. P. Gepp, Clerk, Chelmsford	,, 22
Hackenthorpe—New Church		John D. Webster, Architect, 19, St. James's-street, Sheffield	,, 22
Morecambe—Hotel Cecil	Baxter and Abbott	Jas. Marshall, Butterworth, & Duncan, Architects, Morecambe	,, 22
Ilkley—Pair of Villas		Isitt, Adkin, and Hill, Architects, Prudential-buildings, Bradford	,, 22
Lincoln's Inn, W.C.—Enlargement of Receiving Workhouse, Bear-yard	Strand Union	A. H. Maddocks, Clerk, 15, Henrietta-street, Covent Garden	,, 23
Cupar—Chimney Shaft at Lunacy Asylum		J. Osborne, Clerk to Lunacy Board, Cupar, Fife	,, 23
Colchester—Additions to Workhouse	Board of Guardians	G. H. Page, Trinity Chambers, Colchester	,, 23
Preston—Auction Mart at Cattle Market	Corporation	H. Hamer, Town Clerk, Town Hall, Preston	,, 23
Elgin—Kiln and Manager's House, Glen-Moray Distillery		Charles C. Doig, Architect, Elgin	,, 23
Lewisham, S.E.—Coroner's Court and Mortuaries, Ladywell-rd.	Lewisham Board of Works	Surveyor's Department, Lewisham Town Hall, Catford, S.E.	,, 23
Woolwich—Coal Store, &c., Public Baths	Local Board	H. O. Thomas, Surveyor, Town Hall, Woolwich	,, 23
Cleethorpes—Three Houses, Shop, and Post-Office in Alexandra-road		M. Cook, 130, Victoria-street, Grimsby	,, 24
Frizington—Two Houses		Moffat and Bentley, Architects, Whitehaven	,, 24
Downpatrick—Additions to Lunatic Asylum	Commissioners of Control	W. H. Stephens, Donegall-square Buildings, Belfast	,, 24
Pontypool—House		D. Davies, Springfield, Pontypool	,, 24
Shoreditch—Rebuilding Wall and Constructing an Area	St. Leonard's Guardians	Robert Clay, Clerk, 213, Kingsland-road, N.E.	,, 24
Stairfoot—House and Shops		H. Crawshaw, Architect, 13, Regent-street, Barnsley, N.	,, 24
Kingsthorpe—Infectious Hospital, Welford-road	Urban District Council	John Ingman, Architect, Abington-street, Northampton	,, 24
Bransty, Whitehaven—Ten Houses		Moffat and Bentley, Architects, Whitehaven	,, 25
Ballybaise Station—Two Cottages	Great Northern Railway, Ireland	T. Morrison, Secretary, Amiens-street, Dublin	,, 25
Whitehaven—Additions to House, Coach-road		Moffat and Bentley, Architects, Whitehaven	,, 25
Ton—Infants' School	Ystradyfodwg School Board	W. G. Howell, Clerk, School Board Offices, Pentre	,, 25
Hull—Mosaic Pavement (630sq.yd.) at East Hull Baths	Corporation	A. E. White, City Engineer, Town Hall, Hull	,, 26
Hemsworth—Victoria Hotel		Walter E. Richardson, Architect, 28, Bond-street, Leeds	,, 26
Fort William—Cottage, Cameron-road	John MacPhee	Thos. R. Soutar, Architect, High-street, Fort William	,, 26
Hopetown—Pewing Primitive Methodist Chapel		Joseph Land, Alpine Villas, Hopetown, Normanton	,, 27
Colchester—Nurses' Home at Hospital	Essex Hospital Committee	C. E. Bland, Secretary, Crouch-street, Colchester	,, 27
Whickham—Eight Cottages		E. Rutherford, Whickham, Co. Durham	,, 27
Bristol—Pupil Teachers' Centre, Broad Weir	School Board	La Trobe and Weston, Architects, 20, Clare-street, Bristol	,, 29
Goole—Repairs to Schools (12 months)	School Board	Hy. Lindley, Clerk, Goole	,, 30
Forfar—Post Office	Commissioners of H.M. Works	The Secretary, H.M. Office of Works, 12, Whitehall-place, S.W.	,, 30
Enfield—Additions to Chesterfield-road School	School Board	N. Hepworth, Clerk, Council House, Enfield	Dec. 2
Aberystwith—Chancel and Vestry, Trinity Church		Rev. Prebendary Williams, Aberystwith	,, 4
Reddish—Goods Warehouse and Extension of Platforms at Station	Sheffield and Midland Railway Cos.	Oliver S. Holt, Secretary, London-road Station, Manchester	,, 6
Rowley Regis—Addition to School	School Board	J. T. Meredith, Architect, Kidderminster	,, 6
Llandudno—Municipal Buildings	Urban District Council	Alfred Conolly, Clerk, Council Offices, Llandudno	,, 6
Rodborough—Board School	School Board	W. H. C. Fisher, Architect, 6, Rowcroft, Stroud	,, 6
Winchmore Hill, N.—Nurses' Home and Isolation Pavilion at Northern Hospital	Metropolitan Asylums Board	T. Duncombe Mann, Clerk, Norfolk-street, Strand, W.C.	,, 8
Halifax—Police Station and Court-House	Corporation	George Buckley and Son, Architects, Tower-chambers, Halifax	,, 9
Newquay—Villa	W. R. Northway, Tavistock	William Square, M.S.A., Tavistock	,, 9
Kilkenny—Erecting 40 Houses and Repairing 24 Houses	Corporation	William K. Cleere, Executive Sanitary Officer, Kilkenny	,, 9
Buenos Ayres—Central Railway Station (cost, 4,000,000 piastres)		Legation of Argentine Republic, London	,, 26
Copenhagen—Repairing Cemented Walls of Thorvaldsen's Museum	Corporation	F. Meldahl, Copenhagen	Jan. 1
Leeds—Caretaker's House, Whingate-road School	Leeds School Board	W. Packer, Clerk, School Board Offices, Leeds	—
Armley—Two Houses in Whingate		Ambler and Bowman, Architects, 9, Market-place, Leeds	—
Whitehead, Belfast—Villa Residence	D. J. Lanigan	Thomas Pentland, Architect, 35, High-street, Belfast	—
London—Additions to House at 5, Whitehall Gardens		R. Curwen, A.R.I.B.A., 149, Bishopsgate-street Without, E.C.	—
Aylesbury—Three Shops and Houses, Cambridge-street	H. J. Goodey	W. F. Taylor, Architect, Aylesbury	—
London, E.C.—Three Blocks of Artisans' Dwellings in Moira-place and Plumbers'-place, City-road	Shoreditch Vestry	H. Mansfield Robinson, Clerk, Town Hall, Old-street, E.C.	—
Hillsborough—Two Houses		T. Peckett, 19, Wood-road, Hillsborough, Sheffield	—
Ashton-under-Lyne—Cottages	A. B. Wilkinson	Eaton, Sons, and Cantrell, Architects, Stamford-st., Ashton-u-Lyne	—
Haydon Bridge—Cottage Villas		George Tyzack, Tyne View, Haydon Bridge	—

BUILDINGS—*continued.*

Carlisle—Offices at Caldewgate	Carr and Co.	Johnstone Bros., Architects, 39, Lower-street, Carlisle	—
Bridlington Quay—Villa		John M. Dossor, A.R.I.B.A., Architect, 2, Manor-street, Hull	—
Aston-cum-Aughton—Additions, Swallow-Nest Schools	School Board	W. Dust, 40, Bank-street, Sheffield	—
Harrogate—Cabman's Shelter		H. E. and A. Bown, Architects, Harrogate	—
Stowe—Small Farmhouse, Lea Heath	Stowe Charity	W. H. Walley, Architect, Queen-street, Burslem	—
Sowerby Bridge—House in Clifton-street		S. Wilkinson, Architect, Sowerby Bridge	—
Rushwood—Lodge	T. Willans Nussey, M.P.	H. E. and A. Bown, Architects, Harrogate	—
Barnsley—Eleven Houses		Wm. McCoy, Wellington-street, Barnsley	—
Margate—Additions to Hope and Anchor p.h., High-street	W. W. Wonder	A. Latham, Architect, 15, Cecil-square, Margate	—
Rochford—Cottage		Rainbow Cottage, Ashingdon, Rochford	—
Belfast—Rebuilding Licensed Premises and Two Houses, Peter's Hill	Francis M'Kenna	John J. O'Shea, Architect, 16, Chichester-street, Belfast	—
Manchester—Premises	Grange Park Dairy Co.	E. W. Leeson, 49, Princess-street, Manchester	—
Ashton-under-Lyne—Seven Houses, Stockport-road		Edward Garside, Architect, Town Hall Chambers, Ashton-u-Lyne	—
Knottingley—Stables, Lamb Inn	Carter's Brewery Company	Tennant and Bagley, Architects, Pontefract	—
Aberdeen—Offices on Annfield, Hazelhead		D. Rose and Co., Union-street, Aberdeen	—
Donaghadee—House on Shop, High-street	Mrs. Davidson	T. Portland, Architect, 35, High-street, Belfast	—
Truro—Passmore Edwards' Buildings Central Technical Schools for Cornwall		Alfred Blenkinsop, Secretary, Truro	—
Tallow, Co. Waterford—Alterations to Rectory, West-street	Select Vestry	Rev. J. R. H. Becher, M.A., Tallow	—
Shrewsbury—Additions to Premises, Castle Foregate	Industrial Co-operative Soc., Ltd	Architect, Co-op. Wholesale Soc., Ltd., 1, Balloon-st., Manchester	—
Belfast—Four Houses, Two Shops, & Two Stables, Connswater		H. H. M'Kenna, 51, Ann-street, Belfast	—
Arnside—Two Semi-detached Villas	Elijah Nelson	John Stalker, M.S.A., Architect, Kendal	—
Lingwood—Reading Room	Reading Room Committee	John Broom, Lingwood	—
Sligo—Completing Dominican Church		The Priory, Walkin's-row, Sligo	—
Mossley—Two Cottages, Stockport-road	Oldham Brewery Co.	C. T. Taylor, A.R.I.B.A., Clegg-street, Oldham	—
Mautby—Additions to Rectory		Rector, Mautby, near Great Yarmouth	—
Cork—Alterations to Premises, Knapp's-square	N. Ross	Arthur Hill, A.R.I.B.A., Cork	—
Cork—Two Villas, Douglas-road		D. J. Buckley, Architect, 21, Adelaide-street, Cork	—
Selly Oak—Porter's Lodge at Workhouse, Selly Oak	Guardians of King's Norton Union	Edwin Docker, Clerk, Workhouse, Selly Oak	—
Caldicote, Cambs—Two Cottages		J. Brake, 18, Northumberland-grove, Tottenham	—
Rochdale—Minister's House at Castlemere	Wesley Circuit Trust	T. Townend, jun., District Bank Chambers, Rochdale	—
Leeds—Two Houses at Street-lane		J. Wray, Spencer-lane, Leeds	—
Grange-over Sands—Pair of Semi-detached Houses		John Stalker, M.S.A., Architect, 57, Highgate, Kendal	—
Walton-on-Naze—Two Shops and Dwelling-Houses	W. B. Greenwood	Chas. E. Butcher, Architect, 3, Queen-street, Colchester	—
West Hanningfield—Two Cottages		J. Brake, 18, Northumberland-grove, Tottenham	—
Harrogate—Extension of *Herald* Printing Works		Whitehead and Smetham, Architects, Albert-street, Harrogate	—
Patricroft—New Hospital at Workhouse	Barton-upon-Irwell Guardians	Worthington and Son, Architects, 46, Brown-street, Manchester	—
Killinure—Rebuilding Killinure House and Building Stables and Offices		P. P. Metge, C.E., 9, Harcourt-terrace, Dublin	—
Rumney, Glam—Villa		S. Rooney, 9, Quay-street, Cardiff	—
Ashton-under-Lyne—Offices and Stores	Co-operative Society	J. D. Lindley, Architect, Ashton-under-Lyne	—
Batley—Two Blocks of Houses		Geo. Hollies, Crossbank, Batley	—
Woodham Ferriss—Four Cottages		J. Brake, 18, Northumberland-grove, Tottenham	—
Stapleford—Branch Stores	Co-operative Society	Ernest R. Ridgway, M.S.I., Architect, Long Eaton	—
Lincolnshire—Stanhope Memorial, Horncastle		S. Goe Overton, Secretary, 2, Manor House-street, Horncastle	—
Saltaire—Semi-Detached Villas		Peterson and Lawson, Architects, 1, Bank-street, Bradford	—
Bodmin—Isolation Hospital at County Asylum	Visiting Committee	Robt. P. Edyvean, Clerk, Bodmin	—
Scarborough—Fourteen Large Houses on South Cliff		A. Moore, 23, West-bank, Scarborough	—
Redruth—Alterations to Lanner Board Schools		S. Hills, Architect, Redruth	—
Bingham—Board Room and Offices	Board of Guardians	A. R. Calvert, Architect, Nottingham	—
Bury—Two Houses and Shops, Elton-road		J. Sellars and Son, Architects, Union Chambers, Bury, Lancs	—
Belfast—Six Houses, Mersey-street, and Six in Lawnbrook-avenue		Wm. Campbell, Architect, 4, Hurst-street, Belfast	—
Keighley—Houses, Skipton-road	Robert Feather	Peterson and Lawson, Architects, 1, Bank-street, Bradford	—
Yatton—Additions to Claverham House		A. C. Rowley, Architect, 20, Nicholas-street, Bristol	—
Mallaig—Business Premises		Dun. Cameron, Architect, Inverness	—
Fleetwood—Shop and Dwelling-House		D. Rankin, Church-street, Fleetwood	—
Dudley—Additions to Conservative Clubhouse		A. Gammage, Architect, High-street, Dudley	—
Colmonell, Ayrshire—Free Church		Alex. Petrie, Architect, 134, Wellington-street, Colchester	—
Consett—Fifteen Houses		J. Bloom, 9, High West-street, Sunderland	—
Colchester—Reinstating Two Houses after Fire		C. E. Butcher, Architect, 3, Queen-street, Colchester	—

ENGINEERING.

Nelson—Bridge across the Walverden Water	Parks Committee	B. Ball, Borough Surveyor, Nelson	Nov. 20
Hull—Lancashire Boiler	Brewery Company	Secretary, Silvester-street, Hull	,, 20
Glasgow—Shafting, Machinery, &c., at Granary	Corporation	John Lindsay, Interim Clerk, City Chambers, Glasgow	,, 22
Blackpool—Electric Traction	Corporation	R. C. Quin, Borough Electrical Engineer, Blackpool	,, 22
Stockport—Boiler, &c., at the Public Baths	Baths Committee	Walter Hyde, Town Clerk, Stockport	,, 22
Hornsea—Waterworks	Urban District Council	Thomas Hornsey, Clerk, Hornsea	,, 22
Bexley—Laundry Machinery, Lunatic Asylum	London County Council	R. W. Partridge, Clerk, 21, Whitehall-place, S.W.	,, 22
Dreghorn—Water Supply Works	Ayrshire County Council	Walter Williamson, Beith	,, 22
Totnes—Water Main	Town Council	W. F. Tollit, Borough Surveyor, Gate House, Totnes	,, 22
New Brighton—Four Pontoons	Wallasey Urban District Council	H. W. Cook, Clerk, Public Offices, Egremont, Cheshire	,, 23
Flamborough—Repairing Bridge crossing Danes Dyke	Bridlington Rural District Council	Samuel Dyer, Architect, Quay-road, Bridlington Quay	,, 26
Downpatrick—Filters at Reservoirs	Guardians	P. C. Cowan, County Surveyor, Downpatrick	,, 27
Blackburn—Electric Tramcars, Trolley Poles, &c.	Corporation Tramways Company	J. W. Baker, Secretary, Railway-road, Blackburn	,, 27
Long Framlington—Extension of Water Supply	Rothbury Rural District Council	J. Wake, Surveyor, Rothbury	,, 29
North Shields—Elevator to Load Coke	Tynemouth Gas Company	W. Hurder, Jun., Engineer, Gasworks, North Shields	,, 29
Nuneaton—Covered Service Reservoir (500,000gal.)	Urban District Council	J. S. Pickering, A.M.I.C.E., Waterworks Engineer, Nuneaton	,, 29
Belen Para, Brazil—Water-supply Works	Government	Brazilian Consulate, London	,, 30
Llandudno—Water Main (3 miles of 15in.)	Urban District Council	A. Conolly, Clerk, County Offices, Llandudno	,, 30
Llanelly—Dock (9 acres in area)	Llanelly Harbour Commissioners	Henry W. Spowart, Clerk, Town Hall, Llanelly	Dec. 1
London—Locomotive Boilers	East Indian Railway Co.	A. P. Dunstan, Secretary, Nicholas-lane, London, E.C.	,, 1
Cardiff—Service Reservoir (3,000,000 gallons), Water Tower, &c., on Penylan Hill	Corporation	J. L. Wheatley, Town Clerk, Cardiff	,, 2
Sheffield—300 Retort Mouthpieces	United Gaslight Company	Hanbury Thomas, Secretary, Commercial-street, Sheffield	,, 4
Sheffield—Fittings for 150 Through Retorts	United Gaslight Company	Hanbury Thomas, Secretary, Commercial-street, Sheffield	,, 4
Southampton—Pontoon, &c.	Harbour Board	E. Cooper Poole, A.M.I.C.E., Surveyor, 4, Portland-st., Southampton	,, 6
Collooney—Watercourse and Turbine Pit at Creamery		W. F. Gilcriest, Architect, Sligo	,, 6
Craiova—Waterworks	Town Council	The Mayor, Craiova, Roumania	,, 7
Ostend—Harbour Works (estimated cost, £496,792)	Official	Provincial Government, Bruges	,, 14
Carrickfergus—Rebuilding Retort Bench	Gas Company	David Gillespie, Secretary, Carrickfergus	,, 27
St. Gilles-lez-Bruxelles—Gasworks	Council	The Secretary, 504, Chaussée de Mons, Anderlecht, Brussels	,, 31
Brazil—Railway from Novo Hamburgo to Caxies	Government	Central Directorate, Public Works, Porte Alegre	,, 31
Pernambuco—Port Works	Government	Brazilian Ministry of Public Works, Rio de Janeiro	Feb. 28
Madras—Utilisation of Water of Periyar Lake		Chief Engineer for Irrigation, Madras	July 1
Flushing—Two Sluice Gates	Official	Provincial Government, Middelburg, Holland	—
Bexley—Laundry Machinery and Cooking Apparatus	Asylums Committee, London C.C.	R. W. Partridge, Clerk, 21, Whitehall-place, S.W.	—
Manchester—Hydraulic Elevators		Maxwell and Tuke, 41, Corporation-street, Manchester	—
Manchester—Water-Meters	Waterworks Committee	Secretary, Waterworks Offices, Town Hall, Manchester	—
Tralee—Three-ton Steam Crane		Harbour Commissioners, Tralee	—

FENCING AND WALLS.

Grimesthorpe—Concrete Retaining Wall	Sheffield United Gas Light Co.	Hanbury Thomas, Secretary, Commercial-street, Sheffield	Dec. 4
Keswick—122 yards of Stone Wall, 4ft. 6in. high		Owner, Red House, Keswick	—
Dewsbury—Walling (180 yards run)		F. W. Ridgway, F.R.I.B.A., Dewsbury	—
Hunslet—Wall in Pepper-road		W. Broughton, Builder, Jesmond-terrace, Pudsey	—

FURNITURE AND FITTINGS.

Watford—School Furniture	School Board	Sedgwick, Turner, and Oddie, Solicitors, Watford-place, Watford.	Nov. 22
Liverpool—Extension of Nurses' Home at Workhouse	Select Vestry	H. J. Haggar, Vestry Clerk, Parish Offices, Brownlow Hill, Liverpool	—

PAINTING.

Burnley—Health Depot	Corporation	G. H. Pickles, Borough Surveyor, Town Hall, Burnley	Nov. 22
Harrogate—Royal Bath Hospital & Rawson Convalescent Home		B. Shaw, Secretary, Harrogate	,, 24
Burnley—Cemetery Chapels and Lodges	Corporation	Borough Surveyor, Burnley	,, 24
Sutton-in-Ashfield—28 Steel Girder Bridges, and 17 Miles W.I. Fencing	Great Northern Railway Company	W. H. Hutchinson, Sutton-in-Ashfield	—
Sleights Bridge—Two Villas		D. Richardson, Newholm, Whitby	—
Nottingham—Eight Board Schools	School Board	W. J. Abel, Clerk, Victoria-street, Nottingham	—

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FRIDAY, NOVEMBER 26, 1897.

LEVELLING DOWN PROCESSES.

PEOPLE who travel northwards (say to any of our great Yorkshire or Lancashire cities) will find buildings having all the resemblance in features and details to those of London or localities farther south. In Leeds, Bradford, Halifax, or in Manchester, Liverpool, or Bolton, one sees buildings of stone and brick, and for various purposes that might equally well have been erected in London, or Brighton, or Portsmouth. We are not now speaking of large public or palatial buildings chiefly, but of the smaller commercial and domestic buildings. We may wonder at this likeness when we consider how many hundreds of miles separate us, and what the different materials and modes of habit of the districts are. The same astonishment would be excited in the minds of the citizens of those Northern towns who happened to visit London and see buildings of stone of the same massive and lavish character. What is there to distinguish, for instance, between such buildings as those of The Exchange or Assize Courts, Manchester; or those in Deansgate or in St. George's-square and Castle-street, Liverpool, and those in London—we mean as to their general characteristics and features? Nothing is seen to indicate any differentia as to material, their method of treatment, or the uses of the building such as we might have expected, and which a few centuries ago obtained. And what rapid progress has been made in Liverpool! The president's address (Mr. W. E. Willink's) delivered the other day before the Liverpool Architectural Society, pointed to the wonderful development made in architecture alone in that city since St. George's Hall was projected. Since 1836, when the population was not a quarter of a million, the buildings erected were comparatively meagre; great developments have been made, and the number of architects has been trebled. During the last fifty years the architecture of all our great cities has become more assimilated, their local peculiarities having gradually disappeared, or have softened down; but it has been so with every other branch of enterprise, and even people themselves in that time have shaken off their insular prejudices and irregularities of habit and disposition. Railway intercommunication and facilities of travel have been the chief agencies in bringing about this general leavening of the masses. The local habits of thought and speech have been rubbed off, and it has been so with architecture. The old towns of the North displayed 50 years ago a certain local character of their own, which has gradually disappeared, and we have now in its stead, stately and pretentious buildings—not always in good taste, but which embody the prevailing methods and characteristics of modern architecture of the official order. Classic, Renaissance, and Gothic are the styles one generally sees, and these have entirely supplanted the local style and character of the older buildings. Such edifices as St. George's Hall, Liverpool; the Walker Art Gallery, the Town Hall, Leeds, and the Mappin Art Gallery, Sheffield (the last three recent structures), appear to show a strong Classic feeling in the North. In one sense they are in keeping with localities in which stone is the chief material; but we can scarcely say they are suitable in style for cities in which the climate is by no means favourable. But Gothic has been encouraged also; the Manchester Town Hall, the Corn Exchange, Sheffield, of brick and stone, and other buildings compare favourably with the Gothic work elsewhere, and in the latter town we see several school board buildings of brick in this style. To take Sheffield as one instance of a modern town where progress has been made in building, much is attributable to the influence of a few architects like Messrs. Flockton and Gibbs, Messrs. Hadfield, and others. Brick is largely used with good effect, as in the Corn Exchange, and in many business premises. Mr. Mountford's municipal buildings are the most important contribution of a Renaissance or Late Gothic character. We have instanced these buildings to show how entirely one commercial town can become representative of all that is modern in architecture, to the extinction of older local modes. Uniformity of building has been adopted in our great cities, and this has been promoted in several ways. First by mechanical means. Under this head we may include improvement in machinery and labour-saving apparatus for lifting heavy materials, and other developments in building. It has become possible now by easy transport and mechanical labour-saving and lifting apparatus to use the same granite or stone in London as in Glasgow or Yorkshire, and with little extra expense to export bricks from the South or clay districts to localities surrounded by the largest quarries. Has not machine-worked labour done away with much of the distinctiveness and local treatment of hand-worked stone masonry, and brickwork, and had a tendency to reduce all work to one level? In the old days masons worked their material by tools and methods peculiar to the district; they had a personal interest in their work; they were often quarrymen or quarry owners who had the most direct interest in seeing that the proper stone was employed and properly tooled and laid. But all this is now changed. The stonework is done by a contractor who may not live or work in the locality, all turned out by machinery and transported to the building, and often the specified stone—say Portland—is mixed with stones of inferior quality. The labour on the masonry is reduced to a dead-level by machine tools. It is often of poor quality, as in that which comes from the planing and moulding machines, the surface being often soft and pulverised when new and wet stone is used. The result of this machine-worked material is to overwork the stone with mouldings and enrichments. Under the old *régime* the surface was treated intelligently by the mason's chisel; by men who knew the stone and who cut and worked it to suit its position in the building. Whereas in the London builder's yard all kinds of stone—Bath, Caen, York, Portland, marbles, and granites are worked by the same mason in turns. So it comes about that we lose all character in stonework. Again, terracotta-work competes much with mason's work, and has led to the use of all labour-saving appliances, as well as to imitation of stone.

The mechanical agencies used to lift heavy blocks of stone have also operated to bring about a certain character of uniformity in buildings, irrespective of locality. What was once impossible, except by a large expenditure of labour in working a lever or a handle, is now performed with ease by cranes erected on staging that can be employed to lift tremendous blocks of stone or heavy iron girders, and swing them to their desired position. By the aid of cranes, overhead staging, and travellers, tons of masonry can be handled with comparative ease, so that huge monoliths can be erected as easily in London or the South of England, as they can be in the North. We have only to consider how much more work can be done by mechanical means than by manual labour. A man turning a winch handle can produce work estimated at about 25lb. exerted through a given space; say it is 220ft. per minute, then the useful effort may be estimated at 5,500 foot-pounds of work per minute while he can turn the handle. These mechanical agencies have, therefore, by cheapening the labour of building, induced a general uniformity in the methods of construction, and have so far eliminated those local peculiarities and traditions of design which have been valued by the artist.

But there are other ways by which we have been verging towards a dull uniformity, and all the beauty and temper and sincerity of the old buildings have left us The habits of people have changed our buildings. Once upon a time there was a sincerity in building; heart and human handiwork were knit together in the planning of every room—in the design of masonry, brickwork, and woodwork. One reason for this change is the imported materials brought about by our increased facilities of transport. The architecture of the past was attuned to the site; the old church and manor-house seemed naturally to grow out of their surroundings; the "key-note" of the building and its design was set by the local formation, its stone or its clay. But when the old order gave place to the new of railways and electricity, the dweller in a stone district thought he would like to build his house in brick which he had seen somewhere in the eastern or southern counties; the expense of transport of brick was comparatively small, and so he indulged himself in the brick or half-timbered construction which had taken his fancy. This taste, to have something new or different to the old, spread till we find in many Yorkshire and West-country towns, as in Bath, where stone is plentiful and cheap, brick buildings of the latest phase. In a few more years this levelling of buildings, of new mixed with old methods and styles, will go on increasing till it will become difficult to discover any of those pleasing local varieties of styles which once rewarded the eye of the tourist. And with materials other conditions have changed also. We see the ordinary cockney house or suburban villa plan adopted in districts and on sites where a totally different arrangement is called for. The plan is stereotyped without reference to approach, to aspect, or scenery. The great modern hotel of several stories, like the Railway Hotel in Lime-street, Liverpool, may be a replica more or less of a London hotel, and, of course, other hotels and buildings soon spring up emulating the latest style and the same employment of materials. Extremes meet also. The most ornamental French Renaissance may be seen in the great Lancashire seaport as in the Exchange Flags—a building almost Louvré-like in style, and in business premises in Castle-street; on the other hand, Attic regularity and reserve may be seen in Elmes' great Hall and in Picton's Art Gallery. So the effect of intercommunication and mechanical agencies is to distribute in our great centres all materials and methods, to level down local characteristics. Against this levelling process, the architect is to a large degree helpless to do much. He can, however, assist in preserving distinctions which depend on material and other developments of style as the natural expression of character.

STRESSES IN MASONRY ARCHES.

A GREAT deal has been written on the mathematical theory of arches of masonry, and much speculative inquiry has been evoked ever since Newton's time. Among the great writers on the subject may be mentioned Coulomb, Navier, Lamé, Hutton, Moseley, Rankine, and several others. Two theories have been enunciated—the statical theory, according to which the com-

ponent stones or voussoirs are held together by the force of gravity, held in equilibrium by the resistance of the materials, which are supposed to be rigid and incompressible; and the elastic theory, according to which the materials are regarded as more or less compressive or elastic, as in the case of metallic structures of the arched form. Many instructive treatises and papers have been written on the elastic resistance. The statical theory still holds good in massive arches of moderate span, where the statical load is in excess of the moving load, but in bridge arches the elastic theory is more applicable. Here the curved line or catenary principle is brought into notice, this curve accommodating itself to every position of the load. Our readers are no doubt acquainted with this theory in principle, the peculiarity of which is that the highest point of the curve is directly under the load, and as the load advances, as on a bridge arch, the stones rearrange themselves to a new curve. Readers of Hutton's and Ware's treatises will remember diagrams showing the rearrangement of the curve under different loads. Under a symmetrically disposed load the curve of equilibrium is regular and easily found; but in arches or bridges exposed to loads which vary in position and amount, the problem is more complicated. A writer in the *Engineering Magazine*, Mr. Henry Harrison Suplee, has given a brief *résumé* of the subject on the "Strength and Failure of Masonry Arches," and he considers the question in its practical bearings. In the first part of his paper he deals with the elementary principle of the catenary curve or chain. When this natural or self-sustaining chain is inverted, the curve is that assumed in a "similar arch under the same loads, all the directions being reversed, and all the tensions converted into thrusts." This is well known to every student of mechanics, and the way the curve theory can be applied to arches with voussoirs made with curved faces so that they easily move on one another under varying loads, is illustrated by diagrams given by Professor Fleeming Jenkin in his article on "Bridges" in the *Encyc. Britannica*. Taking a model arch with curved faced voussoirs, he loads it in different ways. When the load is in the centre the crown of arch is depressed; when two weights are placed one on each side over the haunches they become depressed, and in like manner a load on one haunch causes a distortion. In each case a line drawn through the points of contact of the curved faces of the voussoirs gives us the curve of equilibrium of the weighted arch, and these curves assume different forms in each, the curve "humping" itself up to meet the load. In a real arch with the bed-joints plane, the same pressures exist, and the stones suffer compression along the curve line, though they cannot rotate as in the former case. In practice, in fact, a slight distortion of the arch takes place, "and restores its equilibrium when the stone has a high modulus of elasticity." On the static theory, when the line of pressure approaches the outer curve of arch, "rotation" is supposed to take place at the joint of the arch opening below; but the resistance of the stones was that of crushing strength, elasticity not being taken into account. Considering the question how far the elastic theory is applicable to arches of masonry, Mr. Suplee gives a few of the results determined by the Austrian Society of Engineers and Architects, relating to full-sized arches of various materials under certain stresses. The report of the experts appointed is to be found in the journal of that society, and is of much value to all interested in bridge building. We may briefly refer to these tests. Four arches of 73·4ft. span (23 mètres) and 15·1ft. rise and 6·56ft. width, three of which were of rubble, brick, and concrete, and the other was of concrete in which a network of round iron rods was imbedded to resist tensile stresses, known as the Monier construction. These experimental arches were constructed on the Western Railway, near Vienna, and are shown by photographs in the paper we refer to. In these arches the equilibrium curve or line of pressure for uniform loading is found practically in the middle of the arch ring. One half of the arch was loaded gradually, the deflections along the curve being carefully taken, and any cracks that might appear were particularly noted. The loads were applied at equidistant points on steps—a form of loading which is precisely that in actual bridge arches. The methods employed to measure the deformations are given in the report, but we simply give the results as recorded by Mr. Suplee. Taking the rubble-stone arch, the depth at key was 23·6in., and at the springings 43·3in., the load being placed at six equal distances from crown to the springing. The author says: "As the loads were applied the deflections increased almost in direct proportion to the force applied, showing that the laws of elasticity held good for masonry as well as for metallic structures, while after the elastic limit was surpassed and cracks began to form, both the location of the cracks and the point of maximum deformation showed that the position of the equilibrium curve practically coincided with that demanded by the elastic theory." The cracks appeared when the one-sided load reached about 500lb. per square foot, and in most cases they occurred at places furthest from the distorted line of pressure, or the part under greatest tension, or the intrados on the loaded side and at the extrados on the unloaded side. At these points the arch failed when a load of 660lb. per square foot was applied. Similar results were found in the other arches, the differences being only those due to material. The conclusions derived from these tests establish the fact that, within certain limits, the law of elasticity is the same for all arches, whether of masonry, concrete, or metal. These experiments have shown the possibility of building up from the extrados of the solid arch vertical piers at intervals, as in the case of a metallic construction, each pier being located as in the distributed loads of the test arches. The effect is an artistic structure with pierced spandrels, and a series of small arches under the roadway.

On the principles described, a great stone arch has been constructed over the Pruth at Jaremcze, with a span of 213ft., and a rise of 58·6ft.—a span only exceeded by the Cabin John Arch near Washington. The Jaremcze arch was designed by Inspector Huss, the load being distributed in the manner followed in the test arches, and no doubt other great railway arches will be erected on similar lines.

BATHS AND WASHHOUSE COMPETITION, BETHNAL GREEN.

THE Vestry of St. Matthew, Bethnal Green, have selected two designs for the intended baths and washhouses. The assessor whose decision has been adopted was the late Mr. Shoppee, whose sudden death we record, and this was one of the last cases in which he was engaged. The memorandum prepared by the surveyor, Mr. F. W. Barratt, has set forth all the particulars and estimates as to the seven sets of designs exhibited at the Vestry Hall. The plan of site is a rectangle, bounded by three streets, 131ft. 9in. long by about 64ft. deep, north to south. The author of the design "Savon" (Mr. R. S. Ayling, A.R.I.B.A.) has been awarded the first premium, and the author of design "Red Cross" (Mr. E. Harnor, A.R.I.B.A.) the second. There can be little question as to the wisdom of the choice in this instance. "Savon" has a compact arrangement of baths and entrances, and these are well lighted and ventilated—very important points. The ground-floor plan shows ten first-class baths for men and 20 second-class baths with a waiting-hall in a central position; also five women's first-class baths and 11 second-class and waiting-hall, each class being well separated, with a central pay-office between the two entrances. These entrances occupy the centre of the Cheshire-street front, are well lighted by an area in the centre of site taken out of the men's first-class baths. The washhouse, 48ft. by 40ft., occupies the corner of site between Cheshire and Abbey-streets, and is arranged for 40 persons, and has four hydro-extractors and closets. The author has taken advantage of the levels, the highest corner in Abbey-street being utilised for an entrance to washhouse, which can be used for storing perambulators, and is 8ft. 6in. wide. It is well lighted by skylights. The washhouse is not only lighted at sides, but has central skylights. The waiting-rooms, 14ft. by 12ft. each, are also well lighted, and no borrowed lights are shown. Other good points in this plan are the separate entrances to board-room and superintendent's office—these are on the ground floor, shut off from the baths, and the superintendent's private rooms are above, on the first floor at the corner of main front and Ramsey-street, well lighted and compact; careful study of the establishment laundry in the basement, linen-lift, dynamo and engine-house, workshops and stores, a subway for under gearing of hydros—all these offices being well lighted, and with well-ventilated water-closets opening into area. Instead of being in one heavy tank, the water is distributed in four separate tanks. The external treatment is in a plain, sensible style, of deep-toned bricks, with a basement of stone or terracotta—the latter material would be the most desirable for wear and cleanliness. The entrances are effectively emphasised by dressings of this material. The total estimated cost is, in terracotta and glazed bricks, £11,910; if in Portland stone, £600 extra. An alternative scheme shows the women's baths placed on first floor.

"Red Cross" has a carefully-prepared plan, but is less economical, and its lighting arrangements not so good. The plans show the whole area covered. The baths for men and women occupy the north-western area of the site, while the laundry for 40 is placed at the Ramsey-street end, and with an entrance in front next the women's-baths entrance—a not very good arrangement. There are two pay-offices in front: one between men's first and second classes, and one for the other sex. The waiting-rooms are small, and are apparently not directly lighted. No space for perambulators is shown; the closets also are in dark, ill-ventilated corners, which would not pass the requirements of the L.C.C. In the basement the closets are also generally inside, and the windows of mess-rooms are placed too much in the corner. The board-room and superintendent's house occupies two floors above the ground level, and is arranged as a centre over the entrances. The elevations are plain, in good keeping, all in red brick, and the cost is put at £15,946. We notice that the area lighting the laundry in Ramsey-street is rather narrow; also the large tank to hold 10,000 gallons on roof at this end is carried on iron columns and stanchions over drying closets, a scarcely secure mode of construction. In other respects the design carries out the requirements. An alternative design B is sent in. We cannot speak of the other designs, which are scarcely in the running with these two. "Simplicity with Utility" is one of the best; but the closets are not well ventilated, and arrangement of laundry out of the way. "Sweetness and Light" scarcely realises its motto, as there is very little lighting on the principal floors, and the superintendent rooms are distributed on three floors. The entrance is from low-level, the corridor to washhouse is dark, and the entrances to baths cramped. "Expectus" also shows defective arrangement and lighting. The entrance from Abbey-street to washhouse at the other end is long and ill-lighted, and the area at this end is dark and very narrow.

SURBITON MUNICIPAL OFFICES COMPETITION.

IN the Gables Theatre at Surbiton the whole 26 sets of designs for the proposed Municipal Buildings for this urban district have been on view. The three recommended by Mr. Mountford, the assessor, appear to possess many merits, and, on the whole, fulfil the conditions of the competition. We are not concerned here with the local reasons of the council for waiving the assessor's choice, which has dissatisfied some of the competitors; but there are certain reasons for preferring the plan, at least, of the

design No. 25, which has been accepted by the council. Design No. 11, by Messrs. Wimperis and East, recommended by the assessor, is externally simple and bold in character. A single-span green slate roof, broken by dormers and chimneys, covers the main building, which is of red brick and freestone dressings; but the south end is emphasised by a circular gable or pediment, which gives character to the elevation, and expresses the council chamber externally. The entrance part of façade facing the Ewell-road is slightly set back, and Ionic columns carry the entablature of the roof; the windows are plain sashes, with some little carving below the centre light of council chamber. This detail is shown on a large scale drawing. The plan is less satisfactory. A wide central corridor, not well lighted at ends, through the centre of main block gives access to the two main departments. The clerks' public and private offices, and the registrar's and collectors' offices are at the south end—and these form a projecting wing below the council chamber, and are convenient to entrance. At the other end of corridor the surveyor has similar offices, with a lobby between them, and the medical and sanitary offices are next to the entrance in front. The council chamber on first floor is 42ft. by 30ft. 3in., and is approached by a staircase opposite entrance, with two committee and waiting-rooms adjoining. The entrance and corridor appear the weakest part of the plan; the hall staircase is narrow. The caretaker is located in the roof, and has a separate entrance in Berryland-road. The total cost is estimated at £5,004, cubed at 9½d. per foot.

The "selected" design, by Messrs. Forsyth and Maule, Great Marlborough-street, is compact in plan and symmetrically disposed. The central block is about square, and is carried to a greater height than the side wings, and has a high hipped roof with flèche. A centre entrance from Ewell-road gives access to the collector's department on the left and the public clerks' office on the right; each is 21ft. by 15ft., and has a safe. The transverse corridor right and left, with main staircase in front of the entrance, leads on one side to the council clerk's private office, to the sanitary and medical department, 16ft. by 15ft., and the registrar's office. On the corresponding wing to the left are the surveyor's offices, well lighted by north light, easily approached, with waiting-room between. Between them and the main staircase is the caretaker's entrance and stairs, and in the rear is an isolated lavatory and closet block. The council chamber, lighted in front and sides, is 40ft. by 29ft. 3in., and placed over entrance and offices, and has a semicircular arrangement of seats with space all round. It has a ventilator by a trunk in roof connected to the extractor and flèche, and has two end fireplaces. The committee-rooms are conveniently placed in the projecting wings over the waiting and the sanitary and medical department. The principal stairs make a handsome access to a landing with lobbies to the chamber, and the waiting-room for deputations is well located. The conveniences are also cut off at the back behind main stairs. The second floor in roof is reserved for the caretaker's apartments. The design is rather commonplace and of a domestic type, with high roof and low-roofed wings. The building is cubed at 7d. per foot, and is estimated at about £5,000. The plans and details of the plan are carefully studied.

The design of Messrs. Hewitt and Ryan-Tenison (second premium) has many good features. The external treatment is of the old English manor-house character, and makes a somewhat long and broken but dignified façade, with mullioned and dormer windows, centre flèche over the board-room, which is over the north wing, and which breaks forward from the central part. There is a quiet breadth in the treatment. A longitudinal corridor 8ft. wide runs down the centre, lighted at each end, with the main entrance in the centre of the façade. Opposite the entrance is a commodious staircase to the council room, with conveniences behind. On the south end of corridor, the council clerks' private and public offices are placed, well approached and lighted; these are in front, behind them are the collecting and registration department. The surveyor's offices, well lighted on two sides, occupy the wing on the north end of corridor, with waiting-room, and are near the entrance. Behind are the medical and sanitary offices. The council-chamber, 40ft. 6in. by 26ft. 3in., is placed in the northern wing over the sanitary, medical, and surveyor's block, and is lighted at ends and sides, with committee-rooms in front. There is a library for members, and the caretaker's rooms are over, in the roof, lighted by dormers. There is a good ink-wash perspective.

Other designs include many well-executed, but too costly, buildings. Mr. Henry A. Cheers, of Twickenham, sends a cleverly-drawn and mounted set of drawings in line, shaded in a Free Renaissance style; the council chamber on upper floor is on the right-hand side, lighted by end windows and by side lights over the dado. The detail of entrance is clever, but does not harmonise with upper story. Messrs. Harrington and Ley show a rather florid design with corner turrets. The council-room is on first floor at south end, with entrance under. A few others have put themselves out of court by extravagant façades. No. 14 is a pretentious-looking design in two blocks, one facing the Berryland-road. No. 14 has a large square hall in centre, lantern over the offices being grouped round, the council chamber in rear. No. 16 is a balanced plan, with turreted square angles, and a wide gable to front; 17 has a central hall on upper floor, but is too ambitious. No. 18 resembles a large villa, with rounded corner to the two roads. No. 23 has some good points, but is too costly in style.

MUNICIPAL AND COUNTY ENGINEERS AT SUNDERLAND.

A NORTHERN DISTRICT meeting, in connection with the Incorporated Association of Municipal and County Engineers, was held on Saturday at Sunderland, when papers were read and visits paid to places of interest to the members within the borough. Amongst those present were:—Messrs. C. H. W. Biggs, London; S. T. Carr, Grangetown; J. E. Tiffin, West Hartlepool; Cuthbert Brown, Bedlington; Geo. R. Fraser; W. Kirkley, Ripon; T. B. Mather, Heaton, Newcastle; Frank Baker, Middlesbrough; H. F. Campbell, Stockton; John Cooper, Edinburgh; Thos. Cole (secretary), London; John P. Dalton (hon. district secretary), Ryton; T. W. Stainthorpe, Eston; J. W. Brown, West Hartlepool; H. F. Crummack, West Hartlepool; Thos. H. Tarbitt, Loftus-in-Cleveland; H. W. Taylor, Newburn; W. Edson, Ripon; B. F. Smellie, Tynemouth; W. G. Bent, York; Geo. Hollings, Wallsend; J. P. Spencer, North Shields; R. S. Routhwaite, Sunderland; F. J. C. Snell, Sunderland; W. P. Pattison, Benwell; and C. J. Baff, Gosforth.

The members were received in the Council Chamber of the Town Hall by the Mayor (Alderman W. Bruce), who welcomed them to Sunderland.

Mr. John Cooper (Edinburgh) then took the chair.

TYNESIDE ROADS.

Mr. H. W. Taylor, A.M.Inst.C.E., Newburn-on-Tyne, read a paper entitled "Notes on the Specifications of Tyneside Roads." He said that the foundation of a macadamised road necessarily depended in great measure on local circumstances. The local sandstone or freestone was very generally used on Tyneside, and an excellent material it was. Continuing, the author said: In the construction of roads on building estates, what is known as "random chip paving" is frequently employed. It is a cheap or bastard kind of sett paving, composed of irregular or random lumps of whin-stone or granite, averaging 5in. to 7in. deep. Random chip paving is a somewhat questionable success, inasmuch as the chips are not uniformly shaped, the beds must vary, and with average traffic the road loses its shape, and hollows and depressions are formed. It is frequently used in back streets, although it has a multitude of joints in which refuse and fæcal matter are bound to lodge in a district where middens and ashpits are in vogue. It is an exceptionally noisy pavement when a little worn, its one advantage being that it costs but little to scavenge and maintain compared with ordinary macadam. Tarred macadam is not used to the extent it perhaps deserves; it is clean and impervious, and, as it can be washed with ease, it is an unrivalled cheap paving for back streets in a midden town or district. Considerable skill and manipulation are required in properly mixing and laying tarred macadam, and there is no doubt that it has got into disrepute through inattention or neglect of these matters. The stone must be thoroughly dry before coating it with the tar. Tar from a gas-works where a regenerative heat is used in almost worthless. On sanitary grounds tarred macadam is preferable to the usual random chip paving with its multitude of joints. It has the disadvantage of being somewhat difficult of repair. Of all road metals, the most local, universally used, and generally favoured is the famous Northumberland whin-stone. It is hard and durable, its wearing properties being of the first order. Aberdeen (from whence nearly all our granite macadam is obtained) Cove granite is well spoken of; it may not, perhaps, stand quite so heavy a traffic as whin-stone, but it bears an ordinary traffic well. It makes a smooth road, and has the great advantage of not working loose in dry weather. The hard blue mountain limestone, such as is obtained from Alston, is very suitable for inclines (or "banks") and roads of a rural character. It should be thoroughly steam-rolled as soon as it is laid, with a roller preferably not exceeding 10 or 12 tons in weight. It is sometimes objected that limestone is muddy in wet weather, and under heavy traffic this is undoubtedly so, but with light and medium traffic it is an excellent stone. It makes a smooth road, one much appreciated by cyclists, and when once rolled in it lies splendidly, even in the driest summer weather. The general consensus of opinion of iron-stone slag as a road metal is that it is worthless, and does not pay for the labour of laying on. As it is now produced it is full of honeycomb, and quite undesirable. In some of the outlying roads, where the traffic is light, it is still used as a metalling, but the practice is gradually ceasing. As a foundation it is admissible, but is not equal to freestone, as it has little or no "jambing" property, and cracks and crushes beneath the roller.

HOUSING OF THE WORKING CLASSES.

Mr. R. S. Rounthwaite, Assoc.M.Inst.C.E., read a paper, in which he dealt with the housing of the working classes, the proposed technical school in the borough, and a new hospital pavilion. He said the adoption of the 1890 Act, having reference to the housing of the working classes, had in Sunderland received the careful attention of the council and of the health committee. A large number of insanitary areas in the older part of the town were in 1892 inspected and reported on by the then medical officer of health (Dr. A. E. Harris, of Islington) and himself, and the health committee confined their attention in the first instance to one of the worst districts in the town—namely, the "Hat Case area," which comprises, in streets, courts, alleys, land, and buildings, only about two acres, of which 2,404 yards or thereabouts are intended to be used for the erection of workmen's dwellings, the remainder being thrown into adjoining streets and utilised for new streets. Allowing two persons to each room of the 480 persons unhoused, provision will be made for 454, and the rentals from the erection of these workmen's buildings will make a gross revenue of £978 18s. 6d. per annum, whilst the outgoings are estimated at £332 16s. 6d., leaving a net annual income of £646 1s. 6d., which is sufficient to cover the interest and sinking fund on the total estimated cost of the scheme (£16,402). Respecting the proposed technical school for the town, the whole of the funds necessary for the erection and equipment of such have not yet been obtained. The probable cost of the whole scheme will be about £20,000; and of this sum about one-half remains to be provided. The council have purchased a most eligible and central site. With regard to the new pavilion in connection with the Sunderland Fever Hospital, it had been found necessary to increase the accommodation for patients. The new pavilion would be, like the others, one story in height, and would contain two large wards for male and female patients. Each patient would have a floor space of 156 superficial feet and an air space equal to 2,028c.ft., which was slightly more than was required by the Local Government Board.

SUNDERLAND ELECTRIC LIGHTING.

Mr. J. C. Snell, borough electric engineer, read a paper on this subject, in the course of which he said:—A system of arc lighting in the principal public streets is about to be inaugurated. The contract for lamps has been let to Crompton and Co., of Chelmsford, and these will burn four in series across the outers of the low-tension three-wire system. The poles are being supplied by J. Spencer, of Wednesbury, and are of steel in two sections, the upper section tapering, and the

poles being set in ornamental cast-iron bases. The reason for the adoption of steel poles is their possible requirement for the support of overhead wires for electrical traction. The lamps will be suspended from swan necks at a height of 21ft from the ground, and will be placed about 60 yards apart. Sunderland supplies current to its consumers at the cheapest rate in the three kingdoms (whether municipal or private company), the average price paid per unit during last year having been only 4·09d., and the next lowest having been Newcastle at 4·14d. A most gratifying increase in the motors connected to the mains has been obtained. In March, 1895, only 29½H.P. was connected; at the present time we have 291¾H.P. These motors are used for various purposes, such as for lifts and hoists, chaff-cutting and corn crushing, printing presses, for driving workshop tools, pumping, and even for revolving hair-brushes. The demand is increasing so rapidly that extra boilers and steam dynamos will be again required for next year.

VISIT TO THE PIERS AND DOCKS.

The members afterwards proceeded by tram to Roker Pier Works, which they inspected, and then crossed the river to the South Docks, where they viewed the installations of gas-driven pumping machinery at the graving docks, and then proceeded to the South Pier works and inspected the concrete and block making plant, and other objects of interest. The members were conducted over these works by Mr. H. H. Wake, M.Inst.C.E., engineer to the River Wear Commission. They next drove to the electric generating station, which was described by Mr. Snell, and then inspected the Corporation Swimming and Slipper Baths, and the Washhouses in High-street West. The members returned to the town-hall about five o'clock, where a short discussion on the papers which had been read took place.

PASSMORE EDWARDS PUBLIC LIBRARY, EDMONTON.

ON Saturday last, Dr. Richard Garnett, C.B., Keeper of the Printed Books at the British Museum, opened the new public library erected in Lower Fore-street, Edmonton, at a cost of about £4,000, exclusive of the site, and including the oak and pitch-pine fittings. Mr. Passmore Edwards gave £3,000 towards the total cost. Mrs. Humphry Ward laid the foundation stone in April last. The building is dedicated to the memory of Charles Lamb and John Keats. We illustrated the library in the BUILDING NEWS for April 9 last, with plans, view, and details. The builder is Mr. Arthur Porter, of Tottenham; Messrs. Hart, Son, Peard, and Co. have supplied the gas-fittings and art-metal work; Messrs. Strode and Co. the heating apparatus. The fire-proof staircase is by Messrs. Wilkinson and Co.; the carvings and marble tablet are by Mr. Nathaniel Hitch. The clerk of works is Mr. Jno. C. Laight. The fittings are being executed by Messrs. Adamson and Sons. Mr. Maurice B. Adams, F.R.I.B.A., is the architect.

Dr. Garnett's address dealt clearly with the value of free libraries in supplying the greatest need of the age. He pointed out that, just as monasteries afforded homes of learning in their day, and as colleges and grammar schools crept into existence to supply educational needs when monasteries appeared to have fulfilled their useful mission, so mechanics' institutes and free libraries in our time had come to meet the demands of the age for sources of education such as schools and other institutions were not capable of giving and not intended to supply. Then again—and thus helping to complete his interesting historic analogy—the veteran bookman made reference to the fact that, just as monasteries and grammar-schools were mainly the outcome of private benevolence, built and endowed by earnest men of learning to meet needs that were keenly felt, so nowadays the free library movement—truly a people's movement, and one meeting the inarticulate and unaided yearnings of the poorer people of England—owed most of its success to men like Mr. Passmore Edwards, who realised the needs of the age and devoted their best energies to the satisfaction of them. There was now, much more than at any time in the nation's history, a great need for education as to the duties of citizenship. Every part of the world was now virtually next door to every other part; and unless we acquired a greater knowledge than our ancestors concerning other lands and other peoples, we should suffer disagreeable consequences as a nation, involving loss of life, unnecessary suffering, loss of trade, and neglected opportunities of advancement. The people, whose power in the end directed the affairs of the State, must be better informed on all questions, in order to give a wholesome direction to the policies of our statesmen, for those who stood in ignorance and needed learning were too often more painfully and intimately affected than those who had possession of the necessary knowledge. This work could only be done effectively to-day by free libraries, giving to the people great books, which tended to enlarge and humanise the minds and develop harmony instead of chaos. There were, further, our great commercial interests depending in a large measure upon a knowledge which could not be gained at school, which had to be secured by miscellaneous and well-directed reading. The greatest obstacle to British trade was ignorance. This, existing in many forms, and the unfortunate arrogance that accompanied it, must be got rid of in order to secure real progress. Then, finally, among the many other useful ends served by free libraries, there was the possibility of some boy or girl, unconscious of his or her genius, being awakened by the reading of useful books to a realisation of his own peculiar fitness for some branch of learning, and thus ultimately giving to the world the value of thought and services which might otherwise be unknown.

Mr. Edwards, in responding to a vote of thanks, said that in addition to the need of free libraries there was another and a very pressing want that ought to be met. The working-class people of Edmonton—90 per cent. of the population—for whom the new library was built, wanted more time in which to use the library. How could men have much time for reading if three hours were spent in going to and coming from their work in various parts of London, and they were obliged to work every day for nine hours? He was not there to advocate any policy or to represent any party; but he saw clearly that we could not reasonably expect public libraries to be turned to the very best account unless the people for whom they were erected had fair opportunities of using them. Finally, he wished their educational work in Edmonton the best success, and hoped to hear in days to come that they were prospering.

The party then adjourned from the Town Hall, where the public meeting was held, to the new Library, headed by a band and a procession consisting of members of the local fire-brigade, friendly societies, and trade unions, and Dr. Garnett, after opening the porch gates with a silver key, declared the building open for the perpetual use and enjoyment of the people of Edmonton.

WINDOWS BY LEWIS F. DAY.*

MR. LEWIS F. DAY is so capable and practical a writer, and so artistic and experienced a designer, that we are prepared for a high standard of excellence when he places any fresh work before us for notice. His latest production of a literary character is a charmingly got-up volume, entitled "Windows: a Book about Stained and Painted Glass," fully illustrated, and really beautifully printed, while the neatness of the binding well befits so artistic a work. Mr. Batsford has evidently spared no pains in co-operating with the author in publishing a book worthy of their united reputations. The reader must recognise these qualities, which go far in favourably introducing the treatise which is so tersely inscribed by Mr. Day in the following terms: "To those who know nothing of stained glass; to those who know something and want to know more; to those who know all about it, and yet care to know what another may have to say upon the subject—I dedicate this book." All concerned in its enjoyment are thus put on good terms with themselves, while the critic, no longer described as the "gentle reader," as he invariably used to be, can scarcely ignore the genial influence of so good-humoured an author who disarms criticism, at least to some extent, by frankly acknowledging that he has no claim to learnedness in this matter. Apart from the pleasure afforded by the study of glass for windows he evinces but a modified concern, leaving to others—such as Winston and Westlake—the erudite task of precise historical information. The author's aim has been to write as a workman addressing workers, setting out with the idea of tracing the course of *workmanship*, and to follow the technique of the craftsman in glass from the 12th to the 17th century, and then to show the development of *design*, concluding with a chapter on *style*, this latter being introduced mainly for the use of those who are in want of *data*, by which to form some correct opinion as to the period of a window when they see it. This is an attractive programme; but it has in the making-up of the book the appearance of going over the same ground two or three times, making it by no means always easy for the less attentive reader to follow exactly where the individual point intended to be emphasised comes in distinctively from much else which could be said on the same illustrated example. All the drawings are in black and white, and we quite agree with Mr. Day's observations as to the worthlessness of representations of glass printed in colours. Mr. T. M. Rooke and Mr. John R. Clayton have lent some charming drawings of windows, which much enhance the value of the author's series of more than 250 illustrations. The tints on the heraldic plan are indicated by the method of hatching adopted in the cuts.

The beginnings of glass need not occupy our brief space, and we know that so long ago as 2,300 years B.C. the Chinese are said to have made white glass of great purity. The Egyptians made jewels of glass, and the Greeks and Romans worked glass in imitation of precious marbles. The records of the Early Christians describe stained-glass windows, and church inventories as time went on soon make frequent reference to such things; but the greater part of the Early Gothic glass still preserved to us scarcely ever contains specimens belonging to an earlier time than the date of the 13th century, such, for instance, as our English examples at Canterbury, Salisbury, and Lincoln.

Speaking literally, "stained" glass and "painted" glass are two distinct things. Mr. Day thus defines them: "Stained glass is glass which is coloured, as the phrase goes, 'in the pot'—that is to say, there is mixed with the molten white glass a metallic oxide which stains it green, yellow, blue, purple, and so on, as the case may be—for which reason this self-tinted glass is called 'pot metal.' . . . Once for all, 'pot metal' is glass in which the colour is in the glass, and not painted upon it." . . . "In painted glass, on the other hand, the colour is not in the glass but upon it, more or less firmly attached to it by the action of the fire. A metallic colour which has some affinity with glass, or which is ground up with finely-powdered glass, is used as a pigment, precisely as ceramic colours are used in pottery painting. The painted glass is then put into a kiln and heated to the temperature at which it is on the point of melting, whilst the colour actually does melt into it. By this means it is possible to paint a coloured picture upon a single sheet of glass, as has been proved at Sèvres. Strictly speaking, then, stained and painted glass are the very opposite one to the other; but, in practice, the two processes of glazing and painting were never kept apart;" the difference between the Early and Late work being that at first the painting was only used to help out the stained glass, and in the later the stained glass is introduced to help out the painting. Slight as the difference may seem it made a vast difference, and, being intentional on the part of the designer, so correspondingly did it influence his design. Mr. Day graphically describes the mosaic windows of Early times, and the method of mapping out a window and the art of glazing in leadwork. Oriental lattices and Arab plaster glazings are described and illustrated with sketches showing developments of the craft. As a capital example of line-design, in which the composition is formed entirely by the lead, is given by the drawing of plain glazing from Bonlieu, which we reproduce (Fig. 1). The lines are all in lead, but it is interesting to remark that some of them are mere dummies, strips of metal holding nothing, carried across the face of the glass only, and soldered on to the more business-like leads at each end. The bottom right-hand corner of the drawing shows the *bonâ fide* glazing. The cutting of the glass in the 12th century, the date assigned to this example by Viollet-le-Duc, was exceedingly difficult, and so was shirked. Mr. Day notices other specimens of the same subterfuge employed at Rheims and Châlons.

The scheming of lead-glazing affords endless varieties, and then comes in the question of strength in the network of leads. The early use of paint and the comparative methods of early mosaic windows supply much that is eminently

* Windows: a Book about Stained and Painted Glass. By LEWIS F. DAY. London: Batsford. 21s. net.

Fig. 1.—Plain Lead Glazing from Bonlieu.

Fig. 2.—Fourteenth Century German Work.

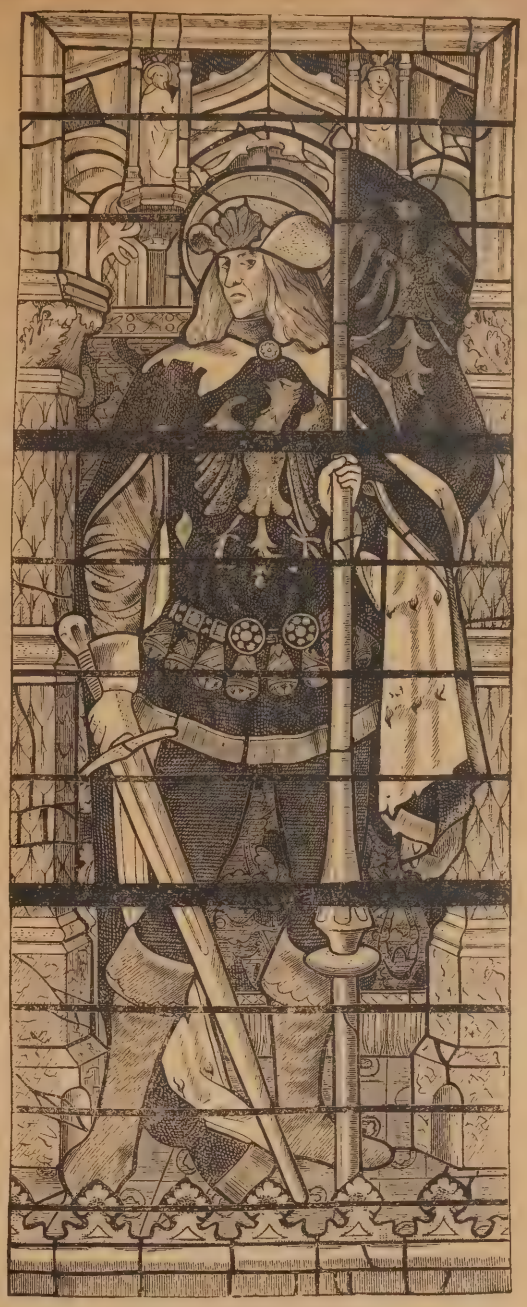


Fig. 3.—Cologne Cathedral.

interesting, for, quite apart from the halo of sentiment about the earliest work, and apart from its picturesqueness, much of which is due to age and accident, there is almost always an evident knowledge and feeling for the material, and a sense of treatment seldom found in what we may term accomplished modern glass-painters' work.

Shaded glass painting, diapers and coated glass, white and yellow stain, abrasion and painting out, all obtain a reference, with much information, which is impossible to condense, and so we go on, only being able to thus briefly indicate the thoroughness of Mr. Day's research, which must have taken him years to accomplish.

The Middle Gothic glass was much influenced by what the author terms a wave of realism, and thus a naturalistic form of ornament occurs in what is known as the Decorated period, and, whatever its merits, a departure was thus established in carvings, metalwork, and painting decorations. The grisaille glass of this date was systematically indicated by painted outlines, and not glazed with lead lines if it could be avoided; 14th-century glaziers seldom complicated their quarry work by the introduction of strips of colour between the quarries. In Germany it was customary to use geometric patterns in diaper long after it had gone out in France. In these colour was of prime consequence, whereas in the Earlier diaper the glazier was more concerned with the pattern. Fig. 2 is a 14th-century German diaper of heraldic character from Nuremberg. The Fairford window may have been executed in England; but, if so, German or Flemish artists had a hand in it, and in the nave windows of Cologne Cathedral German glass reaches its limit, a figure

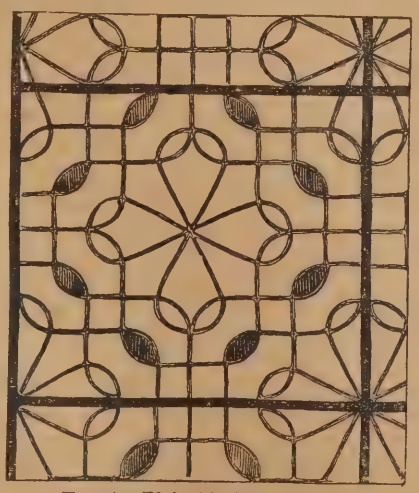


Fig. 4.—Plain Glazing—Lisieux.

here given (Fig. 3), from one of which is thoroughly representative. Indications of Renaissance detail in the design are evident. This leads Mr. Day to deal with 16th-century canopies and cartouches, as well as plain glazings splashed with jewels of colour sparingly, or enriched with heraldic centres. Fig. 4 is a charming pattern of plain lead-line glazing from Lisieux. Picture windows and the influence of mullions are considered with examples—landscape in glass, bull's-eye windows, tracery lights and rose windows, painted quarries, roundels; domestic and Italian glass, Netherlandish glass, Swiss and Dutch windows, all furnish subjects for much information. Then comes a chapter on style, another on how to see coloured glass, with some pages on mending properly. We have hardly done the volume justice: it is replete with examples, about which there is so much to be usefully said, and besides, the very plan of its arrangement prevents our making an epitome which may be considered quite satisfactory; but we have said more than enough to induce the reader of this brief review to make a more intimate acquaintance with what Mr. Day has to tell of his subject. His earliest training well befits him to write upon it, seeing that he was apprenticed in the workshop of an artist in stained glass.

THE SURVEYORS' INSTITUTION.

At the ordinary general meeting of the above society held at Savoy-street, W.C., on Monday last, a paper was read by Mr. J. D. Wallis on the compensation cases settled by the promoters of the Manchester Ship Canal, princi-

pally under the agency of his partner, the late Mr. A. M. Dunlop. Mr. Wallis gave, as was necessary to explain his subject, a long series of figures representing the land values, the compensations for disturbance and severance, and the other negotiations involved in a scheme of this nature. He mentioned incidentally that after unsuccessful applications to Parliament in 1883 and 1884, an Act was obtained in 1885, capital was raised in 1887, and during the latter year the first sod was cut, and the construction forthwith commenced. The canal was opened for traffic in 1894. Its length is 35½ miles, the depth of water 26ft., the minimum bottom width 120ft., the average water-line width being 172ft. It follows generally the course of the rivers Irwell and Mersey from Manchester to Eastham, where it enters the channel of the Mersey, the rise of 60ft. between water-level at Eastham and water-level at Manchester Docks being maintained by five locks. The average width of land required for the water-way was from 200ft. to 300ft. for the 35½ miles. In addition, a large area was required for docks, for the deposit of spoil, for deviation railways, for company's railways, new roads, river diversions, and for temporary purposes. The total excavation necessary amounted to about 50 million cubic yards, nearly the whole of which had to be placed on adjacent land, covering about 1,300 acres. The land cut off by converting the sinuosities of the rivers into the straight canal had to be dealt with. Much of it was used for the deposit of spoil, but many frontage claims had to be met. Five deviation railways, each extending 1¼ mile on each side of the canal, had to be constructed for the purpose of carrying the rails at a level of 75ft. above the canal. The Parliamentary estimate for the Bill of 1885 amounted, for land, compensation, interest, and expenses, to £1,100,000 for some 3,500 acres or about £320 per acre, credit being taken for the sale of 1,700 acres of surplus and spoil land. The actual gross expenditure under the above heads had been £1,359,490, or an average of £291 per acre. Alterations in the Bill during its passage through Parliament had necessited the taking of some 1,200 acres more land, and it was therefore not possible to draw an exact comparison between the results obtained and the Parliamentary estimate; but the average cost was, as he had said, £291 per acre. Nearly 1,000 claims were sent in, amounting in the aggregate to some two-and-a-half millions, which were settled for as nearly as possible one half that amount. The total area purchased was 4,664 acres, and the total expenses of purchase were £1,359,490. The price paid after allowing for chief rents and exceptional properties worked out at about £172 per acre, the price varying from £97 per acre for agricultural land near Warrington to about £5,000 an acre for building land at Manchester. The author then proceeded to mention some detailed instances of prices paid in various localities. The agricultural distress of recent years had, he said, affected Lancashire and Cheshire less than some other localities, the rent paid by occupiers averaging some 40s. per acre, rising in some places to 60s. The severance caused by the canal was more serious than in most ordinary cases, owing to its great width, and many costly swing bridges had to be constructed to carry roads and waterways over it. The author proceeded to give some instances of compensations. In one case of an estate with a frontage to the Mersey £83,000 was claimed; the witnesses for the company allowed only some £20,000, and the award was £28,900, or £240 per acre. In another case of 180 acres the claimant's surveyors put the price at about £73,000, the the company's surveyors at £25,000, and the arbitrator awarded £37,000, or £209 per acre. In Warrington township the average price was £250 per acre, in Latchford and Grappenhall £300 p.a., in Thelwall and Woolston £175 p.a., in Lymm £115 p.a., in Rixton from £110 to £200 p.a., in Partington £140 p.a., in Irlam from £150 for agricultural land to £600 for building land, in Flixton £150 p.a. In Barton-upon-Irwell the agreed price paid to Sir Humphrey de Trafford averaged £290 per acre, including park land, agricultural land, and land with a building value, and some allowance for severance. In Pendleton about 50 acres, with a frontage to the river Irwell, cost £400 p.a. The Mode Wheel Mills were purchased under award for £21,174. In Salford 56½ acres was acquired under an arbitration for £63,240, or about £1,100 p.a. Five acres in Ordsall-lane, Salford, cost £11,143. Land for the Manchester Docks, comprising some 21 acres, cost £70,000. In Manchester, £15,000 was paid for 1¾ acre of timber yard, with a saw-mill and machinery; and Mr. Wallis gave several other instances of land values on the line of the canal. The total number of contested cases was, he said, 32 out of 954 claims, and the amount awarded by arbitration or jury was £332,000, as compared with £881,000, the amount of the claims settled by agreement. As to arrangements for possession, the author said little difficulty had been experienced, but in some few cases it had been found necessary to apply to the Board of Trade to appoint a surveyor to make the valuation for deposit, which course was often a great help in arriving at a settlement. Mr. Wallis next gave tables showing the amounts of the valuations made for the purposes of the deposit and the prices afterwards paid, which figures in the majority of cases very nearly approximated each other, although in some cases two equally able and competent surveyors took very different views of the value of the same property. Th average price per acre paid to agricultural tenants was £9 12s., the interest of a tenant from year to year extending to about eighteen months. The "Surplus Lands Act" of the company gave them some exceptional powers of dealing with such lands, which comprised an area of some 2,600 acres, and had been acquired for deposit of spoil, or upon counter notices from landowners, or to avoid severance claims, or for accommodation works. These lands were a valuable asset in the hands of the company, affording good sites for manufactories and warehouses. Land had already been disposed of for ship-repairing works, timber and coal wharfs, soap-works, cattle lairs, cold-meat stores, oil-tanks, and other purposes to the extent of some 127 acres. The land had originally a merely agricultural value; but the expenditure of 15 millions by the Canal Company had raised it to the value of building land, and there seemed little doubt that the banks of the new waterway would, in a few years, be lined with factories and warehouses, producing traffic and developing a trade which would pay a good return on the cost of the undertaking.

After some remarks by Mr. A. Vernon, Mr. D. Mathews, Mr. Lightfoot, Mr. H. Hendriks, and Mr. Warner, the vote of thanks to the author was put and carried unanimously, and the meeting adjourned.

ELECTRIC LIGHTING NOTES FOR ARCHITECTS.—IX.

By an Assoc. Inst. Elect. Engs.

ACCUMULATORS (*continued*).—DISTRIBUTION.

GENERAL REMARKS.—The requirements of a good secondary cell are large capacity, solidity, durability, efficiency, and cheapness. The only method of getting large storage capacity and the capability of giving heavy discharges is to expose considerable surface; thus, with the L-type of the E.P.S. cells, 30sq.in. of active surface on the positive plate is required per ampère, and, although this is somewhat excessive as compared with newer plates, it emphasises the fact that to render storage cells less wieldy and more compact, the positive and negative plates must be interwoven, as shown diagrammatically in Fig. 15.

As will be observed, the positive and negative plates are made up by connecting a number of small plates (called sections) in parallel so as to expose a large surface, and by taking one more negative section than positive it is clear that both sides of the positive plate are formed, and are effective in storing energy. Thus, the total superficial area of peroxidised surface—*i.e.*, the areas of both sides of the positive plate are countered to obtain the effective surface—is a measure of the amount of energy which can be stored. In other words, the capacity and discharge may be taken as being strictly proportional to the amount of active material involved. The capacity of a cell is usually given in ampère-hours; thus, a 15-plate (7 positive and 8 negative—there always being one more negative than positive) E.P.S. cell has a capacity of 330 ampère-hours, so that it may discharge 30 ampères for 11 hours, or 22 ampères for 15 hours, and so on. For convenience in indicating the polarity of a cell the lead bars connecting together the sections and called lugs are painted, the positive red and the negative black.

Since internal resistance diminishes the discharge rate, it is reduced to a minimum by placing the plates as near together as possible, the usual distance between a positive and negative section varying from ⅜in. to ½in. In practice, this distance is found sufficient to allow the required quantity of acid being used, and also to permit the paste to fall to the bottom, should it become detached, and so prevent short-circuiting the plates. At this point we may also mention that the positive and negative plates are in all cases separated by using insulating combs, forks, or separators made of ebonite or celluloid.

The E.M.F. of a storage cell or accumulator depends entirely upon the combination of the material of the plates and the acid used, and with lead plates (as commonly used) the E.M.F. of one cell is from 2 to 2·5 volts, and with *n* cells connected in series, the E.M.F. of the battery is *n* times that of a single cell. By enclosing the plates in glass cells, facility of inspection is assured.

Working and Faults.—The character of the success of the working of accumulators corresponds very largely to the care and attention they receive. When abused they rapidly deteriorate, and give more or less trouble when working. Nothing is so conducive to good results as keeping the cells well charged, and nothing tends to spoil a cell as heavy and prolonged discharges. In fact, a rule which should never be broken is *never to completely discharge a cell.* The faults which attend the working of accumulators, particularly in isolated installations, are:—

1. Disintegration and loss of peroxide or active material.
2. Short-circuiting of plates.
3. Buckling of plates.
4. Sulphating.

As we have already indicated, many improvements have been effected in the manufacture and construction of storage cells, resulting in increased capacity and durability, so that the tendency of the above-mentioned faults to occur is diminished, unless the cells are abused. Thus, if the cells are left fully discharged, or even only partly discharged for a long time, there is a tendency produced to set up local action, especially in the positive plate between the peroxide pellets and the grid. This, of course, produces unequal action in different portions of the plate, and a shedding of the active material. Small pieces of the active material fall out, and if they do not fall to the bottom of the cell they may rest between two adjacent plates and so short-circuit and discharge the cell. To prevent short-circuiting the cell, should much disintegration take place, a space from 2in. to 3in. should be allowed between the bottom of the containing vessel and the plates. Furthermore, not only do the short-circuiting pieces of plate discharge the cell, but they also prevent that cell being properly charged and so receive its share of stored energy, in addition to which the quantity of active material is diminished, resulting in diminished capacity. Another result of the unequal action in different portions of the plates is to produce buckling or bending of the positive plate. We have already mentioned that during use the plates expand and contract, so that with unequal action we naturally get unequal expansion and contraction, and so the plate buckles, tending to permanently short-circuit the cell. It is also clear that when once a plate buckles, the distance between the opposite parts of the adjacent sections is changed, and therefore the internal resistance varies from point to point, and different parts of the plates take more current (during charging) and give out less current when charging. This action increases the tendency to unequal treatment at different points of the plates. A moment's consideration will suffice to show the advisability of building up a plate by means of a number of sections connected in parallel rather than by means of a single large one.

Frequent excessive discharge and the neglect of plates in the condition just mentioned diminishes the specific gravity of the acid, and a white deposit of lead sulphate is produced, especially on the positive plate. This lead sulphate is a bad conductor of electricity, so that the internal resistance of a cell in this condition (sulphated) is increased, and its capacity materially diminished. To remove the sulphate, extra care and continued overcharging must be employed. Nor must the cells be discharged at their normal rate until the sulphate is removed.

In all cases the makers of storage cells supply

instructions for working accumulators, and it is important that the instructions be strictly adhered to. The following notes are from those supplied by the E.P.S. Company, and will serve as a general outline for the management of storage batteries in use.

Solution.—The sulphuric acid must be perfectly free from impurities, such as arsenic, nitric or hydrochloric acid, and must be diluted with pure water to a specific gravity of 1·19. Brimstone acid (specific gravity 1·84) should be slowly poured into the water, and well stirred and cooled before taking the specific gravity. The proportions are about 21 gallons water to 4 gallons acid. The acid solution may be obtained from the makers ready for use, and it is important to remember that the acid should *not* be added until everything is ready for charging. The solution is added until it covers the negative plates fully half an inch.

First Charge.—The first charge commences immediately the cells have been filled with solution, and should continue until the solution of each cell has become milky, owing to gasing of both positive and negative plates, when the specific gravity should have risen to at least 1·195 or 1·2. This charge usually lasts about 30 hours, and on no account should the charge be stopped during the first twelve hours.

General Charging.—Partial charging and then exhausting the cells is bad; the charge should always continue until the acid turns milky. The cells should always be kept fully charged, and as soon as possible after a discharge they should be recharged. When the discharge has been excessive, it is better to recharge gently at first, and to gradually increase to the normal value. Should any cell not turn milky, it should be examined and cleaned, and then cut out of the circuit until it attains its normal condition. During charging the acid tends to evaporate, and any loss by evaporation should be made up by adding distilled water, and not acid. Evaporation may be minimised by using covers or spray arresters made of a non-conducting substance, such as glass.

Connections between the plates should be soldered or burnt. If not, they must be kept thoroughly clean, and all brass or copper connecting-pieces should be protected with *vaseline* or *paraffin-oil*.

When the cells are not required for a time, they should be charged at least once a fortnight, and on no account must the acid be removed. We have already remarked that the specific gravity of the solution increases with charging; it also decreases whilst discharging. In fact, the specific gravity of the solution indicates the condition of the cell, it is therefore of importance to make regularly observations of the density of the solutions, and by recording these and other observations, exact information of the condition of the battery is secured. Below a copy of the tabular form issued by the Chloride Electric Storage Syndicate is given, and is strongly recommended to all using accumulators. If the cells are in good working order, there should be the same variations in the density of the acid in all the cells, and the voltage on open circuit should remain constant when the cells are fully charged. The following are the headings of the daily and weekly records referred to above:—

Installation at.....
Consisting of.....cells, each containing.....plates.

DAILY RECORD.

Day of Week.	Date.	Commenced Charging at		Finished Charging at		Average Current in Amperes.	Maximum Volts during Charge.	Specific Gravity of Acid in Hydrometer Cell.	
		Hr.	Min.	Hr.	Min.			Before Charging.	After Charging.

WEEKLY RECORD.

Week ending ..... 189....

No. of Cell.	Before Charging on Open Circuit.		After Charging.	
	Specific Gravity	Volts.	Specific Gravity on Open Circuit.	Volts on Discharge.

As is probably well known, the specific gravity of the solution is obtained by means of a hydrometer, and at least half an hour should elapse after the charging of the cell is completed before the specific gravity of the cell is taken, so that the solution is in its normal condition. Cell-testing voltmeters should also be used for taking the E.M.F. of each cell.

Having pointed out the faults, we may now mention the advantages of using accumulators.

1. The current from charged accumulators is available at any instant.

2. Lamps fed by accumulators give a steady light without fluctuation, as the accumulators are practically self-regulating.

3. When used in conjunction with dynamos for lighting purposes, accumulators smooth down all irregularities of driving. Accumulators are therefore particularly adapted for use with gas-engines.

4. Accumulators are particularly adapted for isolated plants in connection with the lighting of private houses, since the dynamo may be placed some distance from the house, so that noise, vibration, and smell are avoided. They may be charged when convenient.

DISTRIBUTION.

The distribution of electricity comprehends the study of the best means of disposing of electrical energy economically to a number of receiving mechanisms. This study includes the consideration of the choice of a system of distribution from

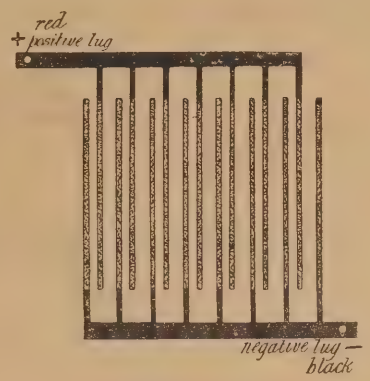


Fig. 15.

a variety of systems, to suit the particular requirements and needs of the case; the expenditure of capital and loss of energy; the control, regulation, and permanence of the working conditions of the conductors forming the network. It is thus evident that the problem of distribution is one of the most important problems encountered by the electrical engineer. The systems of distribution vary principally by reason of the different methods of arranging the conductors as indicated by the arrangement of the receiving apparatus, which is indicated by the service which they have to perform. And here it may be remarked that the character of the success of an installation corresponds largely to the attention paid to the selection of the means to distribute the electrical energy.

The Line.—We have already defined an electric circuit as the complete path traversed by electricity, and for lighting and power purposes an electric circuit is composed of.

1. A source or generator to impress the required electrical pressure (E.M.F.) on to the circuit.

2. The line or conductor connecting the source with the receivers.

3. The receiving mechanisms, such as lamps, motors, &c.

It is with the second that we have now to deal. The term "line" is here used to include the conductor, supports for the conductor, such as posts, culverts, insulators, and protecting devices generally. The essentials of a line are:—

1. *Continuity*, so as to form a connecting-link between the generator, lamps, &c. This is assured by using a continuous metallic conductor as lead and return.

2. *Protection*, so as to prevent leakage and to secure safety. This is assured by introducing high insulation resistance, and by inclosing the conductor in casing and culverts or by supporting it on well-insulated posts, as in aërial lines.

As is well known, metals are the best conductors of electricity, and consequently metals are invariably used so as to give the continuity required. The conductor may be solid, or composed of a number of wires stranded together. Stranding gives flexibility, and avoids the rigidity of thick bars or rods, so that the conductors may be the more easily handled. Generally the conductors are of circular section, in which form they are more conveniently covered for insulating purposes, and rarely in practice do we find solid wires exceeding 0·08in. in diameter (No. 14 S.W.G.). It thus follows that the main cables are almost invariably stranded wires, whilst for branch wires leading to and from single lamps a single conductor of No. 22, 20, 18, or 16 S.W.G. is often used. Many fire insurance companies, however, insist that No. 20 must be the smallest, and No. 18 the largest, single conductor used in an installation. The stranded cables used as mains for carrying large currents are made up of a number of wires, usually consisting of 3, 7, 19, 37, 61, or 91 strands, the wires composing the strands being Nos. 22, 20, 18, or 16 S.W.G., according to the carrying capacity of the cables required, and if seven No. 16 wires are used to form a strand, the cable is termed a 7/16 cable, the former number always referring to the number of separate wires, and the latter to the gauge of the wire. In practice, 3/22, 7/16, 19/14, 37/18 cables are much used. Presently the laws relating to the proper carrying capacity of wires will be considered, but before doing so it is necessary to discuss the question of insulation.

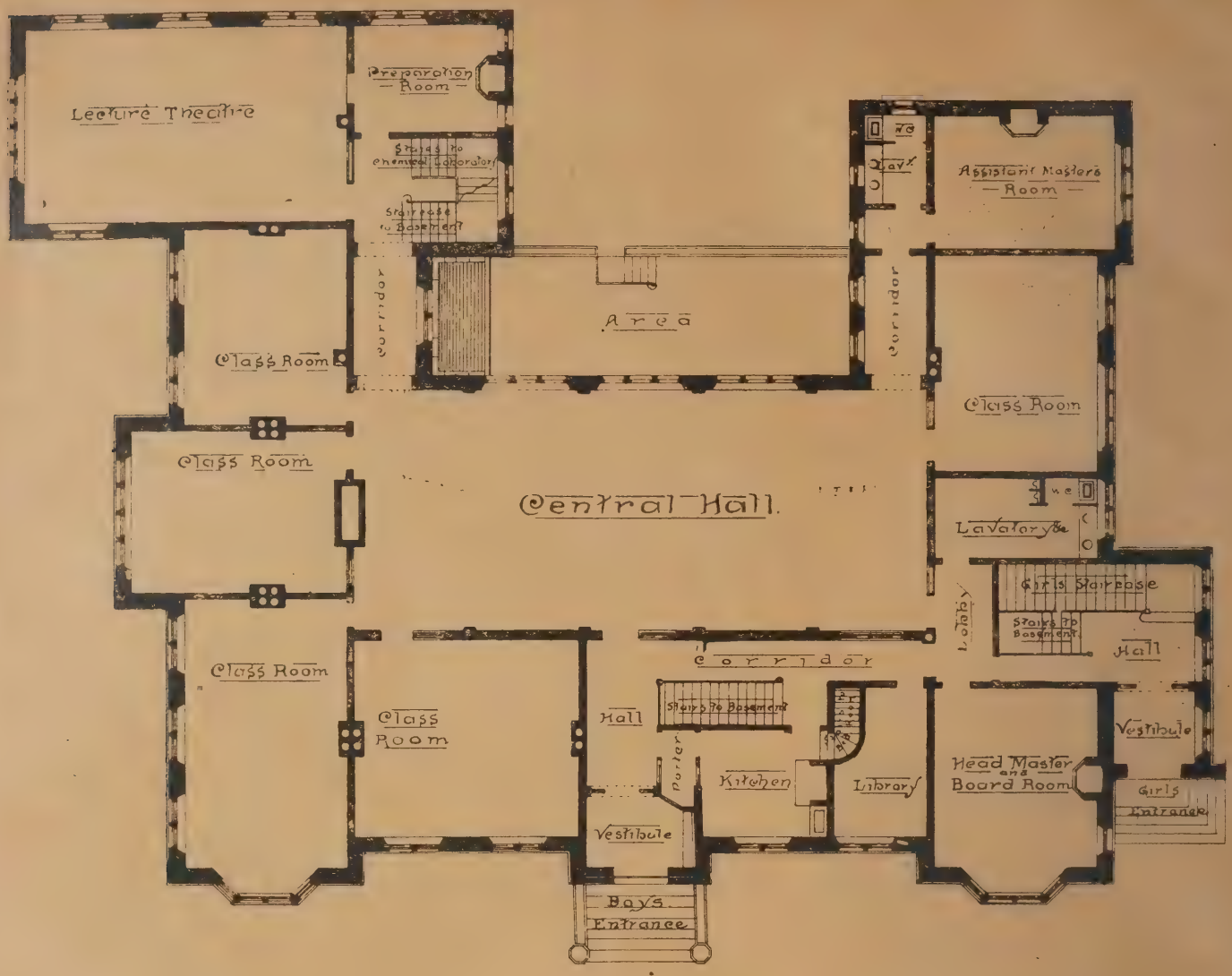
Insulation.—As we have already pointed out, it is just as necessary to confine electricity in well-defined paths as it is to supply means of conducting electricity—that is, conductors must be insulated. For this purpose materials (called insulators) which offer a high resistance to the passage of electricity are used to surround and completely envelop the metallic conductors with a perfectly uniform and continuous coating. The following are among the best insulators:—Air, oils, paper, indiarubber, guttapercha, resinous and bituminous compounds. In some cases for temporary work, and for dry situations, the insulation consists of cotton or hemp woven into a braid and well soaked with indiarubber solution, pitch, tar, or resin. For electric light and power cables the essential properties of a good insulator are:—(1) High specific resistance or resistivity; (2) mechanical strength and toughness—this is partly secured by increasing the thickness or number of layers; (3) durability; (4) flexibility with no tendency to crack; (5) capability to resist abrasion; (6) should be homogeneous (to resist disruptive discharges), waterproof, and not affected by temperature, moisture, acid, and gases.

Of the various materials possessing the above properties to a greater or less degree, experience points to the superiority of the various forms of indiarubber when properly prepared and of good quality. At this point it will be well to refer to the characteristic properties of fibrous materials, guttapercha, and indiarubber.

Fibrous materials, such as braid of hemp or cotton saturated with insulating compounds, are specially adapted for very dry situations and low pressures. For damp situations they are never recommended, since they readily absorb moisture, and so lose their insulating properties.

Guttapercha, although extensively used for submarine cable cores and underground telegraph lines, has not proved itself suitable for insulating electric-light and power cables. Its main defect is its low melting-point and a tendency to soften at low temperatures. Consequently, there is the possibility of the metallic conductor displacing itself because of its weight; and since the temperature of the conductor increases with increase of current, there is much to prevent its wide adoption. It is practically useless for temperatures higher than 100° Fahr. and for exposure to the atmosphere in cold weather or in very dry places, in which case it becomes brittle, and readily cracks. It is, however, suitable for immersion in water between temperatures of 40° and 80° Fahr.

Indiarubber of all substances fulfils the requisite properties to a high degree; but there is the disadvantage that the best rubber, especially that brought from Para, is very expensive, in addition to which there is a tendency to set up decomposition of the rubber if pure rubber alone is used when the temperature rises. Consequently, various combinations of rubber have been introduced. "When first used for insulating cables,



GROUND-PLAN

WHEELWRIGHT GRAMMAR SCHOOLS, DEWSBURY.

the pure rubber was cut into strips, and wrapped spirally round the conductor, this being the easiest way of applying it, and requiring only very simple machinery. A cable made in this manner is by no means satisfactory, as the covering is not homogeneous or waterproof. The application of a little heat—as, for example, by dipping the cable in hot water—will make the overlapping edges stick together, so that for the time it appears to test well in water; but this very sticking together is the result of the rubber commencing to decompose, and the decomposition, once started, will rapidly increase, especially at high temperatures, and will eventually destroy the rubber, both mechanically and electrically."

To overcome this difficulty, a compound rubber has been introduced, the rubber being thoroughly mixed and kneaded together with litharge, French chalk, oxide of zinc, barytes, lampblack, sulphide of lime &c. The result is a compound mechanically stronger, and less likely to decompose than pure rubber, and although the specific insulation resistance is diminished somewhat, a very satisfactory insulating material is produced. The form of rubber, however, which experience has shown to satisfy the conditions imposed for insulating materials is vulcanised rubber. The operation of vulcanising, or curing, as it is sometimes called, is a method of treatment to prevent decomposition of the rubber. It is a process of mixing a small quantity of sulphur with pure rubber, and subjecting the mixture to a temperature of from 250° to 300° Fahr.

Experience has shown that vulcanised rubber is more durable than pure rubber; that it is mechanically stronger, more flexible, and capable of withstanding a higher temperature without injury. This result is due to the chemical combination which takes place between the rubber and sulphur during the operation of vulcanisation, in consequence of which the decomposing action of pure rubber is neutralised.

A layer of pure rubber is often interposed between the copper wire and the vulcanised rubber that surrounds it, because if an excess of sulphur be used when vulcanising, the free sulphur acts on the copper, and produces deterioration. At the present time, vulcanised rubber is extensively used.

In practice, the branch wires do not require so high an insulation as the main cables, although circumstances vary considerably, and each case should be considered separately. For most cases an insulation resistance of 300 meg-ohm-miles is sufficient for branch circuits, and 600 meg-ohm-miles for the main circuits. In a few cases, especially for very dry situations, the branch wires may require only 150 meg-ohm-miles as the insulation resistance, although the use of such low insulation resistances is not recommended, and its use should be restricted for lighting and power circuits.

The following is the description of the insulation of the qualities just mentioned:—

Vulcanised Rubber Insulation (300 to 600 meg-ohm miles).—Insulated pure indiarubber, then vulcanised indiarubber, indiarubber-coated tape, and the whole vulcanised together, braided, tarred flax, and coated preservative compound.

Pure Rubber Insulation (150 meg-ohm miles).—Insulated one coat prepared cotton tape, indiarubber, a second coat of prepared tape, braided, tarred flax, and coated preservative compound.

(*To be continued.*)

WHEELWRIGHT GRAMMAR SCHOOLS, DEWSBURY.

MANY readers were puzzled last week, probably, by the appearance on p. 718 of what purported to be the ground-floor plan of these schools, which we otherwise correctly illustrated. The plan that was given was wrongly inserted, having nothing to do with the above schools, but belonging to a subject yet to be given. We herewith give the ground-floor plan in question. The architect of the schools is Mr. J. Lane Fox, of Dewsbury.

PROPOSED AMENDMENT OF THE LONDON BUILDING ACT.

THE London County Council has determined, upon the recommendation of its Building Act Committee, to apply to Parliament next Session for some important amendments in the London Building Act, 1894. In a report upon the matter the committee point out that recent decisions in the High Court as to the construction to be put upon certain sections of the Act are such as appear to render the working of the Act as it stands very difficult. The first point in which amendment is desired is with reference to the procedure in the case of dangerous structures. Some delay has occurred owing to a recent decision of one of the magistrates as to the service of the necessary summonses, in which he held that service by affixing a copy upon the premises was not sufficient unless the Council had, after some reasonable inquiry, failed to find the owner. The High Court, when applied to for a *mandamus* to the magistrate to hear the summons with which he had declined to proceed,

decided that if the Council made reasonable inquiry, and could not discover the owner, a summons could be served by affixing a copy on the premises, but discharged the *mandamus* on the technical ground that no evidence was given before the magistrate that such inquiry had been made. The committee think that that decision will put a serious difficulty in the way of proceedings, as it must involve in each case a search for documentary proof of the ownership of premises before a summons can be taken out, as without evidence of ownership the case might be dismissed, with costs against the Council. They consider it essential that structures certified to be in a dangerous state should be dealt with with the utmost promptitude, and this will, they say, be impossible if such inquiries, which have never hitherto been required, have to be made. The section of the London Building Act dealing with the matter is to be so amended as to make it clear that in all cases of dangerous structures all documents in proceedings may always be served on some person on the premises to whom such documents relate, or, if no person be found on the premises, by affixing such documents thereto. An amendment of section 14 of the Act is also to be asked for, in order to make it clear that no part of any new building shall be erected with its boundary fence or wall at less than the prescribed distance from the centre of the road. An amendment of another section is desired to make it clear that no working-class dwelling shall be erected within 20ft. from the centre of the street or way on which it abuts. Amendments are also to be asked for in relation to the clauses providing that penalties for certain offences under the Act can only be enforced when an order of the magistrates is not complied with.

OUTLET AND INLET VENTILATING APPLIANCES.

We have received a copy of Messrs. Hayward Brothers and Eckstein's new ventilator catalogue, in which several excellent inlet and outlet ventilators are shown. The "Improved Sheringham" ventilator (Eckstein's patent) for the admission of fresh air through external walls, without the discomfort of draught, is a great improvemeut on the old form. The front valve is allowed to open inwards, as far as desired, which directs the current of fresh air upwards to the ceiling, where it spreads and forces the air of room up the chimney. The front, or valve, can be adjusted to any angle, or closed entirely by a cord and weight. The ventilator is made in iron, japanned bronze, white and gold, or galvanised, and in four sizes—9in. by 3in., 9in. by 6in., 13½in. by 6in., 15in. by 10in., to suit the brick-courses, and the prices are very reasonable. The "Khola" new inlet ventilator has a fixed front, with hanging valve on the top, which is allowed to open as required by a cord. Several patterns of improved "mica outlet ventilators" are shown, square and oblong in shape, and having brass trellis fronts. Some of these are on the "hit-and-miss" principle, and can be closed if necessary. The "Choop" patent noiseless ventilator, for the discharge of vitiated air into smoke flues, the "Union" ornamental inlet ventilators, Hayward's "Louvre" ventilator, a very good type, and other patterns are shown, all deserving the notice of architects and builders. Particulars can be obtained of the manufacturers, Messrs. Hayward Brothers and Eckstein, Ltd., Union-street, Borough, S.E.

BOOKS RECEIVED.

The Sanitary Inspector's Handbook. By Albert Taylor, Assoc. San. Institute, &c. Second Edition (London: H. K. Lewis, Gower-street).—The author of this handbook is a competent authority on sanitary matters and a practical inspector of nuisances, and his book will be found of service to all in his vocation. As a means of comparing the law of public health of the Metropolis and other parts of the kingdom, the work will be found of service not only to sanitary authorities and inspectors, but to architects and builders. The author gives a useful alphabetical synopsis of the provisions of the Acts. Every sanitary question receives attention: abatement of nuisance and procedure, house drainage, testing closets, soil and waste-pipes, gullies and traps, ventilators, meat inspection, slaughter-houses, lodging-houses, factories and workshops, dairies, &c. The pages are full of carefully-prepared illustrations of sanitary apparatus and details of traps and drains, as Duckett's self-acting slop-water closet, Crapper's Kenon trap, numerous kinds of patent joints, as those of Doulton's and others; forms of house inspection, of notices to owners, &c., and other useful data, and the book will be found of great use to those who are seeking to quality for inspectors.——*Later Renaissance Architecture in England*, by John Belcher and Mervyn E. Macartney (London: B. T. Batsford, High Holborn). Part II. of this valuable series of examples o the English Renaissance, being domestic buildings, erected subsequent to the Elizabethan period, maintains a high character. These photo-prints are of excellent quality, sharp and clearly defined in the detail, and have been specially prepared for the work. In the present part twenty-six tinted plates are given, all representing examples of Later Renaissance domestic buildings. Several very beautiful and typical specimens of the style are selected; amongst them is Raynham Hall, Norfolk, a balanced structure of Ionic Classical features of imposing size, brick and stone, the centre adorned with engaged Ionic columns supporting a pediment on a rusticated basement, the end, with scroll gables, surmounted by pediments. The Customs House, King's Lynn, has almost a French feeling about the design, and high hipped roof with its cupola. Of late work verging on the Classical taste of the 18th century is the Temple of Æolus at Kew Gardens, Queen's College, Oxford; the gateway and cupola, Houghton, Norfolk; Ely House, Dover-street, W.; and a corner of South Audley-street, very typical examples of two different phases; views of Greenwich Hospital, Hampton Court Palace river front. A fine interior view of the Library, Trinity College, Cambridge, shows the handsome carved bookcases between the windows, with details of panelling. Less known examples, but of great interest, are Wolvesey House, Winchester; Lyttenhanger, Herts, a fine brick front; a house in West-street, and Swan House, Chichester; Farnham Castle staircase. A fine carved staircase is that in a house in High-street, Guildford. Two admirable examples in interior decoration are among the plates from the Skinners' Hall, and from a house at Epsom. The work is to be completed in six parts, at a guinea a part.——*Workmen's Compensation Act*, 1897, by W. Addington Willis, LL.B., London, of the Inner Temple, barrister-at-law (London: Butterworth and Co., Fleet-street, E.C.).—This little handbook of the Act gives, in a concise form, the provisions and schedules of the Act which comes into operation on the 1st of July next year. The law will revolutionise the existing relations between employers and their workmen who have been injured, and it is necessary that the employer and workman should study the statute, so as to enable them to understand their position and to make the necessary arrangements. The Act casts upon employers a great responsibility—viz., to make provision for every workman injured by accident in their employ. The insurance companies and other benefit societies will be greatly affected by it in different ways. The workman himself ought to acquaint himself with the provisions, so as to enable him to consider a joint scheme as a substitute for the Act by which they will be able to make terms advantageous to both parties. According to this Act the employer is compulsorily called upon to insure his servants against injury by accidents. It is limited to accidents in certain trades where the risks are great, and the sections extend to injuries arising from accident. These provisions are set out clearly with notes, and the schedules appended show the method of assessing the amount; arbitration for this purpose being substituted for litigation. Every employer and workman ought to study this little summary——A new and cheaper edition of *Practical Building Construction*, by J. P. Allen (London: Crosby Lockwood and Son, 7s. 6d.), is issued. There is no better book for the student, or for men actually engaged in work, and its price now brings it within the range of everybody.——*The Commercial Uses of Coal-Gas*, by Thos. Fletcher, F.C.S. (Fletcher, Russell, and Co., Ltd., Warrington, Manchester, and London), is a little volume of notes, the result of thirty years' experience, on the practical results of coal gas as a fuel. Valuable data and figures will be found on gas-supply; pipes, their areas, minimum bore, and greatest length, and the cubic feet supplied, the gas consumption per hour of different bores. The heating-power of gas is given, from which it appears that 1c.ft. of coal-gas will melt 2lb. of ice, heat one gallon of water 50° Fahr., heat 1,500c.ft. of air 30° Fahr., boil one pint of water, keep an iron plate 1ft. square at 380° Fahr. for fifteen minutes, &c. Drying by heated air, press-heating, and various industrial and domestic uses are treated in separate sections. This little book will repay study by all gas consumers and engineers.

CHIPS.

The contract for the erection of the Edward Richard Memorial Church at Ystrad Meurig has just been let for £1,515. It is proposed to erect a tower at a cost of about £1,000, in addition to the church.

An infirmary is about to be added to the workhouse at Falmouth, from plans by Mr. Powell. Mr. W. H. Dunstan, of Falmouth, is the clerk of works, and the tender of Messrs. Rich and Son, of Penryn, has been accepted for the work at £1,980.

The tender of Mr. J. Hampton Matthews, Harrogate, of £2,155 for the works in connection with the Bilton (Harrogate) sewerage scheme has been accepted by the Knaresborough Rural District Council.

The St. Olave's Guardians have appointed Mr. George Hillier clerk of the works at the new union offices which are to be erected at Shad Thames, Tooley-street, and which will cost, with the site, nearly £30,000.

The first half-yearly meeting of the West of England and South Wales Federation of Master Builders was held on Monday in last week, under the presidency of Mr. August Krauss, at the Guildhall, Bristol. The conference was well represented by delegates from Bath, Bridgwater, Bristol, Newport, Mon., and Weston-super-Mare. The chairman remarked that it was now six months since the federation was formed, and there was now peace in the entire district.

A mural tablet in statuary marble has been placed in the church of SS. Peter and Paul, Brockdish, Scole, in memory of the late Lord Justice Kay. It is elliptical in form, with the arms of the deceased judge carved and emblazoned in colours. There was an elaborately-carved canopied monument, designed by Mr. J. K. Colling, put up in the churchyard some time back in memory of the late Lady Kay, and this has simply had an inscription added to it. Both of these works were carried out by Messrs. J. Forsyth, of Finchley-road, Hampstead.

On Saturday memorial-stones of a new Sunday-school in connection with Grenville Wesleyan Chapel, Hotwells, Bristol, were laid. The scheme involves an outlay of £2,000. The buildings will accommodate between 300 and 400 children. They will occupy a site contiguous to the chapel, with which they will be connected, and will include a large schoolroom, with an open-timber roof, and four small classrooms, with offices. The buildings will be erected with local red facing bricks, relieved with Bath stone dressings. The architects are Messrs. S. Paul and James, and Messrs. Eastabrook and Sons, also of Bristol, are the builders.

The contemplated scheme for the Quarrier Consumption Hospitals of Scotland will cost about £60,000. There will be six hospitals, containing in all 200 beds. Over £20,000 has now been received, which has been expended on the first hospital and necessary buildings.

Mr. W. J. Dibdin, late chief of the chemical and gas department of the London County Council staff, was presented, on Saturday, with an illuminated address by Dr. F. Clowes, the new chief, on behalf of the officers of the department.

A font has just been despatched by steamer for the new cathedral at St. John's, Newfoundland. It has been designed by Mr. J. Oldrid Scot, F.S.A., under whom the cathedral, which was unfortunately consumed by fire a few years ago, is being rebuilt by sections, as means allow. The font is in the Decorated style, and has a central shaft surrounded by columns of polished Levanto marble. The bowl is circular, and of the same mottled marble. The font, which is of exceptionally large proportions, girthing over 10ft., has been made in the studios of Messrs. Harry Hems and Sons, of Longbrook-street, Exeter, by whom the carved oak fittings in the choir were also executed.

The Secretary for War has directed that the attention of officers commanding troops shall be given to the necessity of intelligently and energetically carrying out the portions of the Queen's Regulations which relate to teaching soldiers useful trades, and effecting repairs to barracks by the regiments occupying them. The Commander in Chief adds his opinion that it should be extremely rare for troops to be unable to execute such repairs as may be requisite to keep their barracks in order, with the co-operation of the Engineer and Barrack Departments.

OBITUARY.

Architects and others who were more or less acquainted with the late Mr. J. Aldam Heaton will learn of his death with unqualified regret. In a quiet unassuming way Aldam Heaton carried out with a freedom from affectation a great variety of work, and in co-operation with his old friend, Mr. R. Norman Shaw, R.A., furnished and decorated many country houses and other buildings in an unconventional style and in the best of good taste. Aldam Heaton was an instinctive artist, and although he entertained an unqualified dislike to the productions of the mere manufacturer on the one hand, he was equally severe on the queer and extravagant methods of what has been called the "art and crafty" school. Mr. John Aldam Heaton was born at Leeds in 1830, and he died on Saturday, the 20th inst., in London. A few years ago a paralytic seizure commenced a long and sad illness, from which he partially recovered, keeping to work almost to the very last. He was educated at Repton, Derbyshire, one of the old foundation schools, and was the son of Mr. John Heaton, partner of the old firm of Aldam, Pease, and Co., dealers in Yorkshire fabrics. He was apprenticed as a dyer and weaver, and at the age of 30 Mr. Heaton introduced many improvements in the Jacquard loom, while he was employed as a manufacturer in Bradford. His tastes were, however, far more in accord with the artistic side of his business, and his early endeavours at design developed in attractiveness to such an extent as to induce him to leave his Yorkshire business and settle in London in 1875, when he began to design embroidery and decorative painting. His skill soon brought him work, and as business extended Mr. Heaton embarked successively in furnishing, upholstery, cabinet-making, mural ornament, and stained-glass making. The *Teutonic* and *Majestic* steamers were decorated by him, and the ornamentation of saloon dining-cars for the London and North-Western Railway were among his undertakings. Several churches were enriched by his designs, and stencilling in his hands developed into a fine art. At the present time his establishment in Bloomsbury-street is exceedingly busy, and lately some large ceilings of elaborate character were executed by him for a new palace in India. Mr. Heaton had considerable literary ability, and was a racy and forcible writer. He read papers of much value before the Royal Institute of British Architects, the Architectural Association, and other artistic societies. He wrote for the *Art Journal* on "Colour" and "Form." In 1889 Mr. Heaton edited a big work on "Furniture and Decorations in England During the Eighteenth Century," in two folio volumes, published by Mr. Bumpus. We gave a portrait of Mr. Aldam Heaton in the Building News for April 25, 1890.

The sudden death is announced of Mr. Charles John Shoppee, F.R.I.B.A., a well-known architect, having an extensive City practice. Mr. Shoppee, who was in his 74th year, was at his office in John-street, Bedford-row, on Saturday, the 13th inst., when he appeared to be in excellent health, and on the Sunday following he attended Divine service at the chapel of Gray's-inn, as had been his custom for upwards of forty-six years. On the Monday morning, however, he was suddenly taken ill, and he passed away at his residence, 41, Mecklenburgh-square, on Thursday morning, the immediate cause of death being failure of the heart. He was well known and respected in the City as a member of various guilds. Mr. Shoppee was the eldest son of the late Mr. Joseph Shoppee, of Uxbridge. His family had been connected with that town for four generations, and he was born there on December 9th, 1823. He was educated at Uxbridge School, and then became the pupil of the late Mr. Thomas Morris, of Regent-street, subsequently entering the office of Mr. Railton. In 1851 Mr. Shoppee commenced to practise on his own account at 61, Doughty-street, Gray's-inn, and in 1878, together with his eldest son, who had then joined him, removed to new offices at 22, John-street, Bedford-row. Two years after commencing practice he passed the examination for district surveyor, while he was admitted an Associate of the Royal Institute of British Architects in 1862, and a Fellow of the Institute in 1880. He was elected a Fellow of the Surveyors' Institute on its foundation in 1868, became a member of the council in 1870, vice-president in 1885, and president in 1892, holding the last-named office for two years. During this period he served on the Tribunal of Appeal with regard to the Metropolitan Building Act, and he also represented the institution at the congresses of surveyors held at Paris in 1879 and 1889. He had considerable experience as an arbitrator and umpire in references and compensation cases, and also as an assessor in architectural competitions. In addition to the Surveyors' Institution, he was connected with the Surveyors' Association, and at the time of his death was, with one exception, the senior member of that body. He was an active member of various City guilds. On three occasions he served the office of master of the Armourers and Braziers' Company, and he was, in fact, the immediate past-master of that company. He was also a past-master of the Barbers and Glovers' Companies, and, as a member of the City and Guilds of London Institute, he did much to advance the cause of technical education. The restoration of the old hall of the Barber Surgeons' Company was carried out under his direction. Together with his son, Mr. Charles Herbert Shoppee, he acted for the Home and Colonial Society in the erection of the Reynolds Memorial Schools and the Evans Memorial Chapel, and he was also responsible for the erection of many blocks of buildings in the City. For many years he was annually elected deputy-governor of the French Hospital, as a representative of the old Huguenot family of "Chapuis," the original name of his great-grandfather. He was also a vice-president of the London and Middlesex Archæological Society and of the Ex-Libris Society, and a member of the American Numismatic Society, and was regarded as an authority upon heraldry and scarce books and prints. The practice will be carried on by his son, Mr. Herbert Charles Shoppee. The funeral took place on Monday at Uxbridge Cemetery.

The death occurred in Edinburgh on Sunday of Mr. Kenneth Mathieson, in his eighty-first year. For a number of years Mr. Mathieson took an active part in the public affairs of Dunfermline. Entering the town council in 1853, he sat continuously till 1877. For six years he was Provost, and during that time was instrumental in getting a Bill passed for the introduction of a water supply from Glensherup. He also saw the scheme for the erection of the present suite of municipal buildings carried through. Mr. Mathieson was a man of conspicuous business ability, and as a contractor carried out many important works. Along with his father he built the new bridge at Stirling, and he was the contractor for the Dunfermline and Stirling railway, besides being engaged in various large undertakings in England.

Mr. H. H. Brown, member of the contracting firm of Coleman, Ryan, and Brown, of New York City, which is building the large Croton dam, died on November 9 on the steamer *Puritan*, while on his way to Boston, Mass. He was one of the richest contractors in the United States. He began work as a labourer in the construction of Central Park, New York, and rose to be an extensive employer of labour. He was engaged on the construction of the Union Pacific and other railroads in the West, built the Park Avenue tunnel in New York City and two sections of the new Croton aqueduct, and had just completed some extensive work in changing the grade of the New York, New Haven, and Hartford Railroad lines in the vicinity of Boston.

A boys' department is being added to the board schools at Erdington, Birmingham, from plans by Mr. C. Whitwell, at an estimated cost of £5,700.

The well-known Conciliation Hall in Burgh-street, Dublin, which of late has been utilised as a corn store, has just been transformed into the Grand Lyric Music Hall under the direction and from plans by Mr. W. H. Byrne. Messrs. Meade and Son were the contractors.

A special meeting of the Health Committee of the Liverpool Corporation was held on Monday for the purpose of considering certain rearrangements of the staff of the department consequent upon the resignation of Mr. H. P. Boulnois, city engineer and building surveyor. After some discussion, it was decided to recommend the City Council to promote Mr. William Goldstraw, deputy-building surveyor, to the position of building surveyor to the corporation, and to increase his salary from £350 to £450 per annum. The meeting also resolved that a successor to Mr. Boulnois as city engineer be advertised for, a salary at the rate of £1,000 a year being offered. A sub-committee was appointed to deal with the applications, and make recommendations to the general committee.

Building Intelligence.

Aldeburgh.—Building operations continue very active at this quiet East Suffolk watering-place. A new detached residence has been erected on the Aldeburgh Park estate by Mr. G. O. Knowles, and leased by Mr. Woodcock, architect, who will soon come into residence. Another house on the same estate, which is now being roofed in, is from a design of Mr. Thomas Key, the contractor being Mr. J. E. Stannard. Many of the plots of nearly an acre in extent on the Crescent estate have been sold. A new residence, from the design of Mr. Thomas Key, has been completed by Mr. G. A. Knowles, who is building a very large residence on the eastern portion of this estate, from designs by the same architect, for himself. At Brudenell-terrace, five marine residences, each five stories in height, are in course of erection; the plans are by Mr. T. Key. The South Lodge estate has changed hands, the older portion having been purchased by Mr. G. O. Knowles, and cleared ready for a terrace of houses, from designs by Mr. Wade, a London architect. Improvements are also noticeable in the main street. Colonel Smyth having sold the London House property, the site will be cleared, and the purchaser has instructed by Mr. H. J. Wright, of Ipswich, to design a new residence.

Birmingham.—A number of large Gothic villa residences are in course of erection in the Woodbourne-road, Edgbaston, on the building estate of the Right Hon. Lord Calthorpe. The contractor is Mr. Edward Airey, of Gillott-road, in this city. At the village of Knowle, about nine miles from Birmingham, a number of old cottages belonging to Mr. Samuel Scoltock, having a frontage of about 70ft., have been entirely remodelled. The whole of the internal portion has been "gutted," the building raised several feet, and the front elevation—Gothic in style—brought up to date, by the insertion of bay and two-light windows, porch, shop-front, ornamental cornice, chimney caps, moulded barge boards, &c. The contractor was Mr. S. Needle, of Knowle. The architect for the above buildings is Mr. J. Statham Davis, of Sparkbrook, Birmingham.

Edinburgh.—A new United Presbyterian Church, in Fountainhall-road, was formally opened on Thursday in last week. The church has been built from the designs of Mr. Graham Fairley, architect, Edinburgh. Alike in plan and design, the edifice is an adaptation of the 13th Century Gothic architecture to the requirements of a modern church. Included in the plan are the traditional nave, aisles, transepts, and chancel; and while the nave is wide in span, the aisles are narrowed to side passages. There is no gallery. The chancel, in which stands a communion table of oak, is reserved for the use of the elders, and the choir are accommodated in the east transept, where accommodation for the organ, which is built to designs by Mr. Eustace Ingram, London, is also found. A low parapet wall of stone is built in front of the church, separating the ground from the footway, instead of the iron railing usually adopted. There are several stained-glass windows, most of them gifts from members of the congregation. Two of the windows in the chancel were brought from the former church in Infirmary-street. The windows lighting the aisles are also in stained glass. On the east side these represent historical Old Testament characters, while on the west the representations are of New Testament figures. The pulpit is of Caen stone and red marble, and in the niches are figures of the Saviour and of the Apostles Paul and Peter. The desk is of polished brass work. In the centre of the chancel is a lectern of hammered brass-work, and on the east side a font of the same material as the pulpit—both gifts. The church will accommodate a congregation of 600. The seats are of pitchpine, stained a dark green tint; and the roof is of open-timber work, also stained. Provision is made for the lighting of the building by means of electricity, the heating being on the low-pressure system. Behind the chancel are the halls and offices. The large hall gives accommodation for 200, and is furnished with an open-timber roof. The building is valued at about £8,000.

Glasgow.—A meeting of the sub-committee of the Glasgow Corporation Parks Committee was held last week to consider an outline of the

scheme proposed for the sculpture and carved work of the new Art Galleries. The following chief carvers were recommended:—North façade, William Shireffs, 287, West Campbell-street; south façade, J. C. Young, 197, Dumbarton-road; east and west façades, William Vickers, 221, West Regent-street; bronze figures on towers and north porch, A. M'F. Shannon, 7, Scott-street, Garnethill; central hall, R. A. M'Gilvray and Ferris, 129, West Regent-street; and east and west courts, James M. Sheriff, 20, Canning-place. It is estimated that the work will cost £15,644. There is a provisional sum of £5,007 included in existing contracts which is available towards the proposed expenditure. The sub-committee adjourned consideration of the scheme in order that more information might be laid before them as to the cost of the sculpture work.

Halifax.—A group of gas offices, which has just been completed for the gas committee of the town council, is situate in Mulcture Hall-road (adjoining the gasworks), and has a frontage to that road of 225ft. It consists of drawing-office and plan-rooms, engineer's, engineer's clerks', general, and coke offices, store-room and store-keeper's office, telephone room, waiting-room, and lavatories on the ground floor, with a hall and staircase. The first floor provides committee-room, laboratory, photometer, and four store-rooms. Adjoining are two houses for night and day foremen. The workshops are adapted for the various works connected with the making of lamps, meters, and general repairs. The basement consists of store-rooms for pipes and fittings. The work has been carried out by local firms, from the designs and under the direction of Mr. W. H. D. Horsfall, architect, of 9, Harrison-road, Halifax, who was also intrusted with the borough electric light works for the same council.

Lordship Lane, S.E.—The new Passmore Edwards Public Library in Woodwarde-road, Lordship-lane, Dulwich, was formally opened on Wednesday by the Lord Chancellor. The library is one of the numerous institutions of this class presented by Mr. J. Passmore Edwards, and occupies a site given by the Dulwich Estate Governors. It has been erected from designs by Messrs. Charles Barry and Co., and under their superintendence. The building is of red brick, and with Bath stone dressings and moulded-brick strings and cornices. The floors are fire-proof, and are constructed on the principle of Messrs. Mark Fawcett and Co., of Queen Anne's Gate, Westminster. Messrs. James Gough and Co., of Hendon, took the contract at £5,834, and Mr. J. Bint was the clerk of works. We illustrated Messrs. Barry's design in our issue of Oct. 25, 1896.

Notting Hill-gate, W.—The plans of the new Coronet Theatre have just received the final approval of the London County Council. Mr. W. G. R. Sprague is the architect. The building will occupy a site in High-street, Notting Hill-gate, open on three sides, having frontages to High-street, Johnson-street, and Uxbridge-street. The frontage is to be entirely of white Portland stone. The audience will enter to the better part of the house direct from the High-street. The house is to be on the two-tier system, and is without a single column, the construction throughout being of concrete and steel. On the lowest level are stalls, pit-stalls, and pit, the first circle consisting of dress-circle and balcony, and second circle consisting of amphitheatre seats and gallery. The stage is some 40ft. deep, with a width of 65ft., and a height of 55ft. to grid. The decorating and furnishing throughout will be in Louis XVI. style, and the electric light will be employed. The theatre will be able to accommodate some 2,000 persons, and will be ready for opening early next autumn. The cost will be about £25,000.

Partick, Glasgow.—St. Bride's Church, in Rosevale-street, Partick, was opened on Saturday. The new church is of undressed stone of a red colour, with a roof of open timber. The church proper will accommodate 800 persons, and, in addition, there is a hall accommodating 300. Internally, the building consists of an open nave, free of galleries; an aisle, separated from the nave by an arcade of four arches, and with a gallery; a deep chancel for the choir and the Communion table, a side chapel, an organ-chamber, and a font recess. The estimated cost is £4,000. Mr. P. Macgregor Chalmers, Glasgow, is the architect.

Pudsey.—A new Baptist chapel, erected at Littlemoor, Pudsey, was opened on Saturday. It will supplant an old and incommodious building which has been used for 47 years, and which will now be converted into a Sunday-school. The new edifice has been erected from the designs of Messrs. Hodgson and Farrar, architects, Bradford and Pudsey, and is in a plainly-treated Classic style, the front being relieved with dressed ashlar piers and moulded cornices. The chapel, which has a gallery running on three sides of it, provides sitting accommodation for about 600 persons. At the east end is a choir and organ gallery, separated from the chapel by a semi-circular arch. The whole of the pews, which are of pitch-pine, radiate to the rostrum. The latter is of pitch-pine and mahogany. There are three vestries on the level of the chapel floor, and advantage has been taken of the fall in the site to get a kitchen, rooms for a Young Men's Christian Association, and two classrooms in the basement, but above the level of the ground. The ceiling of the chapel is treated with a lantern running the length of it, relieved with ornamental plaster-work. The heating is by hot water, on the low-pressure system.

Stretton.—The Bishop of Lichfield consecrated on Wednesday a church at Stretton, Burton-on-Trent, which has been built by Mr. Gretton, of Sudbury Hall, at a cost of considerably over £30,000. It is a cruciform edifice of stone, with a massive central tower. The interior fittings and the furniture are elaborate in character. There is a high screen, and the church is also provided with a south chapel. The roof decoration is rich, and the east window, by Sir W. B. Richmond, cost over £1,000. The whole of the woodwork is of oak, and for the most part carved. The church also contains an organ. Accommodation is provided for 400 persons. It has been erected from the designs of Mr. J. T. Micklethwaite, F.S.A., Westminster.

Wrexham.—New business premises for Parr's Bank were opened last week, the site having a frontage of only 27ft. to High-street and 30ft. to Church-street. The whole of the ground floor, with the exception of a side entrance and staircase, is given up to the bank, and consists of a room 24ft. square and 12ft. 6in. high. The fittings are of oak, and the floor of mosaic paving. On the basement are the strong-room and plate-store, voucher-store, private room, and heating apartments, lavatory for bank officials, and coal-store. Light is reflected to the basement rooms by means of Hayward's semi-prism pavement lights, with tiled wall-space below. The staircase to the first floor is formed entirely of concrete, with walls lined with cream-glazed tiles. The first and second floors are divided up into suites of offices, and on the top floor there is a living-room for the caretaker. In order to devote as much space as possible to the banking-room, the outer walls have been constructed of sufficient thickness only to insure strength and stability, and the massive Classic columnar type of architecture identified with banking premises has been departed from, the exterior having been treated in a phase of English Renaissance. The outer walls are faced with stone from the Abenbury quarries of the contractors. The angle of the two adjoining fronts is emphasised by a projecting octagonal turret, which, carried up through three floors, rises above the main roof, crowned with a copper dome. The structural work has been carried out by Messrs. Davies Bros., of Wrexham. The carving on the façades is the work of Mr. F. G. Lloyd, Victoria-place, Manchester. The gasfitting and ornamental ironwork are by Messrs. Hardman, Powell, and Co., of Birmingham, and Messrs. Waygood and Co., of Falmouth-road, London, supplied the lift. The whole has been carried out from the plans and under the superintendence of Mr. J. H. Swainson, M.S.A., architect and surveyor.

The West Ham Corporation have instructed Mr. A. Saxon Snell, F.R.I.B.A., to prepare plans for the erection of public swimming and private baths at Plaistow, E.

The aggregate realisation at the Mart last week, as officially reported by the Estate Exchange, was £126,943. The tone of the market was very satisfactory, the competition for good investments being brisk, and good prices maintained. Landed property was only represented by one estate, which had, however, to be withdrawn. This week bricks and mortar formed the staple supply, with the exception of several large blocks of building land at Brentwood and Shenfield, Essex, which were sold on Tuesday.

LEGAL INTELLIGENCE.

Singular Action as to Sewer Construction.—Whitfield v. The Bishop Auckland Urban District Council.—This action, tried before Mr. Justice Wright and a jury at the last Durham Summer Assizes, was brought to recover damages for injury done to the plaintiff's houses, 18 and 19, Princes-street, Bishop Auckland, caused by the alleged negligence and breach of duty on the part of the defendants, in not properly maintaining and repairing a sewer which was under their control. The sewer was laid along Princes-street in 1866, and the houses in question were built in 1871 or 1872. The pipes of the sewer were the same as those in common use at the time, but without proper flanges to prevent the escape of sewage. In 1879 the sewer was taken over by the defendants. Before 1892 the sewer was repaired, and again in 1892 part of it became defective owing to subsidence, and had to be repaired. Mr. Lindsay, the defendants' surveyor, ordered the pipes to be taken up for a distance of ten yards on each side. In 1895 the plaintiff's houses, which were lower down the street than the place where the repairs were done, were flooded with sewage, causing the damage complained of. It was contended for the plaintiff that the defendants, having knowledge of the defective condition of the joints of the pipes, were negligent in allowing the pipes to remain in the ground. In summing up to the jury, the learned Judge left the following questions to the jury:—(1) Were the foundations of the plaintiff's houses insufficient? Answer.—No. (2) Was the defendants' sewer badly constructed originally—that is, before their time, and, if so, in what respect? Answer.—It was badly constructed in consequence of defective joints. (3) Was the defendants' sewer improperly and negligently maintained or repaired by them, and, if so, in what respect? Answer.—The sewer was improperly and negligently maintained, because the defendants did not examine the drain the whole length of the street on the second occasion upon which they opened it out. (4) Was the damage caused entirely by the bad situation or bad foundation or bad construction of the houses? Answer.—No; it was caused by the water from the sewer. Mr. Strachan, Q.C., for the defendants moved on Monday last for judgment. It was a non-feasance for which no action would lie. The proper remedy for the plaintiff was to complain to the Local Government Board (Public Health Act, 1875, sections 15 and 299). The jury had not found as a fact that the damage was caused by not doing repairs which they had undertaken to do. It was not suggested that there was negligence in maintenance or doing the repairs. In 1892 there was no need to do more than they did. The plaintiff must show that the defendants did something or neglected to do something which they ought to have done. He cited "Atkinson v. Newcastle and Gateshead Waterworks Company," "Robinson v. Mayor and Corporation of Workington," "Leek Improvement Commissioners v. Justices of Staffordshire," and "Cowley v. Newmarket Local Board." Mr. Justice Wright, in giving judgment on Monday, said he thought the findings were contrary to the evidence. He could not say they were perverse. He had to assume that the verdict, such as it was, was right. Assuming it to be right, he saw no ground of liability except misfeasance in the sense that there was something improper or negligent in the way in which the works of maintenance or repair were done. Before 1892 there were partial and local repairs done to the sewer. In 1892 another local and partial collapse occurred. That was made good—not for the whole length, but partially. He should say that all was done that ought to have been done. The jury found otherwise. The jury thought it was reasonable and proper to open up the whole of the length of the sewer. The jury thought it was negligent to do part of the work, and not the whole. Upon the findings he could not do otherwise than enter judgment for the plaintiff. Stay of execution was granted pending an appeal.

Re J. W. Bowles.—This failure occurred in December, 1895, the bankrupt formerly trading as a contractor at New Wandsworth and Battersea. He had previously absconded, and the Official Receiver subsequently set up a claim to three barges upon the ground either that they belonged to the bankrupt, or that they were in his possession, order, and disposition, as reputed owner, with the consent of the respondent, Mr. James Neal, retired contractor, formerly carrying on business at Wandsworth. It appeared that Mr. Neal, at about the end of 1889, having amassed considerable property, decided to retire from the business, and to give up the same to his nephew, the bankrupt. He asserted, however, that the gift so made did not cover the barges. In giving judgment on Monday, Mr. Justice Wright said he did not think he ought to hold as a matter of fact that the bankrupt had become the owner of these valuable barges, as it was clear that they had not been specifically transferred to him by his uncle, Mr. Neal. Nor had the Official Receiver proved to his (the Judge's) satisfaction that the bankrupt was the reputed owner of the barges, as it was principally a land business,

and the barges were generally lying away from his wharf. Nor was there any evidence of credit having been given to Bowles on the strength of his being possessed of the barges. On both grounds, therefore, the motion of the Official Receiver failed, and must be refused with costs.

LAND DRAINS OR SEWERS?—LONDON AND NORTH-WESTERN RAILWAY COMPANY V. THE RURAL DISTRICT COUNCIL OF RUNCORN.—The plaintiffs in this case, heard by Mr. Justice Stirling on Tuesday, were the London and North-Western Railway and the Great Western Railway Companies, and they claimed an injunction to restrain the defendants from connecting new sewers of the defendants in the township of Helsby and parish of Frodsham, in the county of Chester, with certain land drains and ditches belonging to the plaintiffs, and from causing or permitting sewage or water to flow from the said new sewers into the said land drains and ditches of the plaintiffs. The question at issue in the case was whether the land drains and ditches, which had been constructed by the plaintiffs or their predecessors in title on their own lands, were now vested in the plaintiffs, or, as the plaintiffs alleged, had under the provisions of the Public Health Act, 1875, become vested in the defendants as the rural sanitary authority of the district. The plaintiffs were the successors of a railway company for the purpose of making a railway from the Chester and Birkenhead Railway to the Manchester and Birmingham Railway. This railway was made about the year 1850. At the trial the defendants' case was rested on the alleged user of the ditches in question for the purpose of carrying off the sewage from certain houses near the line. This sewage, it was alleged, passed from the ditches into pipes and drains which had been constructed by the plaintiffs for the purpose of land drainage, and consequently it was contended that these had become sewers within the meaning of the Public Health Act, 1875, and were now vested in the defendants. Mr. Justice Stirling, in giving judgment, came to the conclusion upon the evidence that a certain quantity of sewage did find its way from the houses in question into the pipes or drains on the plaintiffs' land, but at the same time there was nothing to affect the plaintiffs with knowledge that before 1896 such sewage did so pass into their system of drains or pipes. His Lordship further came to the conclusion of fact that these drains and pipes were not constructed for the purpose of carrying away sewage from any house, but were constructed (in the language of the Act of 1845) for the purpose of carrying the water "as clearly from the lands lying near or affected by the railway as before the making of the railway." After referring to sections 4, 13, 15, and 21 of the Public Health Act, 1875, His Lordship then said that the contention on behalf of the defendants might be stated as follows:—The pipes and drains were at the present time, and were previously to 1896, used *de facto* for the drainage of more than one building only; consequently they were "sewers" within the definition of section 4, and were vested in the defendants under section 13. To this the plaintiffs answered (1) that none of the owners of the houses in question had acquired against the plaintiffs any legal title to send sewage into these pipes and drains: that according to the doctrine of "Mulliner v. Midland Railway Company," approved by the House of Lords in "Ayr Harbour Trustees v. Oswald," it was competent for the plaintiffs at any time to put an end to the user which had taken place, and that the vesting under section 13 did not put an end to this right—see "Reg. v. Godmanchester Board of Health," where a strong opinion was expressed that the Public Health Act, 1848, was not intended to interfere with rights of a private nature; (2) that the rights vested in the plaintiffs by the special Act for a specific purpose could not be held to be overridden by a subsequent statute conferring on a public body general powers for a different purpose; and (3) that the pipes and drains in question, if sewers within the Act, were "sewers made and used for the purpose of draining land under a local or private Act of Parliament," and consequently fell within the second exception in section 13. His Lordship came to a conclusion in favour of the plaintiffs on this third point, and it was consequently unnecessary for him to express a concluded opinion on either of the other two. With respect, however, to the first, his Lordship was not satisfied that the plaintiffs' argument was consistent with the general scheme of the Public Health Act, 1875. It seemed to his Lordship that the pipes and drains were made under the special Act. He therefore gave judgment for the plaintiff.

ACTION BY A CONSULTING ENGINEER.—Before Mr. Justice Channell last week, Mr. A. M. Fowler, consulting engineer, of Manchester and London, and formerly borough engineer of Salford, brought an action against Mr. Wood, a brick manufacturer, to recover £15 15s. for professional services. Ten guineas had been paid into court by defendants as sufficient. Mr. Bassett Hopkins said the facts were that the corporation of Stockport had some drainage works to be carried out, and they called in Mr. Fowler as a consulting engineer of the first rank. The drainage contract was got by Messrs. J. and W. Meadows, who gave an order for bricks to the present defendants, Messrs. P. and S. Wood, whose place of business is at West Bromwich. Ultimately a dispute arose between Messrs. Meadows and Wood as to the amount of money due to the latter, there being a difference in dispute of considerably over £800. An action was brought at Birmingham Assizes in March last, and the plaintiff was subpœnaed to give evidence. He went to Birmingham, and spent some time having consultations and giving evidence. The case was finally referred to Stafford for arbitration, when the defendants got an award; but the present charges were only with regard to the Birmingham action. Plaintiff gave evidence, and said his charges were for three days—two at Birmingham and one day travelling there—at ten guineas a day; one day and a half for searching documents and getting evidence ready; for the time of his assistant, at 2s. 6d. an hour, and out-of-pocket expenses. In cross-examination by Mr. Shakespeare, he said part of the charge was for a consultation with the counsel for the other side. He only stayed in Birmingham one night, and yet he had charged three days' hotel expenses; but he was away from home for more than 36 hours. He was subpœnaed by both sides. Plaintiff was being further cross-examined when his lordship adjourned the case.

CLAIM FOR SPECIFIC PERFORMANCE.—In the Court of Appeal, on Friday, before the Master of the Rolls and Lords Justices Chitty and Vaughan Williams, an appeal was heard, "Cook v. Williams," from a decision of Mr. Justice Kekewich's. Mr. J. M. Cook, tourists' agent, brought an action for specific performance against the five daughters of the late Lady Watkin and Mr. O. F. Giddy, estate agent, of Pall-mall, in respect of an alleged contract for the sale to him of the mansion and estate of Mount Felix, at Walton-on-Thames. After negotiation, the defendants, it was contended, had agreed to sell the property to the plaintiff for £21,250, and he had paid a deposit; but ultimately the ladies declined to complete the contract. Mr. Justice Kekewich held that there was no completed contract in writing, and dismissed the action, and their Lordships now confirmed the judgment, and dismissed the appeal.

WHAT CONSTITUTES A BUILDING?—Before the Bristol magistrates on Nov. 12, Alfred Joseph Neale, 23, West-street, St. Philip's, was summoned by Mr. T. H. Yabbicom, the surveyor to the corporation, under the Bristol Improvements Acts, 1840 and 1847, for causing to be pulled down for the purpose of repairs a part of a shop front or outer boundary—to wit, the cornice and the facia of 23, West-street aforesaid, and did unlawfully neglect to build the whole of such front or outer boundary so that the boundary should range in the general line of the front walls of buildings in West-street. Mr. W. H. Wise, assistant town clerk, prosecuted, and Mr. F. E. Weatherly defended. In opening the case, Mr. Wise said that the former premises of 23, West-street were laid down by the late Mr. Josiah Thomas, contractor. In the summer of last year a fire occurred at the shop, and damaged the front. In June it was found that a portion of the front had been removed, and a new cornice, facia, and roof had been substituted. Notice of this ought to have been given, but this was not done, and it was not till the new parts had been put in that it came under the notice of the corporation. The question was whether the new work was or was not part of the outer boundary. He contended that it was.—Mr. Richard Slaughter, building inspector to the corporation, said that the upper part of the shop now projected beyond the boundary wall. There was a facia board round the top of the building before the fire, and in consequence of it it became very charred. Witness told the foreman of the work that if this facia board were removed the shop would have to be set back in a line with the bank. Witness suggested that it should be cased or pieced, in order not to bring the affair under the compulsory powers of the Act. The board, however, was subsequently removed.—Mr. Fred. John Williams, assistant in the office of the city surveyor, deposed to visiting the shop on June 19, with the late Mr. Josiah Thomas. By Mr. Weatherly: He could not mention a single case in which, when a shop-front had been charred and the remains removed, the owner had been required to set back.—Mr. Thomas Henry Yabbicom, city surveyor, said that the building line he determined on was made by him on Sept. 14.—Mr. Weatherly submitted, in face of this, that no anterior plans made for this building line, or evidence as to Mr. Thomas's intentions to carry out certain ideas, was admissible.—Mr. Edwin Bailey, foreman to Mr. Harris, builder, said that he was in charge of the work of renovation at West-street.—Mr. W. L. Bernard, architect, deposed to having visited the premises, 23, West-street. As far as he could judge, the parts removed were parts of the shop front. He considered the parts removed were parts of the outer wall.—Mr. Cowper Jones, architect, having given evidence for the prosecution, Mr. F. Weatherly, for the defence, said that an adverse result of that case would be a very serious thing for his client. That was a criminal proceeding, and if there was any doubt in the case they had to give the benefit of it to the defendant. The basis of the Acts rested on the fact of men making a vacancy on their land. Intention had also to be considered. When construing an act of taking down they had to look to the intention, and he contended that the same held with regard to burning down. Turning to the matter of the building line, Mr. Weatherly argued this point from the technical legal side, and said that the only building line applicable in this case was that made by Mr. Yabbicom in September. If this were admitted, then his client could not be called on to set back, for if he finished the building before the line had been decided on he could not be called on to pull down. The magistrates said that they considered that the intention at the time of the taking down was not primarily to alter the building, but to rebuild because it had come down in consequence of the fire. They dismissed the summons, the question of costs to stand over.

DISTRICT SURVEYORS' FEES FOR JUBILEE STANDS.—At Southwark Police-court last week, Mark Patrick and Co., builders, of Westminster Bridge-road, appeared to an adjourned summons for non-payment of £23 odd, alleged to be due to Mr. Bernard Dicksee, district surveyor, for inspecting Jubilee stands within the premises of Messrs. Day and Martin, Limited, Borough-road. The case was one of a large number of similar claims, a few of which were disposed of, while the majority stood over until the present action was decided. The defendants wrote to the complainant, "We decline to pay your preposterous fees. You never surveyed our seating at all, but sent a boy to look at the place; and then you made out an account from an imaginary survey, which is not correct." The complainant admitted that he did not personally inspect the stands, but sent a young man named Brown, who was not a qualified surveyor. He based his charges for "supervision," which amounted in many cases to 15s., for stands seating only seven persons, upon the schedule of fees allowed for inspecting buildings and other structures. The hearing was again adjourned. In reply to the magistrate, Mr. Philcox stated that the defence in another case of the same kind was that the stands were inspected by nobody at all, but the fees were charged all the same.

STATUES, MEMORIALS, &c.

TUNBRIDGE WELLS.—The memorial erected in Tunbridge Wells to the memory of the late Canon Hoare was unveiled on Friday by the Archdeacon of Maidstone. The site is a triangular piece of ground at the top of Culverden Park-road. The memorial, which rests on a granite plinth, consists of a base of dark Pennant stone, from which rises a Gothic structure, built of local sandstone from the Speldhurst quarry. The lower stages are square, with buttresses at the angles, and on the front is an enriched panel containing a medallion portait of Canon Hoare sculptured in statuary marble. This medallion has been executed by Mr. Bridgeman, of Lichfield. Below this is a marble tablet within a carved border bearing an inscription. This part of the design is finished with a cornice and enriched parapet, below which runs a band of tracery. Above the parapet is an octagonal stage with panelled faces surmounted by crocketed gablets. The four angles are emphasised by pedestals carrying figures of the Evangelists, and connected with the octagonal part by flying buttresses. The whole is crowned by a spire, with crochets on angles, and terminating with a foliated finial and bronze areas. The total height of the memorial is 40ft. The memorial was designed by Mr. J. Oldrid Scott, F.S.A., and has been carried out by a local firm, Messrs. Strange and Sons, the carving being by Mr. Arthur J. Tuttell, of Lincoln.

The town council of Great Yarmouth have adopted the recommendation of the Gorleston Pavilion Committe to the effect that the borough surveyor be instructed to prepare plans for erecting a hall, capable of accommodating about 1,200 persons, with reading-room and other necessary adjuncts, at a cost not exceeding £5,000.

The memorial to the Brothers Portal has arrived from Rome, and is about to be placed in position at the end of the south aisle in Winchester Cathedral. The monument is of marble and mosaic work. It commemorates Captain Melville Portal, and Sir. Gerald Portal, G.C.M.G., the former dying in Africa, and the latter at home. Under the white marble arched canopy of the memorial, and occupying the chief space, is an angel with expanded wings in marble, holding in either hand a medallion bearing one of the portraits with inscription.

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NEW HOUSES AND CLUBHOUSE AT SOUTHPORT.—STATUES AT THE NEW COUNTY COUNCIL OFFICES, WAKEFIELD.—THORNLIEBANK PUBLIC SCHOOL.—SCHOOL AND MASTER'S HOUSE AT PEEL.—THE TOLBOOTH, DYSART.—THE ENTRANCE, FALKLAND PALACE.—OLD HOUSE, WHITCHURCH.—TYRINGHAM HALL, CUDDINGTON.—HOUSE AT LITTLE SWITZERLAND, ISLE OF MAN.—NEW RESIDENCE, PARK AVENUE, WOLVERHAMPTON.—FONT AT POYNINGS CHURCH, SUSSEX.—NEW PREMISES IN JERMYN STREET.

Our Illustrations.

NEW BUILDINGS ON THE ROSEHILL ESTATE, SOUTHPORT.

This drawing illustrates the principal front of an extensive block of buildings recently erected on the above freehold estate for Mr. J. Witham. Being situated in the centre of the town, and in the principal street, it was necessary in planning the same to utilise the site to the best possible advantage so that no valuable space should be wasted. On this account a new avenue, 20ft. wide, was formed (as shown on plan), connecting Lord-street with Anchor-street, this being intended originally for suites of offices only; but in execution a portion of same has been used for dwellings, this portion being increased to 24ft. in width. The Lord-street frontage (illustrated) is devoted to four large houses, after which are five lock-up shops with offices above, these latter being approached from the avenue. The Anchor-street frontage is devoted to five dwellings, but much smaller than those in Lord-street. The land in the rear is occupied by a clubhouse, consisting, on the ground floor, of spacious entrance hall and staircase, with conveniences, cloakroom, steward's room, kitchen, and a dining-room, 34ft. by 29ft. On the first floor is a clubroom, 34ft. by 29ft., with an ante-room, 24ft. 9in. by 10ft. 6in., and a committee-room, 16ft. 9in. by 16ft. 9in. The avenue buildings are three stories in height, the upper one being in solid timber framing, filled in with brickwork and finished in rough-cast cement work. Enfield Accrington red-pressed bricks, set in black mortar, have been used for the elevations, with Woolton red sandstone. The ornamental work to pediments and bay windows is in cement, modelled and cast by Mr. Gerhardt, of Liverpool, from the architect's designs. Mr. Nicholas Shaw, of Southport, was the sole contractor for the work, and the architect Mr. Francis P. Halsall, A.R.I.B.A., 4, Post Office-avenue, Southport. Quantities were supplied by Messrs. Hurrell and Taylor, F.S.I., of Manchester. The illustration is from the architect's drawing.

STATUARY AT THE NEW COUNTY COUNCIL OFFICES, WAKEFIELD.

These statuettes form a portion of the sculptural decoration of the new County Council offices at Wakefield, which are to be opened shortly, the niches being set in the piers of arcade to Bond-street. The building is very effectively decorated with a considerable amount of figure sculpture, five of the gables having allegorical bas-relief subjects, representing "Art," "Science," "Music," "Literature," and "Poetry," while over the main entrance is a series of panels with figures in relief of "Justice," "Progress," "Education," and "Hygiea," and in the niche above a statue in full relief of "Honour." The work has been carried out by Mr. W. Birnie Rhind, A.R.S.A., Edinburgh, the architects being Messrs. Gibson and Russell, 11, Gray's Inn-square, W.C.

THORNLIEBANK PUBLIC SCHOOL.

The school buildings erected shortly after the passing of the Education Act, having been almost totally destroyed by fire in the spring of 1895, advantage has been taken of the opportunity thus given to remodel the plan and bring the school into line with present-day requirements. The value of the work left standing being estimated at £1,200, an effort was made to arrange the new plan so as to utilise this, and yet meet the approval of the Education Department. The extensions practically swept away the well-meant efforts to completely utilise what was left of the old work, and added something like £3,000 to the estimates. The plan of the school, which now shows accommodation for 616 scholars, has classrooms grouped round a central hall, and is a one-storied building with all floors on the same level. The boys' and girls' main entrances are from the public road; the infants' entrance on the west side may be used as an exit for the girls also. The boys have an exit on the east side to the higher playground, where their playsheds and latrines are situated. The cloakrooms and lavatories adjoin these latter exits, as also the rooms of the teaching staff, situated in a back wing north of the central hall. Under this wing is a basement entirely devoted to the boilers, engines, fan, &c., of heating and ventilating apparatus. The artificial lighting is by gas pendants, fitted with incandescent lamps. The style of architecture is English Gothic of the 16th century. The cost of school, latrines, and boundary walls, with janitor's house, inclusive of all furnishings, and exclusive of fees only, is about £9,000. Mr. W. G. Rowan, of Glasgow, is the architect.

PEEL SCHOOLHOUSE.

This illustration shows a design for a school and master's house at Peel, Isle of Man. The walls were to be built of local rubble, finished with white rough cast, and the roofs covered with green slate, the woodwork painted green. The effect of the exterior depends entirely on the grouping of the masses, and the only ornament is the modelled figures over the main entrance—a symbolical group representing children plucking the fruit from the Tree of Knowledge. The master's house was planned to contain accommodation for 20 boarders, and the school is designed for 80 scholars. Mr. M. H. B. Scott is the architect.

THE TOLBOOTH, DYSART.

The architect will not find much to occupy his attention in this somewhat quaint Fifeshire town beyond a few harled houses on the seashore and the Tolbooth, which stands in the centre of the town, and was built in the year 1617. It was almost destroyed by an accidental explosion while occupied by Cromwell's soldiers as a barracks and magazine; subsequently it was used as a gaol.

FALKLAND PALACE.

This building, which has played so prominent a part in Scottish history, lies under the shadow of the Lomond Hills, and is supposed to have been begun by James III. or IV., but was not completed till the reign of James V. It is alike interesting to the architect and antiquary, and the student who pays it a visit will find ample scope for the use of his pencil. The peculiar mixture of the several styles strikes one as being somewhat incongruous. That portion which forms the subject of the sketch is the main entrance to the palace, and leads to a large courtyard, described as being in the Palladian style, and which is, unfortunately, still in a very ruinous condition, owing to a fire which occurred at the end of the 17th century. It is, however, undergoing restoration by the Marquis of Bute, the present owner.

OLD HOUSE, WHITCHURCH.

This old house, situated in the centre of a picturesque Buckinghamshire village, is one of several bits afforded the sketcher in the neighbourhood. No reliable information is to be obtained as to its history beyond the fact that it was at one time occupied by monks of the Cestercian Order, and rumour has it that it was once connected by an underground passage with the castle of Hugh de Bolbec, distant about a quarter of a mile. The site of this castle, from which the masonry used in the more modern portion of the house was obtained, is still plainly discernible. An interesting feature of the house is its large cellars and dungeons.

TYRINGHAM HALL, CUDDINGTON.

Tyringham Hall, a charmingly-ruinous old house standing close to the village church, has been for some time unoccupied. In its earlier days it was in the possession of the Tyringhams, and is now owned by Mr. J. Napier Higgins, Q.C., a relative of the original proprietors. A few years ago some fine old oak work was removed from the hall to a residence upon another part of the estate.

Aylesbury. Fred. Taylor.

HOUSE, LITTLE SWITZERLAND.

This is a design by Mr. Baillie Scott for a stone house, near Douglas, the walls of local rubble, and the roof covered with stone tiles. On the entrance front the effect is concentrated on the main entrance, and broad spaces of unrelieved wall are introduced in the gables. On the garden front a slight departure from the symmetrical gives a domestic touch. The interior is designed in the same traditional character, with a liberal use of oak panelling. The corridor communicating with the drawing-room is broad and low and panelled, and, with the passage to the kitchen, keeps the hall free from the routes of servants or visitors. The drawing-room is designed in the Adams style, with broad white panels and a modelled plaster ceiling. The upper parts of the wall in the hall are finished with faced stone, and in the dining-room a frieze of embossed leather is introduced above the panelling.

NEW RESIDENCE, PARK AVENUE, WOLVERHAMPTON.

This house, of which we give view and plan, is approaching completion. The materials of which it is built are Ruabon bricks with red terracotta (J. C. Edwards's) for dressings. The framing, which is of oak, is left fine from saw, and the roof is tiled. Mr. Wm. J. Oliver is the architect, and the builders are Messrs. H. Willcock and Co.

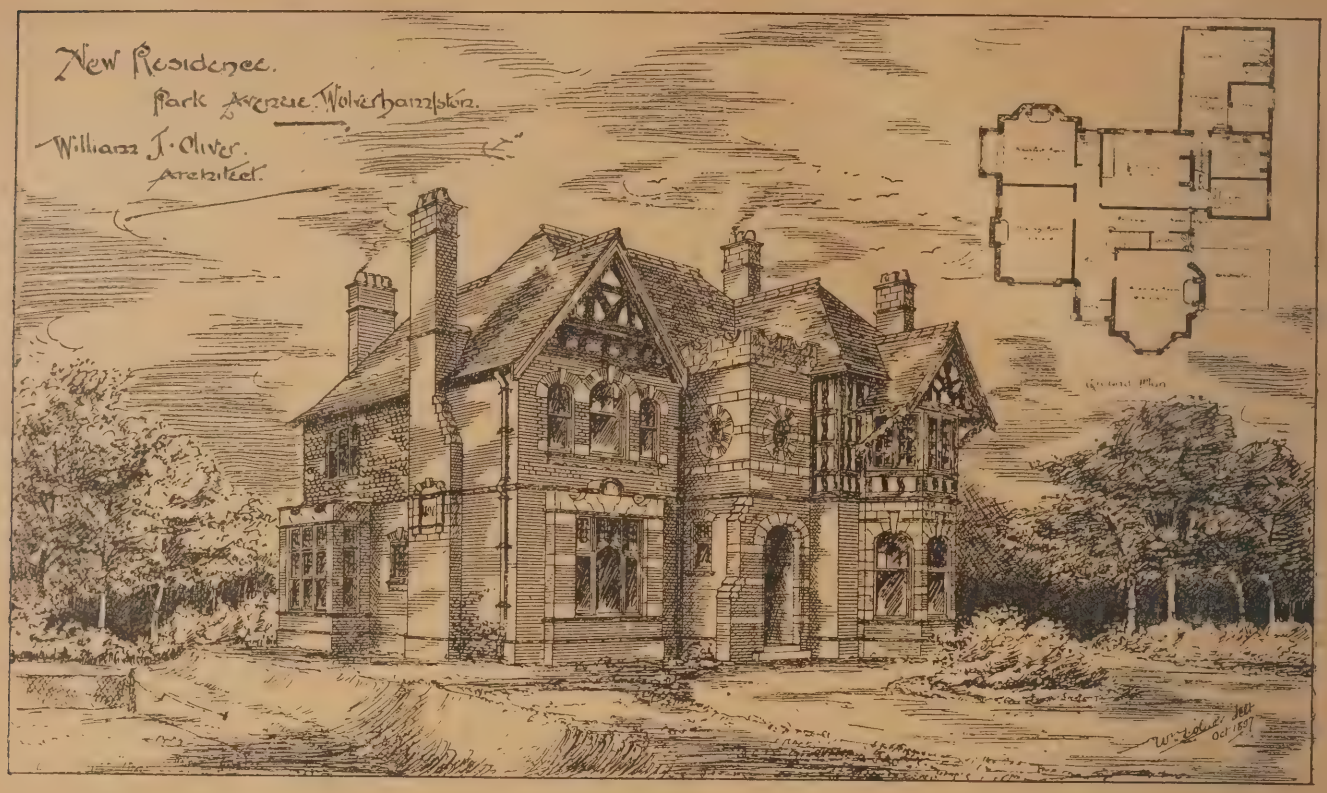
FONT AND COVER, POYNINGS CHURCH.

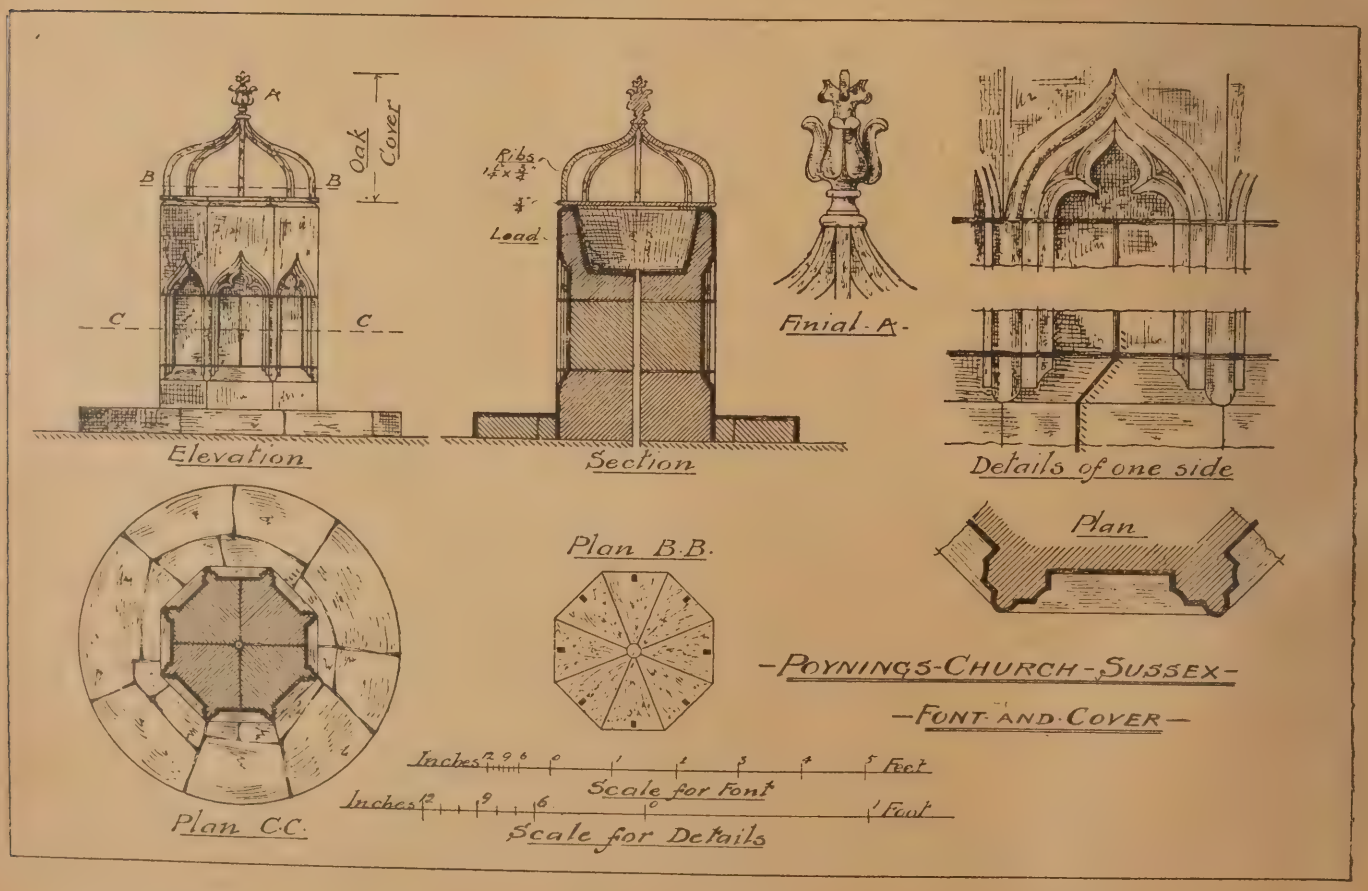
Some six miles to the north of Brighton, at the foot of the Dyke, lies the historic village of Poynings. The fine cruciform church, dating 1380-90, is of Transitional character, the features belonging rather to the Perpendicular period, and has been little altered or modernised, retaining much of its old character and fittings, including the quaint Laudian altar rails, Jacobean pulpit, rood-screen, and a simple, though very effective, font and cover, which is herewith illustrated. Until quite recently this church was most difficult of access, and of the many tourists who went to the Dyke few were able to undertake the tedious task of descending and reclimbing the hill; but now, since a "steep-grade railway" connects the hilltop and the valley, all lovers of old English architecture who go to the Dyke will thereby be enabled to pay this very interesting church a visit. H. C. Pullin.

XVIII. XIX. AND XX. JERMYN STREET.

This block of buildings, now nearing completion, occupies the sites of Nos. 18, 19, and 20, Jermyn-street. The elevation is of Portland stone, and the building is of fireproof construction throughout. The ground floor contains four shops, and there are two large rooms in the rear—on the ground floor and basement respectively—about 60ft. by 25ft., which are used by Messrs. J. Lyons and Co., Ltd., refreshment contractors, in conjunction with their Piccadilly premises. The upper part of this building is planned for use as bachelor's flats, each suite consisting of from one to three rooms, with bath, &c. The kitchen accommodation is on the top floor, and the building is fitted with hydraulic passenger lift. The contractors are Messrs. Thomas Welsh and Son, of Albert Works, Chatsworth-road, Stratford, E., and the designs have been prepared, and the building carried out, under the supervision of Mr. E. Keynes Purchase, architect, 11, Queen Victoria-street, E.C.

The new public buildings at Baldock were formally opened yesterday (Thursday) afternoon.


New Residence.
Park Avenue, Wolverhampton.
William J. Oliver.
Architect.


A
B
B
Oak Cover
C
C
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Details of one side
Plan
Plan B.B.
Plan C.C.
-POYNINGS-CHURCH-SUSSEX-
-FONT AND COVER-
Inches 12 9 6 0 1 2 3 4 5 Feet
Scale for Font
Inches 12 9 6 0 1 Foot
Scale for Details

THE TOLBOOTH DYSART.

THE ENTRANCE FALKLAND PALACE

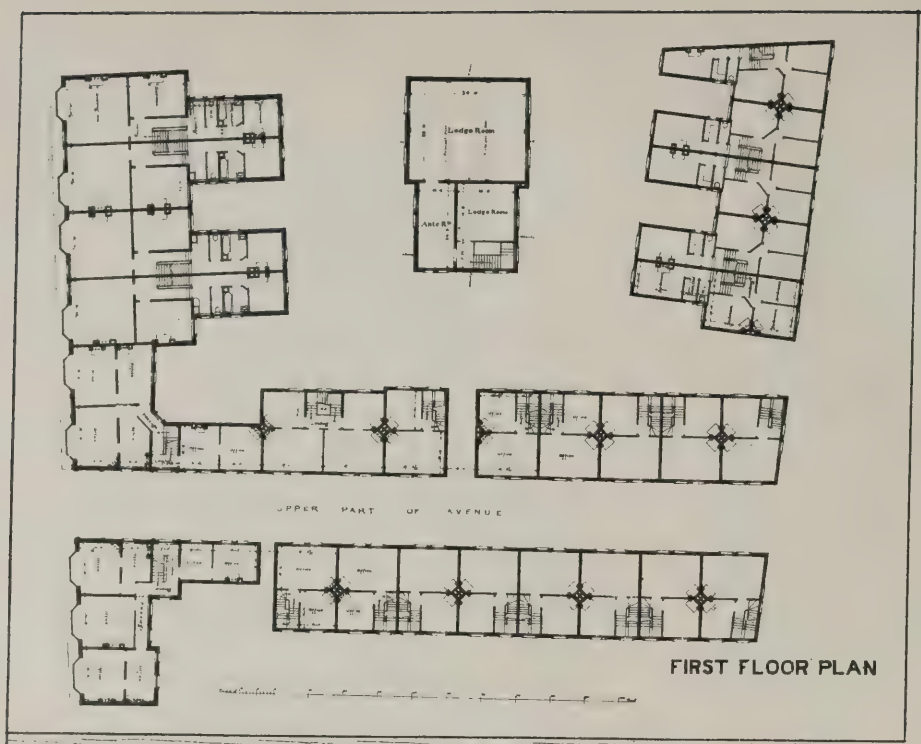
VIEW FROM NORTH-WEST

OLD HOUSE WHITCHURCH

GABLE LOOKING SOUTH

TYRINGHAM HALL CUDDINGTON AYLESBURY

"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.



NEW·HOUSES·SHOPS·

ROSEHILL·ESTATE·SOUT

FRANCIS·P·HALSAL

FICES AND CLUB-HOUSE ·

PORT FOR J. WITHAM ESQRE ·

A·R·I·B·A· ARCHITECT

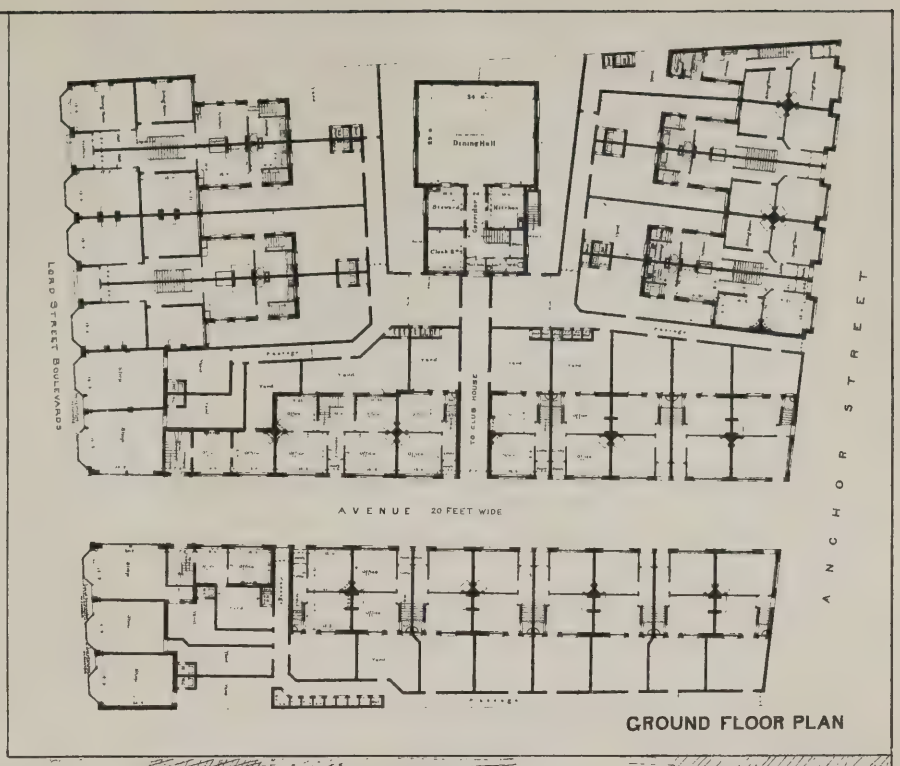
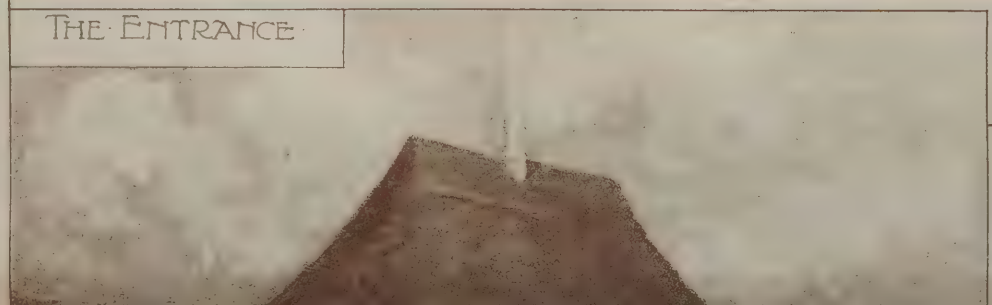


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

THE ENTRANCE



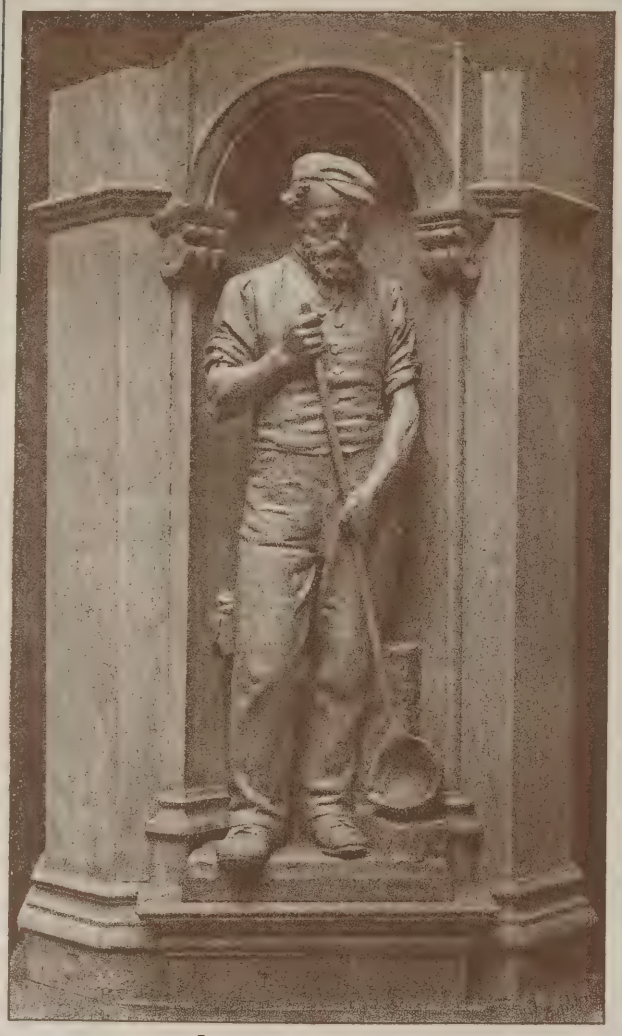
SCHOOL & MASTER'S HOUSE AT PEEL ISLE OF MAN

M. H. BAILLIE SCOTT ARCHT.

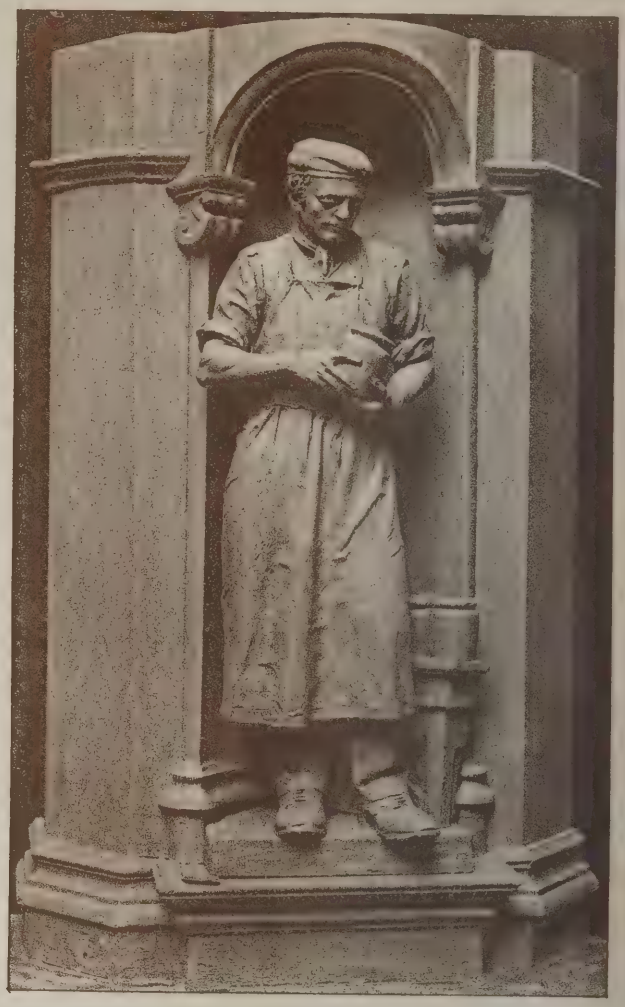
HOUSE AT LITTLE SWITZERLAND DOUGLAS ISLE OF MAN

M.H. BAILLIE SCOTT ARCHT

"PHOTO-TINT", by James Akerman, 6, Queen Square, London, W.C.



IRONMOULDING



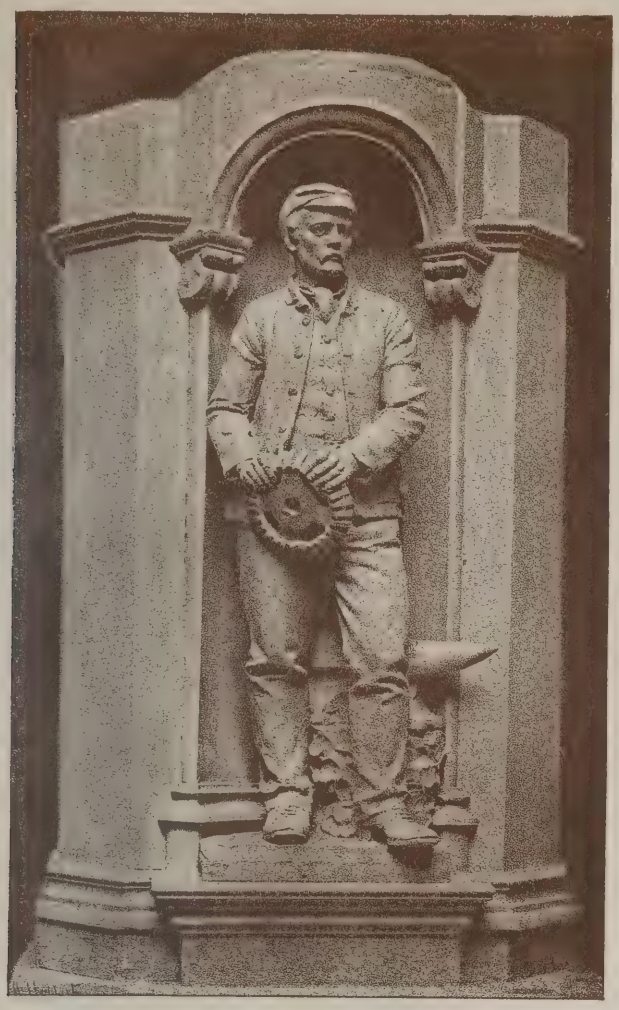
POTTERY

GLASS

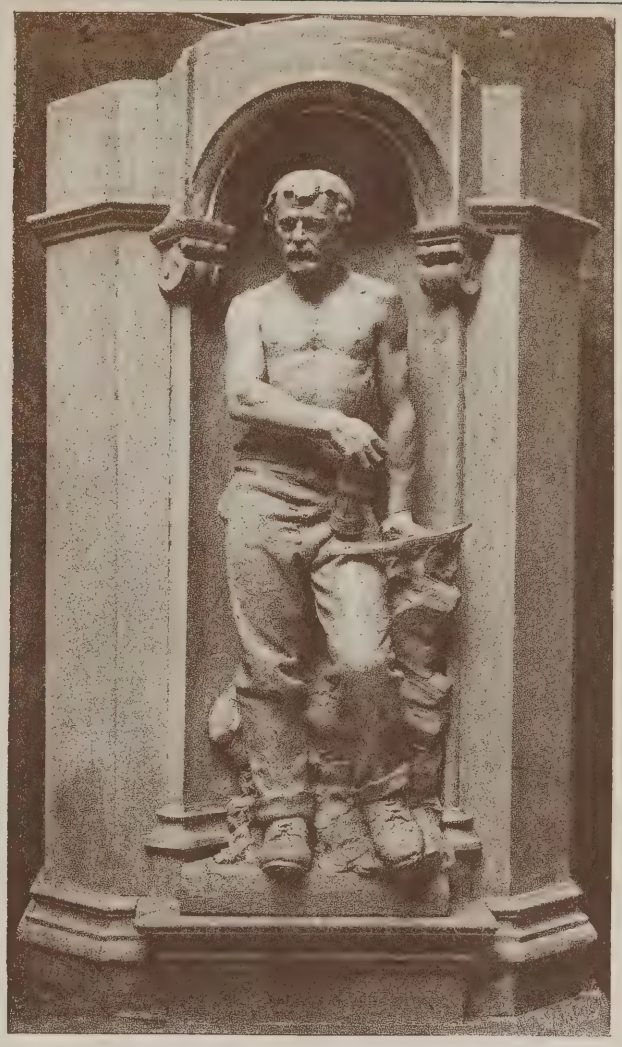
NEW COUNTY COUNCIL OFFICES WAKEFIELD

MESSRS GIBSON & RUSSELL ARCHITECTS

AGRICULTURE

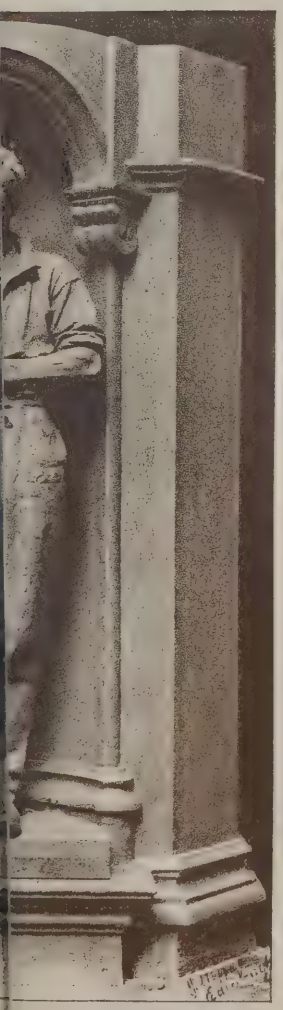


ENGINEERING



MINING

LOWING



SERIES OF STATUES

ILLUSTRATING THE

INDUSTRIES

BY

W BIRNIE RHIND ARSA

SCULPTOR

SPINNING

"PHOTO-TINT" by James Akerman 6 Queen Square London W.C

THORNIEBANK · PUBLIC · SCHOOL

W·C·ROWAN ARCHT

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

Nos 18, 19 & 20 JERMYN STREET S.W.
E. KEYNES PURCHASE ARCHT
FIRST FLOOR PLAN
Sitting Room
Hall
Dressing
Hall
Sitting Room
Bedroom
Bath
Bedroom
Sitting Room

Engineering Notes.

DUDLEY.—On Saturday, at the town hall, Dudley, the Earl of Jersey and Colonel Boughey, commissioners under the Light Railways Act, conducted an inquiry relative to the proposals of the British Electric Traction Company (Limited). It was explained that in connection with the existing Dudley and Stourbridge Tramway, it was proposed to make extensions from Dudley to Kingswinford, through Pensnett, from Kingswinford to Stourbridge; from Stourbridge to Kinver, and from Dudley to Cradley, through Netherton, Old Hill, and Cradley Heath. The promoters of the scheme were the British Electric Traction Company (Limited), who had a capital of £600,000, and who were not contractors, but investors. The total length of the lines would be 8 miles 5 furlongs 4·60 chains. They proposed to work the line by electricity on the overhead system. Mr. Sellon, the engineer, gave evidence on behalf of the British Electric Traction Company.

GREAT CENTRAL RAILWAY TO LONDON.—Just three years ago the Countess of Wharncliffe cut the first sod of the new line to London at Alpha-road, St. John's Wood, which will afford the Great Central Railway Company independent access to the Metropolis. The construction of the line was let in six sections, one of the conditions in each case being that the work should be completed in two and a half years. The undertaking has been vigorously pushed forward, but its completion will probably not be realised until July or August next year. The northern section of the new line extends from Rugby, by the way of Leicester, Loughborough, Nottingham, to Annesley, where a junction is effected with the Great Central Company's existing line. Mr. E. Parry, of Nottingham, is engineer for this portion of the work, Messrs. Logan and Hemingway being the contractors. The southern division—that between Rugby and London—is under the engineering supervision of Sir Douglas Fox and Messrs. Francis and Douglas Fox, of Westminster, and the contractors are Messrs. Oliver and Son and Messrs. Walter Scott and Co. Ninety-one miles from Annesley, along the route of the new line, at Quainton-road, the Great Central trains will pass on to the Metropolitan Railway Company's system, and travel thereover for a distance of about 40 miles, branching off at Finchley-road, and taking an independent course for a little less than three miles, thence to the Metropolitan terminus adjoining the Marylebone-road. That portion of the undertaking which lies in London is being carried out by Mr. Firbank, the contractor, under the direction of Mr. E. Wragge, the resident engineer. Along the section from Annesley to East Leake the contractors have made good progress. Especially is this so in regard to the extensive works which are being executed in Nottingham. For the purposes of the New Central station a vast amount of property has been demolished. The Great Northern Company's extension, from their present terminus in London-road to the New Central station, a distance of some 600 yards, is in a forward state. The line runs under a covered way along Thurland-street, emerging at Weekday Cross, the site of the old town-hall. Thence the metals are carried over a viaduct to the Midland Station, which is crossed by means of massive iron girders. The viaduct extends from here to the river Trent, traversing the densely populated Meadows district, the river being spanned by a bridge. From the Trent to the village of Wilford a huge embankment has been constructed, on which the permanent way is laid, and thence to East Leake the line passes through a hilly district. The company have had to erect a large number of artisans' dwellings on the northern side of the Central Station in Nottingham, and others will be built in due course. The goods yards in the Meadows are being speedily formed, and at the Carrington end of the city gasworks are being constructed. Considerable activity prevails at the present time in the neighbourhood of Loughborough. On the site of the town station several hundred men are engaged, whilst at Leicester and Rugby progress is being made with the line. In relation to the southern section of the undertaking, a considerable amount of earthwork has had to be done. At the present time about one-half of the permanent way has been laid. Five lines of metals will run into the passenger terminal station, which is being constructed on an extensive scale. A goods warehouse is being erected, with a floor space of about 11½ acres. Engine works, a shunting-shed, and numerous sidings are in course of construction at Neasden. More than half of the 3,960 yards of the new railway at the metropolitan end lies below the ground. The longest tunnel which is being made within the London area will be 37 chains in length. The company have had to erect artisans' dwellings to accommodate 3,000 people displaced by the operations of the contractors.

COMPETITIONS.

BIRMINGHAM. — Mr. William Henman, F.R.I.B.A., has written to the local Press declining to allow his name to be added to the half-dozen firms of architects who have been invited to send in competitive plans for the new Borough Lunatic Asylum. He says: "My name has been mentioned in connection with the above without my previous knowledge or sanction. Although I feel indebted to Mr. Councillor Stembridge for his appreciation of my architectural efforts, and have long felt that it is far from just to many capable architects in the city that such marked preference should be displayed towards one firm, I am of opinion that it would be better if such questions could be fought out on broad grounds rather than over a special case like this, because I understand that Messrs. Martin and Chamberlain have for some time past been in close consultation with the committee, and have practically prepared plans, and it must be presumed by their recommending them that they meet their requirements; consequently, a competition now becomes a one-sided affair, in which I have no desire to take part, more particularly as there are members on the committee well acquainted with my architectural work. For reasons best known to themselves, they have not seen fit to invite me; and, as I have no desire to force myself upon them, I have requested Mr. Councillor Stembridge to withdraw his notice of motion that my name should be included in the list of competitors."

LAXEY, ISLE OF MAN.—In a limited competition for the Primitive Methodist New School Chapel, the design of Mr. T. Taliesin Rees, A.R.I.B.A., architect, Birkenhead, has been selected. The building is planned with a central hall and five classrooms, divided by means of folding glazed screens, so that the whole can be converted into one large room capable of accommodating 500 persons. In the rear are kitchen, with cooking-stove, committee-room, heating-chamber, lavatory, &c. The materials will consist of local stone, cemented; the internal woodwork will be pitch-pine, varnished. The style will be Late Gothic, with traceried windows filled in with leaded lights.

LOWER BEBINGTON DRAINAGE SCHEMES.—Some time ago the urban district council of Bebington invited designs for a proposed new sewerage scheme, involving the diversion of the various outfalls now draining into the Bromborough Pool, offering premiums of £50, £35, and £20 for the schemes judged to be first, second, and third, according to the award of an assessor to be appointed. The award of the assessor appointed by the council (Mr. H. P. Boulnois, M.I.C.E., late city surveyor of Liverpool) has now been made, and premiums have been awarded upon such schemes in the following order: — First premium to Messrs. Beloe and Priest, 13, Harrington-street, Liverpool; second premium to Mr. H. Bertram Nichols, of 59, Corporation-street, Birmingham; and third premium to Messrs. Goodison, Atkinson, and Ford, of 11, Tithebarn-street, Liverpool. The proposed scheme is of importance, having regard to the development of the district, and particularly to the continued extension of Port Sunlight.

PAINTERS' CO.—A travelling studentship of £50 is offered by the Painters' Company for the encouragement of the study of decorative painting. The studentship is open to competition by students between the ages of 20 and 35 in any recognised school of art or other institution devoted to the study of applied art in any form, and situate within the limit of the larger Metropolitan postal area. Each set of designs sent in competition must bear the author's distinctive mark or motto (but not his name), and the title and address of the institution by which they are forwarded; they must also be countersigned by the responsible officer of the institution. The set of drawings must be accompanied by a sealed envelope marked outside "Competition," and containing the author's name and address, with the mark or motto borne by the drawings. The drawings and envelope to be addressed to "The Clerks of the Painters' Company, Painters' Hall, Little Trinity-lane, London, E.C." Not more than two sets of designs may be forwarded for one competition by any one institution. The number and description of the drawings required of each competitor and other conditions may be obtained from the clerks of the company, Messrs. Pritchard, Painters' Hall, Little Trinity-lane, E.C., on application by letter, on or before the 1st day of December, 1897. Certificates of commendation may be awarded, at the discretion of the awarding committee, to works occupying the second and third places in the competition. Any competitor who may obtain the first award will be required to sign a copy of these rules and a declaration that he will, within the year 1898, proceed abroad for at least two months, and spend not less than six weeks in Italy, visiting such places as the committee may direct, and devoting himself to making sketches and notes of examples of coloured decorative art. He will at the same time be required to produce a certificate from the Institution which he represents that his general conduct has been satisfactory whilst a student there. All the drawings must be delivered at Painters' Hall on or before March 1. The carriage must be prepaid.

CHIPS.

At the Wesleyan Chapel, Hadley, Salop, last week, an organ built by Mr. J. C. Banfield, of Birmingham, at a cost of £700, was formally opened.

A new park was opened at Airdrie, N.B., on Friday. Of the 13 acres of land, eight have been presented and five purchased, and Mr. John Wilson, M.P., the new proprietor of Airdrie House, gave £1,000 towards beautifying the grounds.

The Corporation Hospital, Birkenhead, is being warmed and ventilated by means of Shorland's patent double-fronted Manchester stoves with descending smoke-flues, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

The London County Council agreed, on Tuesday, to a scheme for the purchase, for £140,500, of a large block of property between Southampton-row and Kingsgate-street, owned by the Duke of Bedford, which is intended to be the beginning of a new public improvement between Holborn and the North-west of London. They also agreed to proceed with a subway for foot passengers under the Thames at Greenwich, the estimated outlay being £70,500.

Henry Taylor, 43, a carpenter, living at 1, Colville-road, Acton, was brought up, on remand, to the South-Western Police-court on Tuesday on a warrant before Mr. Marsham, charged with withholding books belonging to the Wandsworth Branch of the General Union of Operative Carpenters and Joiners, of which he was secretary. He was further charged with embezzling various sums of money belonging to, and falsifying the accounts of, the Union. He was committed for trial.

At Glamorgan Assizes (before Mr. Justice Grantham) on Friday, Samuel Watkins, a middle-aged man, described as a master builder, and also a member of the School Board, living at Merthyr, was charged with having, on July 13, "attempted to kill and murder William Harrington." Some men in prisoner's employ were drinking at a public house for some hours, and then went to him demanding a "sub." The allegation was that prisoner threw a hatchet at Harrington, striking him on the ear and neck, and felling him to the ground. The defence was that Harrington was a violent man who had been convicted of assault, and that prisoner acted in self defence. The judge said there was no evidence whatever on which a jury could convict, and a verdict of "Not Guilty" was returned.

The Bristol Corporation, at their meeting on Tuesday, elected, from a number of applicants, Mr. W. J. Steele, assistant to the surveyor of the urban district council of Tottenham, as assistant city engineer and surveyor, at a salary of £250 per annum, rising by £10 annually, to £300 per annum. A committee have divided the city into five districts, for the purpose of the city engineer's department, and two surveyor's assistants, in addition to the three assistants already employed by the council, were required to take charge of these districts under the supervision of the city engineer. To these vacancies Mr. McKenzie and Mr. Lashmore have been appointed, at salaries of £180 per annum, rising by £10 annually to £250 per annum.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

SCARBOROUGH MASTER BUILDERS' ASSOCIATION.—The annual meeting of the above association was held on Wednesday week at the Albemarle Hotel, the chair being occupied by the president, Councillor James Bland. The annual report and balance-sheet were read and unanimously adopted. It was decided that the association should become affiliated with the Yorkshire Federation of Building Trade Employers. The officers for the ensuing year were elected as follows:—President, Councillor J. Bland; vice-presidents, Mr. J. Barry, Mr. J. Oates, Mr. Sinclair, and Mr. Morrison; treasurer, Mr. J. Jarram; secretary, Mr. R. H. Carr. It is proposed to hold an annual dinner in connection with the association, the first of these repasts to take place early in December.

CHIPS.

Notices have been issued for seeking powers for the construction of a light roadside railway on the electric overhead system, from the Finchley-road Station to Hendon and Finchley.

Mr. Robert H. Bicknell, an inspector of the Local Government Board, held an inquiry at the Town-hall on Wednesday last, respecting an application made by the corporation for sanction to a loan of £30,000 for electric lighting purposes. The details of the scheme were explained by Mr. Fox, the borough engineer, who has prepared the plans for the buildings. There was no opposition.

A new theatre is about to be built at the corner of Meadow-lane and Hunslet-lane, Leeds, from plans by Mr. Frank Matcham, of London. The theatre will face Leeds Bridge, and the exterior will be constructed of terracotta. The building will be surmounted by a light-looking cupola tower. This will contain a water-tank, which will supply a sprinkling installation. The interior of the theatre is to seat 3,500 persons, and standing-room will be provided for another 1,500.

A public inquiry was held at the Bull Hotel, Dartford, on Thursday in last week, by the Light Railway Commissioners, as to an application made by the International Communications, Limited, for an order to authorise the proposed Dartford District Light Railway. Mr. Hubbard, engineer to the scheme, explained. The Earl of Jersey intimated that the commissioners had been prepared to recommend the provisional order that Railway No. 1 commenced at Dartford and was continued to Eynsford, where it practically joined the London, Chatham, and Dover Railway. Line No. 2 deviated from that at Wilmington and went to Swanley Junction, whilst Railway No. 3 was an extension from Farningham of Railway No. 1, and went into the high lands of Kent.

In the Queen's Bench Division, on Friday, a jury awarded Mr. Thomas Tregallas, surveyor and estate agent, of 12, Hobart-place, Eaton-square, £1,250 damages against the London County Council for the loss of his left eye, caused by the branch of an overhanging tree in Grove-road, Victoria Park, striking him while he was on the top of a tramcar. The Lord Chief Justice, however, entered judgment for the defendants, holding that plaintiff could not recover. The cases relied on by the plaintiff were "Cowley v. Newmarket Local Board," "Sanitary Commissioners of Gibraltar v. Orfila," "Municipality of Pictou v. Geldert," and "Saunders v. Holborn Board of Works." For the defence it was contended that the doctrine of non-liability of a public body for non-feasance applied only to highway authorities and sewerage authorities, and in support of this contention counsel cited "Cowley v. Mayor of Sunderland," "Glossop v. Isleworth Local Board," "Gilbert v. Trinity House," "Borough of Bathurst v. Macpherson," "Thompson v. Mayor of Brighton," and "White v. Hindley Local Board."

The Royal Commission on the London water supply held their first sitting for the taking of evidence on Monday. Lord Llandaff presided. Mr. H. L. Cripps, who has been the Parliamentary agent of the London County Council and their predecessors since 1871, was the first and only witness. He stated the attitude of the County Council on the question, and gave evidence to the effect that there were special reasons why the purchase of the water companies' undertakings was expedient in the case of London as distinguished from provincial towns. He said the objects of Parliament in the legislation that had taken place were to improve the supply and reduce the charges of the old companies; but these objects had been frustrated by the combinations entered into by the companies outside their statutory powers. He was convinced that purchase would result in a considerable annual saving to the people of London. The witness's evidence was still proceeding when the Commission adjourned till December 6.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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NOTICE.

Bound copies of Vol. LXXII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX. LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII, may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

RECEIVED.—P. T. C.—L. A. U.—C. and Co.—G. B. D.—I. C.—L. T. D.—S. B.—E. S.

Correspondence.

THE UNIVERSAL TEE-SQUARE.

To the Editor of the BUILDING NEWS.

SIR,—Since the illustration and my letter appeared in your journal, I have had many inquiries for particulars concerning same, and one of my correspondents, Mr. C. McArthur Butler, M.S.A., Salisbury Chambers, Boscombe, Bournemouth, has decided to take up and explain the instrument, and desires all communications concerning same to be addressed to him.

Thanking you for the insertion of my letter and the illustrations,—I am, &c.,

W. C. STANDAGE.

Erdington, Birmingham, Nov. 10.

SEPTIC TANK ACCIDENT.

SIR,—I notice with much regret in your issue of the 19th inst. that a serious accident has been experienced by Mr. A. Creer, the city engineer of York, during an inspection of the septic tanks in connection with the sewerage system of Exeter.

The statement, however, from whatever source it may have emanated, that I have recently suffered from a similar accident is incorrect, and should apply to my friend Mr. J. F. Peddie, of Belfast, whose services here as a sanitary engineer have been most useful, and for whose recovery I am exceedingly glad.

At the same time, I would recommend the authorities in Exeter to take immediate steps to prevent the possibility of a state of affairs recurring that has already laid aside from active service two eminently useful members of the engineering profession in the discharge of their duty.—I am, &c.,

JOS. C. BRETLAND, City Surveyor.

Intercommunication.

QUESTIONS.

[11846.]—**Blisters.**—I thank your correspondent "H. C. S." for the information he has given as to the cause, and shall be glad if he will kindly say the best method to adopt to prevent a recurrence?—W. J. L.

[11847.]—**Lap to Tile Roofs.**—As no answer has been given to this question (asked some weeks ago), I will repeat it. Is the "lap" measured from the nail-hole, or from the top of the tile? It would make a substantial difference in the quantity of tiles used, as well as in the weatherproof properties of a roof. Answer from experienced correspondent will oblige.—C.

[11848.]—**Temporary Structures.**—Should be glad to hear of any textbook on the construction of temporary modern buildings suitable for holding large assemblies.—SURREY, Richmond Hill.

[11849.]—**Vinery.**—I have a vinery with a back formed of 1½in. T. and G. boards instead of a wall; dimensions, 14ft. by 11ft. high. Can any of your readers suggest a plan of treating it so as to get a nice effect and to take away the appearance of boards, and also to prevent it rotting with the damp? I thought of a cement wash, but am given to understand it would not stick to the boards. Covering it with virgin cork would have a nice effect, but is objectionable on account of insects finding a secure lodgment behind. Any suggestion would be thankfully received.—C. D. J.

REPLIES.

[11833.]—**Painting of Galvanised Sheeting.**—I note the remarks of your correspondent *re* reply to query 11833 that, in his experience, acid or copper salts set up a destructive chemical action on the zinc. Such is not the case, except to a very slight degree; the destructive action only continues while the acid mixture is in contact with the zinc, and as this is only a few minutes, the corrosive or erosive action of the acid has not time to exert but a trifling action on the surface of the zinc—just sufficient, in fact, to roughen the surface, and thereby better enable the paint to adhere. The chemical action of the acid or copper preparation has other functions, however, which actually preserve the surface of the zinc from atmospheric or chemical influences. Thus, in the hydrochloric acid compound, all the acidity of the acid has been neutralised by the addition to it of the metallic zinc, whereby the acid has become converted into chloride of zinc, which is one of the most powerful disinfectants known, and antagonistic to all organic changes (such as would be set up by the drying of the oil medium with which the paint is mixed). By thus coating the surface of the metallic zinc with a film of zinc chloride, the metallic surface is preserved against the erosive action of the fatty acids that are disengaged from the oil vehicle in the paint during the drying process of the latter. In the case of the copper preparation, the surface of the metallic zinc is converted into a thin film of sulphide of zinc or oxide of copper, both of which films prevent any further chemical or atmospheric reactive changes. The oxidation of zinc surfaces is not destructive to the metal like oxidation of iron surfaces; for with the latter metal the oxidation proceeds by a catalytic action, by imbibing oxygen from the air or any other available source, and thus the erosive action of the iron proceeds until the solid metal has become converted into pulverulent oxide.—H. C. S.

WATER SUPPLY AND SANITARY MATTERS.

CHIRBURY.—Waterworks have recently been constructed at Chirbury by the Earl of Powis. The supply has been drawn from the Spout, a spring not far from the village. Lord Powis has borne the whole of the expense of construction, which amounts to about £1,000. The spring from which the supply is taken yields in dry weather 7,000 gallons per day. Near its outlet the water passes into a small chamber, and from thence goes through a screen into the pumping well. It is then raised by means of a wind engine into the reservoir, which is situated on a knoll overlooking the town, a distance of some 600ft. The engine is connected with two twin pumps. With one set of pumps going the average quantity of water raised will be about 6,000 gallons per 24 hours, but it is only proposed to work the work the engine an average of eight hours per day. The reservoir is constructed of blue Ruabon bricks, with coping of Grinshill freestone, and has a holding capacity of 45,000 gallons—15 days' supply. The whole of the work, with the exception of the erection of the pumping machinery, has been carried out by the estate workmen, under the superintence of Mr. W. Forrester Addie.

EDINBURGH.—Notices have been given by the Edinburgh and district water trust of their intention to promote a Bill in Parliament in the ensuing session. Power is sought to raise the waste weir of the Gladhouse Reservoir by 1ft. or thereby, which will have the effect of increasing the storage of the pond by one hundred million gallons of water. Power is also sought to authorise the laying of a culvert and line of pipes from Gillycubdeanwell, which is about two miles nearer Edinburgh than Gladhouse. This well is supplied by a large conduit or tunnel from Gladhouse, and is capable of bringing to it three to four million gallons of water a day more than the pipe from it to Alnwickhill can carry away. It is to utilise that water for the service of the city that a new line of pipes is proposed.

Our Office Table.

The ninth congress of archæological societies will be held at the rooms of the Society of Antiquaries on Wednesday morning next. Viscount Dillon, president of the Society of Antiquaries, will take the chair. Among the subjects for debate are:—Catalogue of Effigies; the Best Form of Index for Transactions of Societies; the Annual Index of Periodicals; and a report on the proposed Catalogue of National and Family Portraits. A report will be read on the Formation of the National Photographic Record Association. The Catalogues of Local Museums and the Ancient Monuments Act will also be discussed. If time permit, short papers will be read on "How to Preserve Antiquities," by Mr. George Payne, of Rochester, and "How to Excavate," by Mr. W. H. St. John Hope. The annual dinner in connection with the congress will be held at 7 p.m. at the Holborn Restaurant.

Sir John Wolfe Barry, president of the Institution of Civil Engineers, specially visited on Monday evening the Trades' Technical School, carried on by the Company of Carpenters and other City guilds connected with the building trade, in Great Titchfield-street, Oxford-street. Among the others visitors present were Mr. J. H. Gibbins, the Master, Mr. J. C. Preston and Professor T. Roger Smith, F.R.I.B.A., Wardens, and Mr. S. W. Preston, the clerk of the Company of Carpenters, Dr. W. Garnett, Professor Banister Fletcher, F.R.I.B.A., chairman of the school, the Hon. R. Parsons, M.I.C.E., and representatives of the following companies which are associated with the Company of Carpenters in carrying on the school:—The Joiners' Company, the Painter Stainers' Company, the Plasterers' Company, the Tylers' and Bricklayers' Company, and the Wheelwrights' Company. The party visited the various workshops of the school, in which the classes were engaged from 7.30 to 9.30 p.m. The fifth session of the institute has now been started, and, though the school commenced in a small way, yet the great need of the method adopted of training the craftsman is shown by the fact that during the session just completed 378 individual students attended the various classes. Students who go to the school are set to work, none but actual craftsmen are admitted, and no social entertainments or relaxations are permitted, as is the case in other training schools.

The announcements of railway schemes for the ensuing session of Parliament do not promise many extensive proposals. The Wirral Railway Company propose to make a railway from West Kirby to Rhyl, bridging the river Dee near its mouth. The line is to cross the golf links to the Dee shore, where an extensive embankment is to be constructed. Thence a bridge (3½ miles in length) is to cross the river to a spot midway between Mostyn and Point of Ayr, the line being carried on to Trewaelod and along the Dee to Rhyl. The railway journey from Liverpool to Rhyl is now 50 miles, while the projected new bridge over the Dee will reduce it to 24 miles. The London and South-Western Railway Company will apply for leave to bring in a Bill to authorise them to construct a new railway from Exmouth to Budleigh Salterton; to widen and improve the main line in the parish of St. Mary, Lambeth, between the western side of the Wandsworth-road and Homer-street; and to construct a bridge over the Colne Brook in Wyrardisbury, Eton. The Bill will also contain clauses to extend the period limited by the company's Act of 1893 for completing the widening of the lines leading into their Waterloo Station, and to provide for the removal of the church and schools of All Saints' district, in St. Mary, Lambeth, annexing the district to the adjoining parish of St. John, Waterloo-road. A company is sought to be incorporated to construct a direct railway between Windsor and Ascot.

The South-Eastern Railway Company will seek Parliamentary powers next session to construct a new connecting railway from Lewisham to Orpington, passing through Lee, Bromley, and Chislehurst. Powers will also be sought by the Cranbrook and Paddock Wood Railway Company to extend their line from Brenchley to Snargate Junction, near Appledore, on the Ashford and Hastings branch of the S.E.R. system, thus forming a more direct route between London and Dungeness. A light line of railway is proposed to serve Mid-Essex. Starting by a junction with the terminus of the Great Eastern Railway's "Forest" branch at Ongar, it is carried through Dunmow to Yeldham, a district at present very difficult of access by rail.

The Great North of Scotland Railway Company will seek power to widen and improve their railway between Keith and Dufftown, between Longmorn and Elgin, to widen and improve the Elgin and Lossiemouth line, and to widen and improve a portion of the Buckie Extension Railway. The Bill will also provide for widening the Deeside line between Park and Banchory; also the portion of the Fraserburgh branch railway from Kessock Bridge to the terminus. The Bill will provide, further, for the extension of the bridge which carries Castle Terrace over the railway at Waterloo Station, Aberdeen, and for some street alterations in that city.

With reference to the proposal of the London and North-Western Railway Company to make a deviation of their line near Shap, the fact may be recalled that when the Lancaster and Carlisle line was first mooted in 1841 several projects for overcoming the difficulties of Shap Fells were submitted to the Government Commissioners. Seven alternative routes were suggested. The one by Long Sleddale and Haweswater was the shortest, with the lowest summit level; but in consequence of a tunnel being required of a nature then impracticable, the commissioners abandoned it. The next preferable line in point of distance was that by Shap; but a tunnel would have been required one and a half miles in length, through whinstone on the south side and limestone on the north, with a summit level about 120ft. higher than that by Long Sleddale. The Orton line would have been nearly one mile longer than the Shap line, with a tunnel one mile and a quarter in length, but had the advantages of a lower summit by 70ft., better gradients, and favourable strata for tunnelling. The other lines, by Sunbiggin, Tarn, Smardale, and Ravenstonedale, and the valley of the Rathay to Sedbergh, did not require tunnels; but the summits were higher, and their lengths greater by seven to nine miles. The commissioners did not enter on their merits. The route which the promoters proposed to adopt came from Lancaster down the Kent Valley, and, after passing near Kendal, struck eastward, coming northward by way of Orton to Penrith. That was abandoned, however, in favour of the present route.

In the ensuing session the London County Council will apply for a Bill to authorise them to construct and work a tramway over Westminster-bridge, and to make junctions with the existing lines of the London Tramways Company (Limited) and of the South London Tramways Company. The Council also notify their intention of applying for a Bill authorising them to construct tramways in Holborn, Clerkenwell, and Islington. It is proposed to commence one of the lines by a junction with the North Metropolitan tramway in Clerkenwell-road, opposite the Holborn Town-hall, and to proceed thence along Rosebery-avenue, into and along St. John-street-road, and to complete it by a junction with the existing tramway opposite the Angel, in High-street, Islington. Another short line will commence by a junction with the existing North Metropolitan tramway at the termination in the Theobald's-road, pass thence in a westerly direction along this road, Vernon-place, the south side of Bloomsbury-square, Hart-street, and Bury-street, and terminate in the latter street, near the west end of Silver-street. A third line is to commence by a junction with the existing North Metropolitan tramway in High-street, Shoreditch, at or near the western end of Bethnal Green-road, pass thence into and along this road, and terminate in Cambridge-road by a junction with the existing line near the east end of the Bethnal Green-road.

After a long discussion and divisions, the City Court of Common Council adopted on Tuesday an important report of the Bridge-house Estates Committee relative to the mode of dealing with some 80 premises in Finsbury-circus, West-street, Finsbury-pavement, Albion-place, London-wall, and Bloomfield-street, at the expiration of the present leases at midsummer, 1899. The present rental received from the property is £3,486. On the recommendation of the committee it was decided that a road 30ft. wide shall be carried through from Albion-place to West-street, that the premises in Finsbury-pavement and the buildings at the rear shall be pulled down, and the site let on building lease for 80 years by public auction; the remainder of the area is to be divided into four blocks and dealt with in a similar manner at such times subsequent to the letting of the first block as may seem advisable, and with a minimum of inconvenience to the present occupiers. When so dealt with, the ground-rents to be created will exceed £20,000 per annum.

On the 1st of January next, a new Public Health Act of 196 sections comes into force in Scotland, repealing all former legislation, and making various entirely new enactments on the subject with which it deals. A large part of the Act is only a repetition of the provisions of the Public Health Act of 1867, but there are many alterations and extensions of the provisions of the Act in 1867 in that of 1897. The Act of 1867 and five amending Acts are all repealed, and Scotland starts on 1st January, 1898, with a new code of Public Health. Part I. deals with authorities for the execution of the Act. Part II. relates to sanitary provisions, including "general nuisances," "offensive trades," and "cleansing and scavenging." In Part III., the "general prevention and mitigation of disease" of an impetuous character is attempted, and under its clauses wide powers are bestowed on local authorities. The "prevention of epidemic diseases" is the aim of Part IV., and "the regulation of common lodging-houses" of Part V.; while Part VI. makes rules with regard to sewers, drains, and water. Under Part VII. are grouped rating and borrowing powers; under Part VIII. powers for the compulsory acquisition of land by local authorities, and Part IX. treats of legal proceedings. The establishment of port sanitary authorities is dealt with in Part X.; while "miscellaneous" matters are sought to be gathered within the folds of Part XI., the concluding section.

On Saturday afternoon, at the Alexandra Hotel, Dale-street, Liverpool, a complimentary luncheon was given to Mr. H. Percy Boulnois, M.Inst.C.E., who has recently resigned the position of city engineer, building surveyor, and surveyor to the corporation, and in the course of the proceedings handsome presentations were made to the guest of a silver tea and coffee service, designed after an antique pattern of the Queen Anne period, together with tea-tray, *repoussée* silver bowl, and an illuminated framed address on vellum. Mrs. Boulnois was also the recipient of a toilet silver service, inclosed in a morocco leather case. Several other presentations were made to Mr. Boulnois on behalf of the employees of the corporation. In acknowledging the gifts, Mr. Boulnois mentioned that since deciding to commence practice in London he had accepted an important post under the Local Government Board.

At the half-yearly meeting of the Wembley Oark Tower Company, the ground landlords of Wembley Park, held on Wednesday, Captain Francis Pavy, the chairman, said that the future of the estate had given them no anxiety, but their difficulty had been with the company which had partly erected a tower on the land which they had leased to them. This company, which was known as the Tower Construction Company, was already in arrears with its rent to the extent of £6,000, and he saw very little chance of getting any of that sum. If the tower had been finished he had no doubt it would have paid; but it was now quite clear that the tower would never be completed. Something would have to be done very shortly, and, in the mean time, the board had decided to take immediate action in the direction of building over the estate. With this object in view they had already instructed their architect to prepare a report, and they intended to erect one or two houses as a specimen of the class of property they would allow to be built. A discussion arose as to the course to be taken with the Tower Construction Company. It was strongly urged that this company should be "cleared out of the way," so that the development of Wembley-park might proceed unhindered. It was decided to invite shareholders to confer with the directors as to the steps to be adopted.

Mr. J. Romilly Allen, F.S.A., has been appointed Yates Lecturer in Archæology at the University College, London, and intends to give a course of eight lectures in May and June next year on "Celtic Art and Its Developments." Mr. Romilly Allen delivered a course of Rhind Lectures for the Society of Antiquaries of Scotland some time back.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Royal Institute of British Architects. Business Meeting. 8 p.m.
Leeds and Yorkshire Architectural Society. "Stained Glass, Mediæval and Modern," by Stephen Adams. 7.30 p.m.
Society of Arts. Cantor Lecture No. 1, "Guttapercha," by Dr. Eugene F. A. Obach. 8 p.m.

TUESDAY.—Institution of Civil Engineers. "The Law of Condensation of Steam," by Hugh L. Callendar, F.R.S., and J. T. Nicholson, B.Sc. 8 p.m.
Auctioneers' Institute. "Practical Application of the Principles and Laws of Dilapidations," by Henry Bushell, F.S.I. 8 p.m.

WEDNESDAY.—Congress of Archæological Societies, Burlington House, W. 11.15 a.m.
Royal Archæological Institute. "The Omophorion and the Pallium," by Dr. Wickham Legg, F.S.A.; and "A Bloomery on Coniston Lake," by H. S. Cowper, F.S.A. 4 p.m.
Society of Arts. "The American Bicycle," by Prof. Leonard Waldo, D.Sc. 8 p.m.
Edinburgh Architectural Society. "Notes on Edinburgh Buildings and Monuments," by Prof. G. Baldwin Brown. 8 p.m.

FRIDAY.—Architectural Association. "The Planning of High Schools and Endowed Schools for Girls," by J. Osborne Smith, F.R.I.B.A. 7.30 p.m.

THE ARCHITECTURAL ASSOCIATION.

DECEMBER 3rd, ORDINARY GENERAL MEETING, No. 9, Conduit-street, W., 7.30 p.m. Mr. J. OSBORNE SMITH, F.R.I.B.A., on "THE PLANNING OF HIGH SCHOOLS AND ENDOWED SCHOOLS FOR GIRLS," illustrated by Lantern Views.

E. HOWLEY SIM, G. B. CARVILL, } Hon. Secs.

CHIPS.

A font has just been sent out from Messrs. Harry Hems and Sons' studios, Exeter, to the parish church of St. Andrew, Grenada. It was designed by the rector of that West Indian parish, the Rev. R. Medley Fulford, formerly the principal of the firm of Messrs. Fulford, Tait, and Harvey, architects, of Exeter. Early English in character, the octagonal bowl is of Caen stone, the shaft of red Corsehill, and the step of brown Portland stone.

Two stained-glass memorial windows have been placed in the Unitarian Christian church at Newport. The one presented by Mrs. Chatfeild Clarke and family, in memory of the late Mr. Thomas Chatfeild Clarke, F.R.I.B.A., of Bishopsgate-street Within, E.C., and Newport, is a beautiful representation of "The Good Shepherd," and the other, the subject of which is "Christ blessing the little children," is in memory of the late Mr. and Mrs. Abraham Clarke. The work has been carried out by Messrs. Campbell and Smith, of Oxford-street, W.

Further revelations as to the late surveyor to the urban district council of Eastleigh, J. Evans, came out at the last meeting of that body. Among other letters read was one from Mr. H. J. Weston, of Southampton, stating that nearly the whole of the plans prepared in connection with the proposed new offices, for which Evans had taken full credit, had been carried out by himself. Under the circumstances, he asked the council, as the work had taken him some weeks, to be kind enough to make him a grant, and also offered his services as architect. The clerk said Mr. Weston had no one to blame but himself. He thought they should now throw the plans open to competition. It was agreed that the resolution approving of the plans be rescinded.

In the case of Alfred Nicholas Eastwell, of Caxton-road, Mayes-road, Wood Green, N., builder and decorator, the order of discharge from bankruptcy has been suspended for two years ending Oct. 19, 1899.

The urban district council of Springhead, near Oldham, have instructed Mr. Gilbert Wilson, C.E., 10, Nevill-street, Southport, to prepare a report and estimate of a proposed new water supply to the district of Austerlands.

Owing to the interference of the Masons' Union, Sir John Jackson has found it necessary to obtain a large proportion of the granite needed for the Keyham extension works, amounting in all to nearly 3,000,000c.ft., from Norway, in place of from the neighbouring quarries in Cornwall, as he had originally intended. The men, or rather their leaders, have now given way; but the contracts for a very large supply from Norway had already been signed.

The Marquis of Bute is about to restore the Castle of Sanquhar, in Dumfriesshire.

The River Tyne Improvement Commissioners decided at their last meeting to appoint Messrs. Coode, Son, and Matthews as engineers for the reconstruction of the North Pier at a remuneration of 5 per cent. commission on the works carried out.

Trade News.

WAGES MOVEMENTS.

LIVERPOOL.—A conference has been held between members of the committee of the Master Builders' Association and representatives of the operative plasterers with a view to the settlement of the dispute which has existed for a considerable period in connection with the trade. Mr. James Woods, president of the Master Builders' Association, occupied the chair, there being five other members of the committee at the conference, and the operatives were also represented by six of their number. The situation attaching to the strike and the demands of the men was discussed in an amicable spirit for a considerable time. No result, however, was arrived at, inasmuch as it will be necessary to lay the whole of the points in dispute before a general meeting of each party to the issue. It is anticipated that these meetings will be held at an early date, and a hope is expressed that the result will be such as to bring to a close a prolonged dispute, which has greatly hampered the progress of the erection of public buildings in various parts of the city.

Sir Benjamin Stone, M.P., has now handed over to the British Museum authorities the first two sections of his Parliamentary photographs, each consisting of 100 pictures, for the new National Photographic Record department in that institution. The present groups comprise photographs taken on the terrace of the House of Commons of exactly 100 members; and a similar number of views of the most interesting features in both Houses—such as the Throne, the Speaker's Chair, the Peers' Library, the Commons Lobby, and Westminster Hall.

A portrait of Miss Bishop, principal of the Royal Holloway College, painted by Mr. J. J. Shannon, A.R.A., was unveiled on Saturday by the Bishop of Winchester in the college picture gallery, before a large assembly of past and present students.

The new flood channel which the Thames Conservators have constructed through the lock island at Teddington, between the lock and the weir, was formally opened by Sir Frederick Dixon-Hartland, M.P., on Monday. The channel is 80ft. in width, and the sill is 6ft. 6in. below the highest flood-water mark of recent years, so that in the event of any abnormal rise in the river above the weir the water will pass away much more quickly than heretofore, and the flooding of the banks will be proportionately abated.

The work of demolition in connection with the frontage of Drapers' Hall, Throgmorton-street, is being proceeded with. The alteration will in no way affect the courtyard, or, indeed, the internal arrangements of the hall. The marble staircase has been removed, and when the new work is completed the staircase will be situated in the centre of the building. The architect is Mr. T. G. Jackson, R.A., from whose plans a stone building will be erected facing Throgmorton-street. The building will be let as offices.

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LATEST PRICES.

IRON, &c.

	Per ton.		Per ton.
Rolled-Iron Joists, Belgian	£5 15 0	to	£6 0 0
Rolled-Steel Joists, English	6 0 0	„	6 10 0
Wrought-Iron Girder Plates	5 15 0	„	6 10 0
Bar Iron, good Staffs	7 0 0	„	8 0 0
Do., Lowmoor, Flat, Round, or Square	17 0 0	„	17 0 0
Do., Welsh	5 15 0	„	5 17 6
Boiler Plates, Iron—			
South Staffs	7 17 6	„	8 5 0
Best Snedshill	10 0 0	„	10 10 0

Angles 10s., Tees 20s. per ton extra.

Builders' Hoop Iron, for bonding, &c., £6 15s. 0d. per ton.

Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.

Galvanised Corrugated Sheet Iron—

	No. 18 to 20. Per ton.		No. 22 to 24. Per ton.
6ft. to 8ft. long, inclusive gauge	£10 15 0	...	£11 0 0
Best ditto	11 5 0	...	11 10 0

	Per ton.		Per ton.
Cast-Iron Columns	£6 0 0	to	£8 10 0
Cast-Iron Stanchions	6 0 0	„	8 10 0
Cast-Iron Sash Weights	—	„	4 2 6
Cast-Iron Socket Pipes—			
3in. diameter	5 10 0	„	5 15 0
4in. to 6in.	5 5 0	„	5 10 0
7in. to 24in. (all sizes)	4 15 0	„	5 5 0

[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]

Pig Iron—	Per ton.
Cold Blast, Lilleshall	105s. to 110s.
Hot Blast, ditto	57s. 6d. to 62s. 6d.

Wrought-Iron Tubes—Discount off Standard Lists f.o.b.

Gas-Tubes	75p.c.	Fittings	77½p.c.
Water-Tubes	70	„	72½
Steam-Tubes	62½	„	65
Galvanised Gas-Tubes	60	„	62½
Galvanised Water-Tubes	55	„	57½
Galvanised Steam-Tubes	45	„	47½

	10cwt. casks. Per ton.		5cwt. casks. Per ton.
Sheet Zinc, for roofing and working up	£22 0 0	to	£23 0 0
Sheet Lead, 3lb. per sq. ft. super.	15 12 6	„	16 12 6
Pig Lead, in 1cwt. pigs	14 7 6	„	15 7 6
Lead Shot, in 28lb. bags	16 10 0	„	17 10 0
Copper Sheets, sheathing and rods	60 0 0	„	61 0 0
Copper, British Cake and Ingot	50 10 0	„	51 10 0
Tin, Straits	63 11 3	„	64 11 3
Do., English Ingots	67 0 0	„	68 0 0
Spelter, Silesian	18 7 6	„	19 7 6

	Per ton.		Per ton.
Cut Clasp Nails, 3in. to 6in.	£8 15 0	„	£9 15 0
Cut Floor Brads	8 10 0	„	9 10 0

Wire Nails (Points de Paris)—

0 to 7	8	9	10	11	12	13	14	15	B.W.G.
8/6	9/0	9/6	10/3	11/0	12/0	13/0	14/9	16/9	per cwt.

TIMBER.

Teak, Burmah	per load	£14 0 0	„	£15 10 0
„ Bangkok	„ ...	10 10 0	„	15 0 0
Quebec pine, pitch	„ ...	—	„	—
„ yellow	„ ...	2 12 6	„	4 12 6
„ Oak	„ ...	5 5 0	„	6 5 0
„ Birch	„ ...	4 7 6	„	6 2 6
„ Elm	„ ...	4 5 0	„	5 10 0
„ Ash	„ ...	3 10 0	„	4 15 0
Dantsic and Memel Oak	„ ...	2 2 6	„	3 2 6
Fir	„ ...	2 0 0	„	4 0 0
Wainscot, Riga p. log	„ ...	2 2 6	„	3 7 6
Lath, Dantsic, p.f.	„ ...	4 10 0	„	5 10 0
St. Petersburg	„ ...	5 0 0	„	6 10 0
Greenheart	„ ...	8 0 0	„	8 5 0
Box	„ ...	4 0 0	„	15 0 0
Sequoia, U.S.A. ...per cube foot		0 1 8	„	0 1 10
Mahogany, Cuba, per super foot 1in. thick		0 0 5	„	0 0 6½
„ Honduras	„ ...	0 0 5	„	0 0 6½
„ Mexican	„ ...	0 0 4	„	0 0 5
Cedar, Cuba	„ ...	0 0 4	„	0 0 4½
„ Honduras	„ ...	0 0 4	„	0 0 4½
Satinwood	„ ...	0 0 6	„	0 1 1
Walnut, Italian	„ ...	0 0 3½	„	0 0 7

Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 11in.:—

Quebec, Pine, 1st	£20 10 0	to	£26 10 0
„ 2nd	15 0 0	„	17 10 0
„ 3rd	7 10 0	„	11 0 0
Canada Spruce, 1st	10 10 0	„	12 0 0
„ 2nd and 3rd	8 0 0	„	9 0 0
New Brunswick	7 10 0	„	8 0 0
Riga	6 10 0	„	7 10 0
St. Petersburg	8 10 0	„	12 10 0
Swedish	9 0 0	„	15 10 0
Finland	8 0 0	„	8 10 0
White Sea	9 15 0	„	16 5 0
Battens, all sorts	5 0 0	„	20 0 0
Flooring Boards, per square of 1in.:—			
1st prepared	£0 8 6	„	£0 15 6
2nd ditto	0 7 0	„	0 12 0
Other qualities	0 5 0	„	0 6 6
Staves, per standard M:—			
Quebec pipe	—		—
U.S. ditto	35 0 0	„	42 10 0
Memel, cr. pipe	230 0 0	„	240 0 0
Memel, brack	200 0 0	„	210 0 0

OILS.

Linseed	per ton	£14 12 6	to	£15 5 0
Rapeseed, English pale	„ ...	27 5 0	„	27 15 0
Do., brown	„ ...	25 10 0	„	26 0 0
Cottonseed, refined	„ ...	14 5 0	„	14 15 0
Olive, Spanish	„ ...	28 0 0	„	29 0 0
Seal, pale	„ ...	23 10 0	„	24 0 0
Cocoanut, Cochin	„ ...	29 10 0	„	30 0 0
Do., Ceylon	„ ...	22 0 0	„	22 10 0
Palm, Lagos	„ ...	22 0 0	„	22 10 0
Oleine	„ ...	18 15 0	„	19 15 0
Lubricating U.S.	per gal.	0 6 3	„	0 7 6
Petroleum, refined	„ ...	0 0 4½	„	0 0 4¾
Tar, Stockholm	per barrel	1 2 9	„	1 5 0
Do., Archangel	„ ...	0 12 6	„	0 15 0
Turpentine, American	per ton	21 0 0	„	23 10 0

LIST OF COMPETITIONS OPEN.

Wells City—Public Hall	£25, £15, £10	Reginald L. Foster, City Clerk, 1, Cathedral-green, Wells, Somerset	Nov. 30
Mexico—Legislature Palace (1,500,000dol. limit)	15,000dol. Mex.	Secretary Public Works, Mexico City	„ 30
Cardiff—Town Hall and Law Courts (A. Waterhouse, R.A., Assessor—£200,000 limit)	£500 (merged), £300, £200	J. L. Wheatley, Town Clerk, Town Hall, Cardiff	Dec. 4
City Corporation—Bronze Diamond Jubilee Medal	£20, £15, £10	Sir J. B. Moachton, Town Clerk, Guildhall, E.C.	„ 6
Hackney—Electric Lighting Scheme		Geo. Grocott, Vestry Clerk, Town Hall, Hackney	„ 14
Nottingham—Laying-out and Planting Basford New Cemetery.	£100, £50	Samuel G. Johnson, Town Clerk, Nottingham	„ 15
Dorking—Workhouse Infirmary (£4,000 limit)	No first, £15, £5	Geo. Scales, Clerk to Guardians, 35, High-street, Dorking	„ 15
Nottingham—Designs for Basford Cemetery Buildings: Chapels, Crematorium, Lodges, &c.	£100, £50	Samuel G. Johnson, Town Clerk, Nottingham	„ 15
Menai Bridge—Landing Pier (£3,000 limit)	£40	Thos. Hughes, Clerk, Min-y-Den, Menai Bridge	„ 16
Festiniog—Temporary Eisteddfod Pavilion for 10,000 (£900 limit)	10 Guineas	Wm. Jones, Hon. Sec., Pavilion Committee, Blaenau, Festiniog	„ 17
Bootle—Fire Brigade and Police Stations (£14,000 and £1,500 limits)	50 Guineas, 25 Guineas	J. H. Farmer, Town Clerk, Bootle, Lancs	„ 31
Altrincham—U.D.C. Offices	£20, £10	J. Stokes, Clerk, 64, Market-street, Altrincham	„ 31
Crich—Water-Supply Scheme (3,100 population)	15 Guineas, 5 Guineas	Joseph Pym, Clerk, Belper	Jan. 8
Carlton, Victoria—Children's Hospital	£100, £50, £25	J. Nicholson, Hon. Sec., Pelham-street, Carlton, Australia	„ 30
Leicester—Motor Refuse Carts	Corporation	E. G. Mawbey, Borough Engineer, Leicester	„ 31
Port Elizabeth—Free Library (Assessors, Sir F. Blaine and R. H. Hammersley-Heenan—£20,000 limit)	100 Guineas, 50 Guineas	G. Cettle, Librarian, Port Elizabeth, S.A.	Feb. 15
New York—Sun Dial (Plaster Model)	500dol., 250dol.	Sec. National Sculpture Soc., 215, West 57th-street, New York	„ 28
Newcastle-on-Tyne—New Infirmary (local Architects)	(No first) £150, £100, £50	Secretary Building Committee, Newcastle	Mar. 1
Belper—Sewage Disposal Schemes	50 Guineas, 25 Guineas	Joseph Pym, Clerk, Belper	May 1
Peterborough—Additions to the Guildhall (£2,500 limit)	£35 (merged), £15	The Town Clerk, Peterborough	—
Wadebridge—Schoolroom, adjoining Wesleyan Church	(No first) £5	Walter O. Wellington, Sec., Building Com., Wadebridge, Cornwall.	—
Lymington—New Forest Hall (Limited to Hampshire Architects)	25 Guineas	Clerk to Hall, Committee, Lymington	—

LIST OF TENDERS OPEN.

BUILDINGS.

Buckie—Tenement Houses, Garden-lane	Jas. Nichol	Jas. Perry, Architect, 41, East Church-street, Buckie	Nov. 27
Burnley—Foundations at Workhouse	Board of Guardians	J. S. Horn, Clerk, Union Offices, Burnley	„ 27
Edinburgh—Alterations to Premises, High Calton	Corporation	Borough Engineer, 1, Parliament-square, Edinburgh	„ 27
Hopetown—Pewing Primitive Methodist Chapel		Joseph Land, Alpine Villas, Hopetown, Normanton	„ 27
Colchester—Nurses' Home at Hospital	Essex Hospital Committee	C. E. Bland, Secretary, Crouch-street, Colchester	„ 27
Wolverhampton—Repairing Fabric and Furniture of the Board Schools	School Board	T. H. Fleeming, Architect, 102, Darlington-street, Wolverhampton.	„ 27
Whickham—Eight Cottages		E. Rutherford, Whickham, Co. Durham	„ 27
Leeds—Three Houses, Ash-road	Joseph May	A. E. Braithwaite, Architect, 26, Norwood-place, Headingley	„ 27
Scarborough—Eight Houses, Victoria Park Estate		J. Caleb Petch, Architect, Scarborough	„ 27
Teignmouth—Drill Hall, Brook-hill	1st Devonshire Volunteer Artillery.	Samuel Segar, F.I.A.S., Architect and Surveyor, Newton Abbot	„ 27
Morecambe—Stable and Coach-house, Cumberland View	John Burrow	Harrison, Hall, and Moore, Architects, 36, Albert-rd., Middlesbrough	„ 27
Newcastle-on-Tyne—Premises and Offices in Collingwood-street		Oliver & Leeson, Archts., Bnk Chmbrs, Mosley-st., Newcastle-on-T.	„ 29
Bristol—Pupil Teachers' Centre, Broad Weir	School Board	La Trobe and Weston, Architects, 20, Clare-street, Bristol	„ 29
Falkirk—Police Cells	Stirlingshire County Council	Patrick Welsh, County Clerk, Stirling	„ 29
Crosby—St. Faith's Church (900 sittings)		Grayson and Ould, Architects, 31, James-street, Liverpool	„ 29
Dublin—Alterations, Aldborough House	Official	H. Williams, Secretary, H.M. Office of Works, Dublin	„ 29
Braemar—Additions to Fife Arms Hotel		A. Marshall Mackenzie, Architect, 1, Bon Accord-street, Aberdeen	„ 30
Londonderry—Three Houses, Northland-street	Buchanan Bros.	Wm. Barker, Architect, 3, Richmond-street, Londonderry	„ 30
Goole—Repairs to Schools (12 months)	School Board	Hy. Lindley, Clerk, Goole	„ 30
Glasgow—Tenements, Gallowgate and Ban-square	Corporation	J. D. Marwick, Town Clerk, Glasgow	„ 30
Ulverston—Stabling, Carriage-house, &c., County Hotel		Case and Co., Victoria Buildings, Ulverston	„ 30
Bridlington Quay—House	J. Jefferson	J. Earnshaw, Architect, Bridlington Quay	„ 30
Forfar—Post Office	Commissioners of H.M. Works	The Secretary, H.M. Office of Works, 12, Whitehall-place, S.W.	„ 30
Londonderry—Six Houses, Benvardon-avenue		Wm. Barker, Architect, 3, Richmond-street, Londonderry	„ 30
Belfast—Warehouse, Great Victoria-street	Strain and Sons	S. Stevenson, Architect, Royal-avenue, Belfast	„ 30
Kendal—Remodelling White Hart Hotel	R. and P. Hartley	Stephen Shaw, F.R.I.B.A., Kendal	Dec. 1
Launceston—Caretaker's Cottage, Sewage Works	Corporation	C. H. Peter, Town Clerk, Launceston	„ 1
Swinton—Cottage Home	Manchester Guardians	A. Murgatroyd, Architect, 23, Strutt-street, Manchester	„ 1
Plymouth—Six Underground Transformer Chambers	Corporation	John H. Rider, Borough Electrical Engineer, East-street, Plymouth	„ 2
Enfield—Additions to Chesterfield-road School	School Board	N. Hepworth, Clerk, Council House, Enfield	„ 2
Plymouth—Electricity Works at Prince Rock	Corporation	James Paton, Engineer, Municipal Offices, Plymouth	„ 2
Aldridge, Walsall—Two Blocks of Three Almshouses	Walker's Trustees	The Rector, Aldridge, Walsall	„ 3
Hampton-on-Thames—Semi-Detached Villas	J. J. Draper	F. G. Hughes, Architect, Hampton-on-Thames	„ 4
Coupar Angus—Farmhouse, West Haugh		J. Reid, Architect, Coupar Angus, N.B.	„ 4
Barrow—Stores, Hindpool-road	Spencer and Sons	J. Butler, Architect, Cornwallis-street, Barrow-in-Furness	„ 4
Lossiemouth—Villa at Stotfield		R. B. Pratt, A.R.I.B.A., County Bank House, Elgin	„ 4
Buckie—Writing Chambers, Baron-street	A. B. Hendry	Jas. Perry, Architect, 44, East Church-street, Buckie	„ 4
Aberystwith—Chancel and Vestry, Trinity Church		Rev. Prebendary Williams, Aberystwith	„ 4
Reddish—Goods Warehouse and Extension of Platforms at Station	Sheffield and Midland Railway Cos.	Oliver S. Holt, Secretary, London-road Station, Manchester	„ 6
Rowley Regis—Addition to School	School Board	J. T. Meredith, Architect, Kidderminster	„ 6
Middlesbrough—Imbecile Wards & Sanitary Blocks to Infirmary	Board of Guardians	R. Lofthouse and Sons, Architects, 62, Albert-road, Middlesbrough	„ 6
Shibden—Semi-detached House in Kell-lane		Jackson and Fox, Architects, 22, George-street, Halifax	„ 6
Llandudno—Municipal Buildings	Urban District Council	Alfred Conolly, Clerk, Council Offices, Llandudno	„ 6
Redborough—Board School	School Board	W. H. C. Fisher, Architect, 6, Rowcroft, Stroud	„ 6
Woking—Public Offices near Station	Urban District Council	G. J. Wooldridge, Surveyor, Bank Chambers, Woking	„ 7
Winchmore Hill, N.—Nurses' Home and Isolation Pavilion at Northern Hospital	Metropolitan Asylums Board	T. Duncombe Mann, Clerk, Norfolk-street, Strand, W.C.	„ 8
Bingham—Boardroom at Workhouse	Board of Guardians	A. R. Calvert, Architect, Nottingham	„ 8
Great Yarmouth—Additions, Isolation Hospital	Corporation	J. W. Cockrill, Borough Surveyor, Great Yarmouth	„ 8
Melincrythan—Schools at Herbert-road for 617 Children	Llantwit Lower School Board	Cook Rees, Architect, St. Thomas Chambers, Church-place, Neath	„ 8
Clayton—Eleven Terrace Houses		Saml. Spencer, Architect, 344, Great Horton-road, Bradford	„ 8
Halifax—Police Station and Court-House	Corporation	George Buckley and Son, Architects, Tower-chambers, Halifax	„ 9
Newquay—Villa	W. R. Northway, Tavistock	William Square, M.S.A., Tavistock	„ 9
Kilkenny—Erecting 40 Houses and Repairing 24 Houses	Corporation	William K. Cleere, Executive Sanitary Officer, Kilkenny	„ 9
Pett, Sussex—Coastguard Station		Director of Works Dept., Admiralty, Northumberland-avenue	„ 10
Neyland—Baptist Chapel at Neyland		S. Wilson Edwards, Architect, Beach Mount Villa, Mumbles	„ 11
Grangemouth—Sixteen Houses, Marshall-street	Co-operative Building Society	G. D. Page, Architect, Old Glebe Chambers, Falkirk	„ 11
St. Johnstown's Castle—Alterations and Repairs		E. A. Hackett, Architect, Clonmel	„ 13
Nottingham—Additions to Lunatic Asylum	Committee of Visitors	Edwin T. Ronald, Clerk, Nottingham	„ 13
Buenos Ayres—Central Railway Station (cost, 4,000,000 piastres)		Legation of Argentine Republic, London	„ 26
Copenhagen—Repairing Cemented Walls of Thorvaldsen's Museum	Corporation	F. Meldahl, Copenhagen	Jan. 1
West Hanningfield—Two Cottages		J. Brake, 18, Northumberland-grove, Tottenham	—
Harrogate—Extension of *Herald* Printing Works		Whitehead and Smetham, Architects, Albert-street, Harrogate	—
Patricroft—New Hospital at Workhouse	Barton-upon-Irwell Guardians	Worthington and Son, Architects, 46, Brown-street, Manchester	—
Killinure—Rebuilding Killinure House and Building Stables and Offices		P. P. Metge, C.E., 9, Harcourt-terrace, Dublin	—
Rumney, Glam—Villa		S. Rooney, 9, Quay-street, Cardiff	—
Ashton-under-Lyne—Offices and Stores	Co-operative Society	J. D. Lindley, Architect, Ashton-under-Lyne	—
Batley—Two Blocks of Houses		Geo. Hollies, Crossbank, Batley	—
Woodham Ferriss—Four Cottages		J. Brake, 18, Northumberland-grove, Tottenham	—
Stapleford—Branch Stores	Co-operative Society	Ernest R. Ridgway, M.S.I., Architect, Long Eaton	—
Lincolnshire—Stanhope Memorial, Horncastle		S. Goe Overton, Secretary, 2, Manor House-street, Horncastle	—
Saltaire—Semi-Detached Villas		Peterson and Lawson, Architects, 1, Bank-street, Bradford	—
Belfast—Six Houses, Mersey-street, and Six in Lawnbrook-avenue		Wm. Campbell, Architect, 4, Hurst-street, Belfast	—
Bodmin—Isolation Hospital at County Asylum	Visiting Committee	Robt. P. Edyvean, Clerk, Bodmin	—
Scarborough—Fourteen Large Houses on South Cliff		A. Moore, 23, West-bank, Scarborough	—
Redruth—Alterations to Lanner Board Schools		S. Hills, Architect, Redruth	—
Bingham—Board Room and Offices	Board of Guardians	A. R. Calvert, Architect, Nottingham	—

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COMBUSTIBLE BUILDINGS.

CAN they be made fireproof? This is the question which naturally occurs to every architect and engineer after the calamitous fire of last week in the City. In the presence of so large an area of devastation—measuring 200 yards by 100 yards—as that between Aldersgate-street and Red Cross-street, one feels abashed at the mere dimensions of the catastrophe, and the rapidity with which the fire spread over such an area. If we do not know positively what are the conditions of a fireproof building, we at least can see what are those of a combustible building. We have at least learned one thing, and that has been more than once suspected—that a warehouse may be constructed on so-called "fireproof" principles, and yet be as vulnerable as a wooden structure under a fierce fire.

Another very important thought is that the catastrophe will suggest serious reflections as to our methods of construction, and affords an opportune occasion for reviewing the whole question of the fire-resisting building of warehouses and business premises in crowded cities. It is quite certain that our methods — good in themselves — have not taken into account the way in which fire attacks a structure; that, in fact, we leave many loopholes and apertures through which fire can pass easily. Patentees and inventors have assumed a certain mode and action of fire, or a certain duration, and have imagined that if they protect their iron floors and columns, that is all that is required. Recent instances in this country and in America have shown that architects and engineers have not reckoned with other equally urgent conditions.

How 17 acres of buildings, many of them substantially constructed, though, alas! many of the jerry-built kind, could have fallen before the devouring element in the time till everything combustible had been destroyed is simply surprising. Engines, water, and firemen were in abundance, and yet the flames spread with astonishing rapidity, till there was nothing else to burn. The Brigade men nobly did their duty in arresting further damage to adjoining properties, but they seemed to be powerless to check the buildings involved till the flames spent themselves from lack of combustible fuel. Given a densely packed area of buildings with plenty of combustible materials within them, and our experience has been that a fire in one of the premises, unless speedily extinguished, involves the whole area.

But the question in its more particular aspect divides itself under several heads. First, as to the extent of the risk. The unit must determine this, and the unit is a building bounded by incombustible walls. If these are vulnerable to fire, the mischief extends, and other properties become involved. The extent of the risk is determinable, then, practically by the distance from one sound party-wall to the next, and may embrace the whole range of warehouses with party-walls between them; whereas it should be confined to one building or the distance between the two party-walls. As to front and back and other external walls, which are generally pierced by windows, there is equally an element of danger when a fire rages within and the street is narrow or the areas in the rear are small; but this danger can sometimes be controlled by well-equipped fire-extinguishing appliances, so that for practical purposes the question is confined to party-walls and to floors and roofs. If the fire can be confined laterally by walls, and also in a vertical direction by fire-resisting floors of steel joists and concrete, it can scarcely obtain those dangerous proportions which render a number of warehouses on fire so difficult a matter to grapple with. The extent of the combustible area or space is therefore an all-important matter for consideration; the smaller we can make this unit the safer. The recent London Building Act has been framed on the principle of limiting the cubical extent of buildings, and it distinctly enacts that "no building of the warehouse class shall extend to more than 250,000c.ft. unless divided by party-walls in such manner that no division thereof extend to more than 250,000c.ft.," and it is further provided that no addition shall be made to any building of this class, so that its cubical contents shall exceed that number of feet. How far these provisions were enforced in the buildings lately destroyed we do not know; some of the warehouses were very old, and therefore were built before the new Building Acts came into operation, and probably few of them had not been altered either in one way or another by additions, or had not been re-divided by inner walls, so that the latter provision, introduced only in the Act of 1894, could not have been fulfilled. The inquiry will, no doubt, reveal more of the facts as to construction than we already know, and it would be very useful to find out whether any of the warehouses burnt out contained a larger cubical extent than here enacted, how many, in fact, contained so much as 255,000ft., or even the previous limit of 216,000c.ft.; and if any of the party-walls were really constructed within the meaning of the Act. Many of them, no doubt, had been tampered with, and openings made in them for extension of accommodation without proper fireproof doors.

The destructive fires at Pittsburg and Chicago of recent date have pointed to certain defects in the construction of buildings of this class. The construction of the Horne Store Buildings in the former city has been fully described in technical journals, and teach important lessons. The store was constructed on so-called fireproof principles; it illustrated several methods and forms of fireproofing materials, and was filled with dry goods very combustible; the windows were large, but unprotected by shutters or sprinklers; the floors were supported by steel columns made of Z-bars and plates, and the iron framework was heavy, the box girders 24in. deep, with double 22in. web-plates; the beams all 15in. deep, carried on brackets riveted to side of box-girders; the front and back walls were self-supporting; the lintels on most floors were close to the windows, and exposed to the fire; the building had openings in the centre of the floors. Further, the iron girders and floors were protected with ceilings of light cellular blocks of fireproofing of hard-burned material. The floor arches were carried on skewbacks, and the columns covered with tile 2in. thick, having a hollow space. Every precaution which modern construction suggests was taken. But the hollow floors formed flues which conducted the draught and increased the action of the fire. Two things were made clear. It was proved that plastering will not prevent the heat from charring wood behind it; that large windows, if not protected by fire-resisting shutters, are one means by which fire can easily spread from one building to others opposite or near. The protection of windows to prevent the heat from breaking the glass is therefore one of the essentials of preventing the spread of fire to adjacent buildings. The open shaft in the centre of the buildings is also condemned as uniting several floors and making them more dangerous than if the space was in one. As to fireproofing materials, it has also been proved that porous protecting materials are superior to hard-burned clay. It is suggested, also, that porous coverings like that of sawdust and clay, inclosing the iron columns with a hollow space, and floor arches and flange protection of the same kind, will stand heat and water without material injury.

These are a few of the lessons learned after a careful observation of great fires in cities of the States. And they apply with equal force to the buildings in the City of London which were destroyed by fire the other day. In many cases the iron construction was of a like kind, but unprotected; and the second schedule of the Building Act, 1894, which provides that timber and iron are to be incased in "plastering in cement, or other incombustible or non-conducting external coating" was, of course, not followed, nor probably the other equally desirable rule that allows a space at each end of an iron bressummer to allow for expansion.

The correspondence which has been published in the *Times* refers to a few of these defects. Mr. Wm. Woodward shows that the Building Act of 1894 has one of its objects to render buildings more fire-resisting, and he instances the second schedule, which provides for encasing timber and iron in plastering or some incombustible coating. If this coating had been applied to the iron in the buildings in the City, probably less destruction would have occurred. A deep girder, supported on good solid brick piers is undoubtedly safer construction than iron columns as supports, especially if the girder is encased in plaster. But we certainly believe in the resistance of timber, if solid. Solid oak or teak beams have fire-resisting properties, and are certainly safer than unprotected iron rigidly fixed. Another correspondent draws attention to the unreliability of so-called fireproof buildings, and to the fact that, as an eye-witness of the conflagration, he noticed that in "nearly every case the fire commenced at the roof, and spread downwards, except those buildings which were opposite a burning structure, in which case the premises caught fire through the window-frames getting alight and shivering the glass." The warehouses in Well-street and Hamsell-street stood back to back in contact with each other; they were tall buildings with large windows and skylights, and thus constituted one building as far as risk was concerned. The windows, in fact, immensely increase the danger of a fire spreading; they should, therefore, be protected by light iron or other fire-resisting shutters, and the skylights should be also protected outside. With the aid of asbestos and other non-conducting plastering on metal lathing, solid wood floors on concrete, proper iron or oak doors in brick walls and over lift openings, brick-walled staircases and escape ladders, automatic water-sprinklers fixed in lintels and on the upper floor, the rapid spread of a fire might be delayed or arrested. These are points which ought to receive attention when the proposed amendment of the Building Act next Session is made. The district surveyors also ought to have certain optional discretion given them in dealing with buildings. A store of combustible matter in connection with shelving of wood, match-boarded walls and ceilings dried by gas burners, is at once a source of danger, and ought to be controlled by enactment.

The dictum of Capt. Shaw that he would sooner have to deal with buildings of brick or concrete and solid timber than so-called "fireproof" structures has been amply confirmed in this recent case. The stone walls have been found calcined and fractured, and the iron girders and joists of floors were twisted into all shapes, and buckled the walls, so that they became a dangerous element to the fire brigade. We have still to learn

many facts as they reveal themselves to those whose duty it is to investigate the matter; but we are left in no uncertainty as to the danger inherent in unprotected iron structures like floors and roofs, and their rigid connection with walls of masonry. Openings in party-walls, lifts, and staircases have contributed, no doubt, to the disastrous spread of the fire. Equally important it is to inquire into the means of escape that are provided for workpeople engaged in these buildings, whose condition forms so sad a feature in the catastrophe, and for those brave firemen who are left to do their perilous duty amidst belching flames and smoke, and, not least, the hot steam to which they are exposed from the water thrown on the heated walls.

LAY CRITICISM OF DESIGNS.

THERE are occasions when lay opinions expressed on professional matters are presumptuous and disturbing. Few persons would venture to set up their own judgment on a question of treatment of a disease or on any legal matter; but on any architectural subject it is not unusual to find people openly questioning the expert opinion of professional men, curiously exemplifying the adage, "Fools rush in where angels fear to to tread." Strange to say, those who are most prone to set at nought the opinions of professional men are they who have taken the trouble to invite professional skill. One would have thought, at least, that these wise-acres would have acted independently; that, having such a good opinion of their own abilities, they would have instructed their surveyors to make plans in accordance with their own views and have dispensed with any other professional aid. They could have formulated a scheme and instructed their official to carry it out. But, no; they want a little popularity, and advertise for designs, and then take upon themselves to select one that will suit their purpose. There can be no objection to this arrangement if the competing architects are willing to abide by the decision, and if the usual hocus-pocus proceedings are not practised; but the board is a little afraid of their own knowledge, and so, with commendable courage, they agree to take the opinion of an expert referee. Sometimes, no doubt, they are reluctantly forced into this position by the competitors, or some central architectural body, or by the force of precedent; for, having employed an assessor to make a choice for them, they curiously revoke his decision and assert their own authority. This sort of contradictoriness or inconsistency has been illustrated much of late. It is difficult to find a motive, except it be that the majority of building promoters who invite architects to compete wish to be their own masters, and to obtain all the honour and glory of the selection of design. It is something to be proud of for Mr. Smith or Mr. Jones, or other local "big-wig," to be able to say he was one of the arbitrators who sat on the design—that he really selected it, or that he was one of the champions on the board who stuck up for and helped to promote the adoption of the best design, even against the expert skill of an assessor. That he actually succeeded in overthrowing the decision of the professional assessor and divided the board on the issue, is at least something to boast of, especially if the design so championed turned out to be a success. One of the latest instances of local ambition is that afforded by the Surbiton District Council, who advertised for designs for new municipal offices, appointed a professional assessor to advise them, and then set aside his opinion as to order of merit for their own in coming to a final decision. As to which of the three selected by the assessor ought to be placed first admitted certainly of some doubt in this instance, and we believe the council were justified in preferring the plan which the assessor himself had placed second. Our own remarks on the designs, which we made last week, confirm the council's selection of design in some points at least. The plan is certainly its strongest point. The assessor himself, in his report, speaks of the plan as a "very good one"; but as regards the artistic treatment, he prefers the design he selected as the best; but says directly after No. 25 is "also a good design in these respects." No doubt the assessor's report was rather indeterminate and somewhat vague, and left the committee in rather a state of hesitancy as to which of the three ought to be selected. Events have shown how desirable it is for an assessor to be, we will not say dogmatic, but sufficiently decisive as not to give a committee any opportunity for preferring their own opinion. Here Mr. Mountford had admitted the merits of the three designs were "sufficiently equal to make it somewhat difficult to decide between them"; and he goes on to say that the "plan placed third in the report may have the most advantages." These advantages were so forcibly impressed upon us, that we should have had little hesitation in placing it first. Now, the lay mind—if we can so describe that of the council—on questions architectural, as on other topics, is generally inscrutible or oblivious to nice distinctions. They can only understand decided points, about which there can be no dispute; but for such details as well arranged and grouped offices, good entrances and corridors, sufficient light and ventilation, artistic points of design, and other matters which only the professional man can appreciate, the ordinary lay committee is helplessly impotent. So that when an assessor says two or three designs are almost equal in merit, we may be quite sure that Mr. Tomkins or Mr. Jones will be quite unable to discern any distinction, and believe that the assessor himself has no distinct preference. In this way we can explain the action of certain members of the Surbiton Council. They thought they were fully justified in setting aside the design selected as best by the assessor, and putting in its place another. As it happens, the choice they have made is a good one, though it might have been much worse; but what we wish more particularly to refer to is the air of superiority assumed by certain members in the discussion on the subject. One of them, in opposing the amendment to the effect that they should submit their judgment to the assessor, exclaimed: "He surrendered his judgment to no one," for, having examined the plans carefully, he came to the conclusion that the plan selected by the assessor was not suitable for the magnificent site. On the question of elevation the same member is reported to have said the design did not fall in with any of the schools, and it was not suitable to the taste of the people of Surbiton. Another member said "he did not think they ought to take too much notice of specialists and experts, but they ought to use their common sense," and he complained the assessor had allowed them a "lot of rope." In this instance, the committee, in selecting one of the three recommended by their assessor, were perfectly within their right, as a clause of the conditions clearly stated that the council had appointed an assessor to advise them, and another clause (5) stated that "If by any sufficient reason the design placed first be not carried out, then the design placed next in order by the assessor shall have priority of consideration, &c."

But it is the boasted "common sense" of the lay-member of committees that is so extraordinary and offensive to the minds of those who wish to see justice and consistency. Although in this case not much harm has been done, except, perhaps, in rejecting two better external treatments, it is right for the competing members of the profession to demand a more satisfactory solution. If the committee are dissatisfied with the assessor's decision, they ought in fairness to appeal to the body of competitors or to another independent arbitrator. These examples of interference with professional awards are often as ludicrous as they are blatant. How is it possible for a committeeman, who only has a faint idea of the requirements of a plan, to place his opinion before that of an assessor who has gone thoroughly into the problem, and has had to keep in view both plan and external design and construction? Yet, so it is, that an architect's professional work is judged by laymen who cannot interpret technical drawings. Lay opinion and criticism on questions of architectural design are exceedingly vexatious and provoking, even in ordinary building matters. It is always the bugbear of "common sense" that is trotted out—a very valuable quality when controlled by knowledge and skill, but generally exceedingly perverse and dangerous when these essentials are absent. The man who is boastful of his common sense often runs his head against the veriest fact. He looks perhaps for a square plan because he can understand it better. He makes a fuss about a closet or a lavatory in a plan, but overlooks the merit of the entire arrangement; or he thinks he has found a "mare's nest," when, all the time, a little study of the drawing and sections reveals the apparent discrepancy. These critics are often men of one idea;—they are cranks about sanitation, about some special department, and all else must go to satisfy their whims. When will the architect's province be exempted from this interference? We never hear of the lawyer's, the physician's, the surgeon's, the musician's, or the painter's work being subjected to criticism—only the architect's. Is it because it appeals to the eye and our sense of utility, whereas in each of the other cases special or technical knowledge are in evidence, and have to be mastered? But this is not the only explanation, and we must wait till the architect and the public better understand each other.

WROUGHT-IRON AND STEEL IN CONSTRUCTIONAL WORK.—XXXI.

JOINTS between complete girders are shown in the accompanying figures:—

Fig. 199 shows how rafters of joist section can be united. Very little bending to acute angles can be done without rolled sections. To set almost any section to an acute angle some welding is necessary, and this is, as a rule, objectionable. Hence the method of jointing shown is generally preferable. Two fish or joint plates, A A, are riveted or bolted one on each side of the abutting joists; they are bolted in the illustration for convenience of erection in place. The circular bearing-plates of cast-iron shown riveted outside the covering plates are to take the pin for tension and suspension rods.

Fig. 200 illustrates a jointing of two girders at an angle, through the medium of a plate. The girders are of lattice form, with distance-pieces between the flange angles, and the end angles are either riveted or bolted, as most convenient.

Fig. 201 is an example of the jointing of four girders on top of a cast-iron column for a roof. A is the top of the column upon which the horizontal girders B C abut at an angle, the roof being polygonal in plan; D is the springing of an arched roof rib or principal inserted between the ends of B and C, and having angles riveted next the edges; E is a horizontal beam bolted to the inner angles on D, the beams E being for the purpose of carrying a raised promenade. The setting of the ends of the flange-plates of a number of girders to an angle, as in the figure, is done by templets, the uses and advantages of which were noted in Article XXX. The bending of the angle-irons to acute and obtuse forms is usually done over blocks cast to the angle required, the bending being effected with a sledge, or by means of stamps or dies under the steam hammer or press. The angles have to be heated

for the purpose, and they are cut to length first. When a very large quantity are wanted, acute and obtuse angles are supplied by the rolling-mills to requirements.

Fig. 202 shows the union at the springing of a

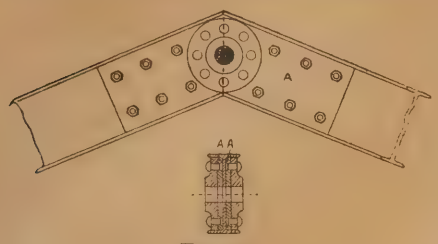

Fig. 199.

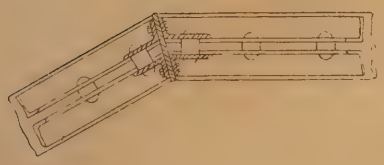

Fig. 200.

roof principal A from a plated column B, the joint being at C; the open plated form of A at the base gives place to lattice work higher up in the rib. It is a natural transition from the

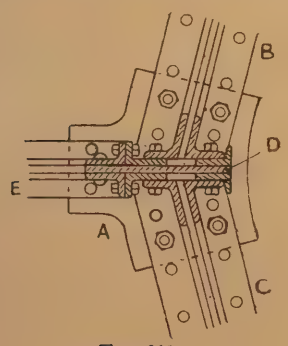

Fig. 201.

diaphragm, connecting adjacent webs of a box-girder or adjacent girders to the cross-beam connecting distant girders. The simplest connections of this class, therefore, are those of diaphragm or

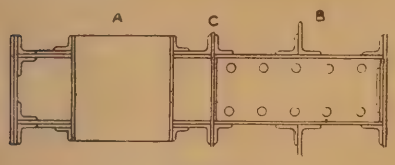

Fig. 202.

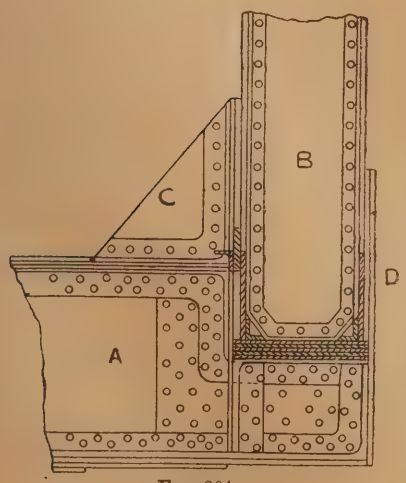

Fig. 204.

stretcher type, comprising a plate surrounded with flange angles riveted to one or to both faces, and bent or set round to the shapes required to

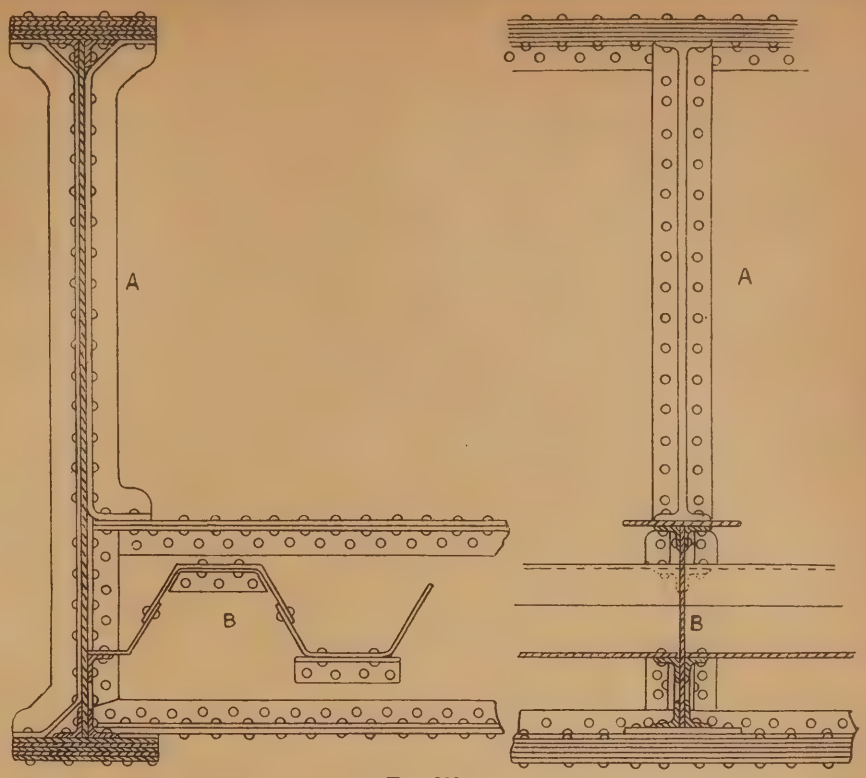

Fig. 203.

fit against the longitudinal girders; for light distance pieces the plate can sometimes be dispensed with, and a deep webbed tee-iron be bent round. Some welding has to be done on such work as this, because neither angle nor tee can be bent to acute shapes, but each corner has to be cut to make the acute angles, and welding must necessarily

flange of A, is riveted to it with a butt joint, and the inner stiffener of A is turned round to form a bracket upon B, which is therefore confined rigidly in each direction. The method of supporting the troughing is indicated here, but special notice will be given to that later.

Fig. 204 shows a union of a main-centre

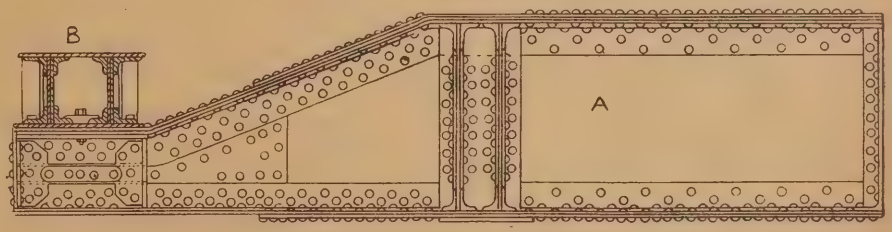

Fig. 205.

follow. It is much easier to fit girders by cutting the corners off at an angle to clear the angles in the longitudinal girders than to attempt to fit them around; the latter has to be done in certain cases, but never unless absolutely necessary, because of the troublesome fitting involved. These remarks apply mainly to cases in which

cross-girder A of a swing-bridge with a centre vertical strut B. The girder A is of box form, as is also the strut B; A is set down to receive B, and the plated gusset-bracket C serves to stiffen the union of the two, which is still further assisted by the gusset-plate D. The vertical and horizontal members are thus rendered sufficiently

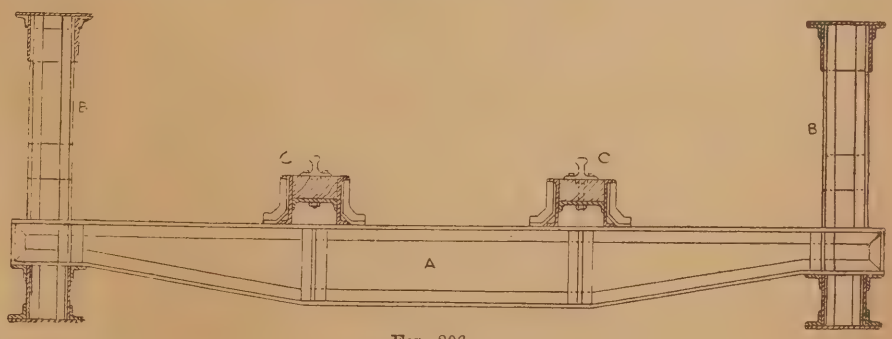

Fig. 206.

the girders are equal, or not very dissimilar in depth; but when the longitudinals are much deeper than the transverse ones a plain butt joint is generally made, or the latter are made to rest upon the former, or, in some cases, suspended therefrom.

Fig. 203 shows a usual method of the jointing of main single-web girders A to the cross-girders B of a railway-bridge; B rests upon the bottom

rigid without any top bracing; the gusset-bracket C is simply a development of the stiffener A in Fig. 203. It is frequently necessary to set down girders in other ways than that shown, in order to make joints where head-room is limited.

Fig. 205 illustrates a case of this kind, in which the distributing girder A is set down to take the cross-girder B.

Fig. 206 is an illustration of the union of cross-

girders A to longitudinal girders B of Warren type; the former rest upon the bottom booms of the latter, to which they are riveted through angles. A A are single-webbed girders placed in pairs. Upon them the rail-bearers C C, each built of three channels, with timber sleepers, are riveted through knees of tee section.

J. H.

ELECTRIC LIGHTING NOTES FOR ARCHITECTS.—X.

By an Assoc. Inst. Elect. Engs.

Conductors in Practice.

INSULATION RULES OF THE INSTITUTION OF ELECTRICAL ENGINEERS.

To complete the information respecting the insulation of conductors, we insert here the following extract from the 1897 edition of the "Rules Recommended for Wiring for the Supply of Electrical Energy by the Institution of Electrical Engineers":—

"Insulated conductors may be broadly classed under two heads:—

"(A) Those insulated with a material as a dielectric which is itself so impervious to moisture that it only needs further protection from mechanical injury, or from vermin.

"(B) Those insulated with a material as a dieleectric which, in order to preserve its insulation qualities, must be kept perfectly dry, and therefore needs to be incased in a waterproof tube or envelope, generally of soft metal, such as lead, which is drawn closely over the dielectric.

"When class A is used, the dielectric must be perfectly damp-proof, and not in any case less in thickness, measured radially, than 30 mils plus 1-10th of the diameter of the conductor; it should not soften at a lower temperature than 170° Fahr.; the minimum insulation of a test-piece cut from it should be that given in column 7 of the table (to be given later), the test being made at 60° Fahr., after one minute's electrification, and after the test-piece has been immersed in water for 24 hours.

"When class B is used, the same conditions as to minimum thickness and softening temperature of the dielectric should be enforced as in class A; its covering should be such that a test-piece cut from the conductor, and immersed in water will not break down when an alternating pressure of 2,500 volts, having a frequency of from 40 to 100 periods per second, is applied for ten minutes between the conductor and the water, the test-piece, previous to immersion, having been bent six times (three times in one direction and three times in the opposite direction) round a smooth cylindrical surface not more than twelve times the diameter of the conductor measured outside the dielectric. The coil from which the test-piece was cut should be tested in a similar manner to class A; but the minimum insulation resistance should be that given in the table, column 8.

"Conductors of class A must be protected from mechanical injury by being covered with stout braid or taping, prepared so as to resist moisture, and must be further protected by casing, or by being drawn into pipes or conduits.

"In the case of conductors insulated as in class B, great care must be taken to protect exposed ends of conductors where they enter the terminals of switches, fuses, and other appliances, from the possible access of moisture which might creep along the insulating material within the waterproof covering.

"Concentric conductors should in all respects conform to the requirements herein laid down for single conductors; the insulation resistance of the outer dielectric should be that given in the table for single conductors, having the same diameter as the outer conductors. The insulation resistance of the dielectric separating the two conductors should be twice that of the outer dielectric.

"The bending test of concentric conductors, class B, should be made round a cylinder twelve times the diameter of the outer dielectric.

"Flexible cord conductors—i.e., those made up of a number of wires not larger than No. 29 S.W.G., which are then insulated (in many cases two such conductors are twisted together, so as to form a double conductor), should only be used for attachment to portable appliances, or for the wiring of fittings. The insulating material used as the dielectric should be either pure rubber or vulcanised rubber of the best quality. If pure rubber be used, it should be laid on in two laps, care being taken that these should be lap-joint. The radial thickness of the dielectric should never be less than 16 mils for pressures up to 125, or 20 mils for pressures up to 250 volts. Each coil should bear a certificate that a piece one yard in length cut from it has withstood for five minutes an alternating pressure of 1,000 volts, having a frequency of from 40 to 100 periods per second applied between the two conductors twisted together, the piece being subjected during the test to the vapour arising from a pan of boiling water placed at a distance not exceeding 3ft., and immediately below it."

There are various considerations which have to be taken into account when deciding upon the conducting part of the line so as to give continuity. The following, among others, are important:—

1. The material to use.
2. The best area of the conductor for the current required.
3. The capital outlay.
4. The cost of power generated and maintenance.
5. The permissible line loss and fall of pressure.
6. The method of protecting the conductors and risks.

Generally speaking, there are three methods of distributing electrical energy; thus, circumstances may require—

1. Varying currents at constant pressure: or
2. Constant currents at varying pressures; or
3. Varying currents at varying pressures.

And it is obvious that although much may be done by laying down general rules, much more depends upon local circumstances, and each case must be considered as a separate and distinct problem. In all cases the one desideratum is minimum all round cost, and at the outset it will be observed from general considerations that one condition produces contradictory results when some other condition is considered. Thus, (1) *to economise capital outlay*, the weight of the metal forming the conductors should be as small as possible—that means, the conductor should have a small cross-sectional area; whilst (2) *to economise energy*, the conductors should introduce little resistance, which means that the cross-sectional area should be large. Then, again, the heating effects of electricity must be considered. As is well-known, the temperature of a conductor is always raised when traversed by electricity, and the essential condition to be fulfilled so that the temperature is between safe limits, is that the heat should be lost (by conduction and radiation) as fast as it is generated. Increase of temperature in conductors means—

1. *Increase of resistance*, and this leads to diminution of current, loss of pressure, and waste of energy.

(2) *Injury to Insulation* by softening the insulation material, the result of which is a tendency for the conductor to decentre and make contact with other conductors, and to set up short circuits with iron conduits, &c.

(3) *The Possibility of Fire Risks.*—We may conclude, then, that if the conductors are too small, a large proportion of energy may be wasted, and that any saving in the capital outlay of the conductor which would result will be expended in fuel and machinery; therefore, the determination of the best area of the conductors is one that requires much thought and attention. The metal used universally for lighting purposes is copper, on account of its high conducting qualities; but for the purpose of showing how to decide which is the best metal to use for transmitting electrical energy in any case that may arise, an example given by Mr. A. T. Snell is here introduced. The comparison should be made between copper and iron, and it is necessary to take into consideration the specific resistances, specific gravities, breaking strains (which are important when dealing with aërial lines), and the cost of each. And for convenience of reference, a table (similar to the short one given below) should be constructed giving particulars of the data required:—

Metal.	Sp. Resistance in Microhms at 0° C.	Specific Gravity.	Breaking Strain in Pounds per Square Inch.	Price per Pound in Pence.
Copper (hard-drawn)	1·621	8·8	56,000	5·5
Iron	9·637	7·7	85,000	1

Since iron has six times the resistance of copper, iron wire having the same resistance for a given length would have six times the area o cross-section of the copper wire; then, if W_c and W_i denote respectively the weights of the two wires, copper and iron, of the same length and resistance—

$$W_i : W_c :: 7{\cdot}7 \times 7 : 8{\cdot}8 \times 1$$

Since the specific gravities are as 7·7 to 8·8,

$$\therefore W_i = \frac{53{\cdot}9}{8{\cdot}8}\ W_c = 6{\cdot}1\ W_c$$

Similarly, if P_c and P_i be the price of the copper and iron wires respectively—

$$P_c : P_i :: 1 \times 8{\cdot}5 : 6{\cdot}1 \times 1.$$

$$\therefore P_c = \frac{8{\cdot}5}{6{\cdot}1}\ P_i = 1{\cdot}4\ P_i,$$

that is, copper costs 40 per cent. more than iron when the lengths and resistances are the same. For aërial lines, the weights and breaking strains must also be considered, and if L_i and L_c denote lengths of span for the iron and copper respectively, we have—

$$L_i : L_c :: 85{,}000 : 56{,}000.$$

$$\therefore L_i = \frac{85}{56}\ L_c = 1{\cdot}5\ L_c,$$

but the iron wire will require stronger supports since $W_i = 6{\cdot}1\ W_c$. We may remark here that the question of insulation must be taken into account, and it is obvious that the cost of the insulation for the iron wire would be greater for a given thickness than that of the copper of same length and resistance. For the purpose of comparing different materials, Snell forms what is called a *figure of merit* for each material. This is of the nature of a constant, and is formed by taking the product of the reciprocals of the specific resistances, specific gravities, and price per pound multiplied by the breaking strain, the best material giving the largest figure. Thus—

$$\text{Figure of merit} = \frac{1}{\text{Sp. R.}} \times \frac{1}{\text{Sp. Gr.}} \times \frac{1}{\text{Price}} \times \text{Breaking strain.}$$

Since copper is so much used, the following particulars respecting the essential properties will be useful:—

The specific gravity of pure annealed copper is approximately 8·9 at 69 F.

The density of copper is 555lb. per cubic foot, or 0·32lb. per cubic inch.

The weight per mile of round copper wire, d mils in diameter, is approximately $\frac{d^2}{62{\cdot}5}$lb., or $d^2 \times {\cdot}016$lb. (Note.—1 mil = ·001 of an inch).

Therefore, to find the diameter of a copper wire weighing w pounds to the mile, proceed as follows:—

$$w = d^2 \times {\cdot}016 \text{ and } d = \sqrt{\frac{w}{{\cdot}016}}$$

$$= \sqrt{62{\cdot}5\ w} = 7{\cdot}91\sqrt{w}$$

The resistance per mile of pure copper wire, d mils in diameter, is $\frac{54892}{d^2}$ ohms at 60° Fahr. From this we get the resistance per 100 yards for different sizes of wire. For purposes of calculating the resistance of copper wires, it will be useful to remember that 10ft. of pure copper wire 0·01in. in diameter has approximately 1 ohm resistance.

The specific conductivity of pure copper is usually represented by the number 100, and the manufacture of commercial copper for cables has reached such a state of perfection that the specific conductivity of the copper used for electric light leads is seldom less than 98 to the same scale.

The specific resistance of pure copper at 0° C. is 0·000001642 ohm, or 1·642 microhms, per centimètre cube, or 0·00000064 ohm or 0·64 microhm per inch cube.

The specific resistance of copper of 98 per cent. conductivity is 1·729 microhms per centimètre cube, or 0·68 microhm per inch cube at 60° Fahr., therefore the specific resistance of any other sample of "p" per cent. conductivity of copper $= \frac{98}{p} \times 1{\cdot}729$ microhms. With one exception the resistance of conductors increases with increase of temperature. According to the results of the experiments of Dr. Matthiessen, the resistance of metals increases with the temperature according to the empirical formula—

$$R_t = R_o\,(1 + \alpha t \pm \beta t^2)$$

in which—

R_t = resistance at a temperature of $t°$ C.
R_o = " " " 0° C.

α and β are numerical constants depending on the metals.

For all but the most accurate calculations the approximation—

$$R_t = R_o (1 + \alpha t).$$

is sufficient. For copper, α = ·00387 and β = ·00000597. In other words, the resistance of copper increases with increase of temperature at the rate of 0·387 per cent. for each degree Centigrade, and 0·216 per cent. for each degree Fahrenheit. These numbers, 0·00387 and 0 00216, are known as the temperature coefficients, which may be defined as that constant by which the resistance of a wire at $t°$ must be multiplied to get the increase on the resistance at $(t + 1)°$. Thus the resistance of a copper wire at T° Fahr. is—

$$R_T = R_t\ (1{\cdot}00216)^{T-t}$$

Temperature Limits Rule of the Institution of Electrical Engineers.—In the 1897 (July) edition of these rules we find "that the conductors should be of such size that when the maximum current is passing continuously through them their temperature shall not exceed 130° Fahr. It will, however, generally be found that if the conductors are worked up to a density of current corresponding to this increase of temperature, the resulting fall of potential or drop in volts will be inconvenient and uneconomical. It is imperative that the temperature of 130° Fahr. should never be exceeded, and, therefore, it is necessary to take into account the maximum temperature to which they may be subjected, independently of electric heating, in each particular locality, and the greatest increment above this temperature should not be more than will raise them to a temperature of 130° Fahr."

"If the maximum temperature of the British Islands be taken as 100° Fahr., then the increment due to electric heating must not exceed 30° Fahr.; that is to say, the size of the wires should be such that, when carrying the maximum current continuously for many hours, the temperature does not rise more than 30° Fahr. above the temperature for the time being of the place in which they are situated. In specially hot places the wires should be so large that the electric heating should be almost *nil*, and the wires should be specially insulated with insulating material which does not deteriorate at the highest temperature to which it will be subjected."

Now, experiments show that the rise of temperature of an insulated wire is less than that of a bare wire, same size, carrying the same current under the same conditions, because there is a larger exposed surface for radiation. From a large number of experiments made by Kennelly in 1889, he has been able to deduce the relation between the current and the diameter of the core, consistent with safe rise of temperature for interior wiring, where insulated conductors are inclosed in casing for protection, with the result that the effects of radiation and convection are diminished to a minimum. The equation deduced by Kennelly may be given in various forms as follows:—

$c = 560\sqrt{d^3}$ where d = dia. of core in inches
$= 0{\cdot}01775\sqrt{d^3}$ " d = " " mils.
$= 138\sqrt{d^3}$ " d = " " centimètres
$= 4{\cdot}375\sqrt{d^3}$ " d = " " millimètres

where c = current in amperes.

$$\therefore\ d\ (\text{inches}) = 0{\cdot}0147\sqrt[3]{C^2} \text{ or } \frac{\sqrt[3]{C^2}}{70} \text{ (approx.)}$$

d (mils.) $= 14{\cdot}7\sqrt[3]{C^2}$
d (cms.) $= 0{\cdot}0373\sqrt[3]{C^2}$
d (mms.) $= 0{\cdot}394\sqrt[3]{C^2}$

As will be obvious, the temperature effects must have an important effect upon the carrying capacity of wires, and presently we shall include a useful working table giving the maximum currents for different conductors under various circumstances, &c., so as to compare the conditions imposed by the Fire Insurance Offices, Institution of Electrical Engineers, and by Kennelly's formula. As is well known, many fire offices state that the cross-sectional area of the conductors used shall be such that the current density in any conductor shall not be more than 1,000 ampères per square inch of cross-sectional area. On the other hand, the Institution of Electrical Engineers give formulæ for calculating the current for any conductor. Thus the maximum current for situations where the external temperature is above 100° Fahr. is given by the formula—

$$\text{Log. } C = 0{\cdot}775 \text{ log. } A + 0{\cdot}301,$$
$$\text{or } C = 2\ A^{0{\cdot}775}$$

where C = current in ampères, A = area in 1,000ths of a square inch. The maximum rise in temperature will be about 10° Fahr. on large sizes.

The maximum current allowable in any situation is given by the formula—

$$\text{Log. } C = 0{\cdot}82 \text{ log. } A + 0{\cdot}415,$$
$$\text{or } C = 2{\cdot}6A^{0{\cdot}82}$$

The maximum rise in temperature will be about 20° Fahr. on large sizes.

(*To be continued.*)

THE SOCIETY OF ARCHITECTS.

THE second ordinary meeting of the Society of Architects was held on Thursday evening in last week, Mr. Walter Emden, J.P., L.C.C., the newly-elected President, in the chair. Mr. James Howard Hendry, of the Bourne, Farnham, Surrey, was elected as a member, and a number of donations to the library were announced.

THE ANNUAL REPORT OF COUNCIL

and the balance sheet were adopted on the motion of Mr. Ellis Marsland, hon. secretary, seconded by Mr. R. W. Coventry Dick. In their report the council referred with satisfaction to the continued prosperity of the Society. During the past year there had been thirty-three candidates for election as members and associates, of whom twenty-eight were approved by the council and duly elected, and one past member was reinstated. Seven had died since the last report, and eight had retired, with the result that there was now a total of 559 on the roll—an increase of 14 since Oct. 31, 1896. With respect to the comparative fewness of elected candidates, members were reminded that on and after Nov. 1, 1896, membership was not open to candidates under 35 years of age without examination. The question of examination had been under the constant and anxious consideration of the council, and they hoped shortly to publish the definite results, also of negotiations which were being carried on with other bodies. The following meetings have been held (all of which were reported in our pages):—President's address, Mr. R. Walker; "Arguments for and Against Registration," discussion postponed; "Restoration," Mr. Thackeray Turner; "Arguments for and Against Registration," discussion; "Technical Schools from a Schoolmaster's Point of View," Dr. C. H. Draper; "The Advantages to Country Architects of Belonging to a London Society," discussion; "The Forum of Rome," Mr. A. Fisher; anniversary meeting. The council expressed regret that members contented themselves with reading reports of the Society's proceedings, without making more efforts to attend the sessional meetings, and they were reminded that membership of a Society carried with it duties as well as privileges. Every new member in particular should, it was suggested, upon his admission, seek to become acquainted with other members and the officers of the Society, thus enlarging a fellowship which might benefit the whole Society. It was much to be desired that some progress would soon be made with the Bill for the Registration of Architects, which had long been before Parliament. The council hoped that arrangements might be made to continue the meetings held in the provinces for the furtherance of this object during the ensuing session. It was of the utmost importance that members should keep themselves fully alive to the urgency of this matter, and more especially endeavour to influence members of Parliament and fellow-members in promoting the second reading of the Bill. At the various meetings of the council and committees many important subjects had been considered affecting the interests of architects, and advice had been given in cases submitted to the council, which had proved of material assistance. Members were strongly recommended to avail themselves of this resource in cases where consultation might be useful. In conclusion, members were reminded that the reading-room at St. James's Hall was now open daily.

The President then proceeded to deliver his

INAUGURAL ADDRESS.

Having expressed his thanks for unanimous election to the chair, Mr. Emden continued: It may seem ungracious, but it certainly is not meant so, if I say that I do not believe in societies as at present constituted, and that for most of the years of my professional existence I stood aloof from them, and only joined this Society because of its efforts to obtain a Registration Act for Architects, and with a desire to help in this programme. I say this because I find, and have always found, that while they purport to give the public an assurance as to the capabilities of an architect, practically without compulsory registration they cannot do so. There is no compulsory regular examination, and no diploma issuable under the law as in the case of other learned professions; indeed, while anyone can set himself up as an architect, without any examination, and without previous study, experience, or competent knowledge, and as long as examination is voluntary, the best benefits of these societies are but small security to the public. Examination is, no doubt, more or less insisted on before entering the Royal Institute and other societies; but this does not meet the case, as, while the use of letters indicating the connection of persons using them with any society may mean that some examination more or less has been accomplished, many, indeed, by far the greater number, do not belong to any society and yet practise. Many of the most competent men practise without belonging to any society, so that it is seldom the public inquire, or care, if the professional man employed belongs to a society or not. Let me again point out, and insist upon the fact, that anyone, never mind what his position is, can call himself (even be he a labourer, or, as in a known case, an undertaker) an architect, surveyor, or engineer, without let or hindrance; and voluntary examination can afford no real protection to the public that the architect employed will design sanitary and properly-constructed buildings. Except absolute compulsion is enforced under an Act for Registration, nothing will accomplish the exclusion of the incompetent.

THE PROFESSION.

The duties of the architect, or master builder, no doubt originally covered the engineering efforts as well as the architectural efforts of the ancient world. Unfortunately, at the present day in England, and probably to a great extent because there is no State intervention in the shape of compulsory examinations (as in other countries), there has grown up in the work of the architect, less knowledge of construction in its larger form, and a separating of engineering from the architectural work, and hence, want of artistic design in our great engineering works. Much has been done of late years by various Acts of Parliament relating to buildings, and for the preservation of public health. A serious difficulty, however, is that each step requires an Act of Parliament framed more or less by men with incomplete knowledge or experience of the necessities, while the alterations necessary in the present Acts so indirectly affect the public that it takes years before even the most simple or urgent necessity for alterations or modifications in the law becomes apparent and obtains a remedy. Much might be done if the Local Government Board could be made more regularly and consistently the recipient of information gained by local and other authorities of the various necessities in building and its sanitation. The Board should be authorised to set machinery to work to obtain from the various surveyors in the districts regular reports, and could therefrom draw information for the alterations necessary in our Public Health and Building Acts, invoking the action of Parliament in the same way as in a question of insanitary areas by a provisional order. Much would thereby be gained, and dangerous delays saved. Undoubtedly, and more particularly as far as London is concerned, the new Building Act is a step in the right direction, and one cannot but admire the courage and perseverance of Dr. Longstaff, L.C.C., who was chairman of the Building Act Committee. The more so that he, a layman so far as building was concerned, set himself to work to become master of the enormous mass of details, and all the *pros* and *cons.* and necessities for alteration, and should have succeeded in carrying through so voluminous an Act as this necessarily was to what must certainly be called a successful issue. No doubt it will prove of great advantage to London, and while its errors must be remedied as they appear, its benefits must not be forgotten, as the Act is a substantial step in advance. One of the difficulties which has to be contended with by the

professional man is the overlapping of the powers of the various authorities. It is a crying evil in London where the central authority deals with frontage lines, projections, construction, and all such-like matters, and puts in action its own surveyors, that there is in each district the surveyor of the local body also dealing, more or less, with the same subjects and other overlapping duties. If the central authority laid down the rules and regulations under such Acts as deal with these questions (after consultation with the local authorities) and the local authorities administered them, much expense to building owners would be saved, and the public also, by preventing the duplication of officials and duties and further friction, as useless as it is delaying, avoided, thus facilitating building operations to an enormous extent. To pass a set of plans under the present system is not only a complicated, long, and harassing process, costly to the building owner, but without increasing the protection of the public; indeed, it is wasteful and unproductive of any benefit at all. A very substantial fee might well be obtained from the building owner, under the simpler system for the passing of, and licensing plans, leaving the owner better off than now, and making the public purse the richer. As a step in the right direction, it ought to be possible (and I think it is possible, were an effort to be made) to so arrange the surveyorship for the authorities that one surveyor in each district should suffice, and that the central body should delegate the active administration to them, and so avoid overlapping, and facilitating very considerably building operations. Another complication in town building is consequent upon our system of leases and the necessary intervention of the surveyors to freeholder and intermediate owner; and here, as private rights are touched, it is difficult to frame laws to deal fairly with it, to save the uncertainty, expense, and delay, and yet fully protect owners' just rights. Indeed, it is so difficult and delicate a subject to handle, that it will be a bold man who accomplishes it. I make it as a suggestion, but as that only, that the building owners should be at liberty after notice given to the freeholder or superior landlord to make the alterations he may deem necessary, subject to a right to the freeholder or superior landlord to formally object, and the objection (failing agreement) being heard and determined by a permanent official under the Local Government Board.

SANITATION.

I should like to turn for a moment to sanitation, and ask you to consider how much might have been accomplished by the present time, how many lives saved, and what spread of disease prevented, had the professional man to pass thorough examination, and obtain an intimate knowledge of the necessity of sanitation first, before practising? What I say does not apply to individuals, many of whom have done great and important work in this direction. But can it be said the profession, as a body, has a thorough knowledge of this subject? By the neglect of each Government to provide for compulsory examination, and the registration of competent men, they have now much to answer for in this direction. In England, with our Free Trade principles, we have hundreds of systems and apparatus stated to be, and no doubt credited with being, good and capable of accomplishing sanitary perfection; but, except by the test of experience, what examination into these claims is brought to bear?—and specialists, each with their own specific, are called in instead of the architect, and no system is thoroughly or effectually exploited. Experience may often be dearly bought by those who have to submit to the use of some so-called sanitary apparatus or arrangement of house or other drainage until its defects are discovered. It is no one's business to say which is best, and even our local authorities pin their faith to different systems, no doubt recommended by their officials. How, then, can professional men be expected to deal more thoroughly than the authorities do? Surely this is folly, when so much depends upon what is used. Can it be wise for such a state of confusion with regard to this most important factor—sanitation—to be allowed to go on unimpeded and almost unthought of until some great calamity visits us? The fact is, no public body and no authority likes to take the responsibility of recommending anything new; but the Local Government Board should be obligated by law to take up and examine into the necessities and lay down what should be done. In latter years no doubt advance has been made, but, until some such power as I before suggested is delegated to the Local Government Board, and those whose duty it is to design and superintend buildings are compelled to pass a thorough examination, no thorough knowledge can be assured, even though there depends upon it the life or the health of every individual citizen.

ART.

With regard to the question of art, undoubtedly much progress has been made during the Victorian era. When we look at the houses built not long before the accession of the Queen to the throne (such houses as form the various squares of London) we obtain at once a very fair exemplification of what was considered a good class of dwelling-house at that period. Compare these with a good dwelling-house of the present period. Sanitarily and constructively we have improved, but certainly in comfort, luxury, and artistic design the advance made is strikingly great. Take again the shop of 60 years ago, and compare it with the artistic design of much of the work of the present day, and the advance will again be strikingly seen. If we turn from this to a higher branch of work, to our more public buildings in the shape of churches, hospitals, theatres, music-halls, hotels, restaurants, &c., at once the luxury and artistic improvement are so marked that one can hardly believe the whole of it has been accomplished in the space of one reign. Moreover, when it is considered that the improvement has come about not because the State has lent its aid, but has been accomplished under many difficulties, it becomes a useful study to consider not only how much greater it would have been, but how much waste in its accomplishment might have been saved had Compulsory Examination and Registration protected the investor and public. This advance, however, speaks much and well for the energy and artistic efforts of the architect, and, considering the difficulties he labours under, should not be forgotten. Too much credit cannot be given to those who have fostered and increased the strength of artistic effort in this country, overshadowed as it is by the question of everything having to be done by private enterprise, and that even in the most elaborate decoration of the buildings for public use, the owner's first consideration must be that it shall pay. I would, before leaving this subject, like particularly to draw attention to the great spread, among the people at large, there has been in Her Majesty's reign in artistic teaching. Many institutions and schools have grown up, by the efforts of the City and London County Council and other corporations and public bodies in the establishment of technical schools, and much has been done to educate those who have taste and intelligence and are willing to devote their spare time to the study of artistic work. It has always seemed to me a pity and a neglected opportunity on the part of trades' unions that they do not make an effort to improve their workers, set up an examination in their trades for each union, and thus be able to assure employers as to the competence of the men employed, and enable, by its certificate, the workers to show which are its best men. It would certainly serve a useful purpose; more useful than some of the other work the unions do, and it would place them in a better and higher position in public opinion. I have often heard it stated that if the profession of architect were to become a registered profession dealt with by compulsory examination, that the artists in the profession would be hampered and prevented from taking up the profession; but when it is seen that not only many of those who are actual workers with their hands by day can, in their evenings, turn out such good work, this reason against the compulsory registration of architects falls to the ground, as it would also if tested by the result of the efforts which, in the old days, were made by the great architects and artists, who often enough struggled through years of hard work in manual and other trades to make themselves, as they eventually succeeded in doing, artists. Indeed, the original architect was the master builder. It cannot be for a moment supposed that artistic effect can be deterred or kept back or even inconvenienced by a knowledge of construction and sanitation. It would be as reasonable to say that a sculptor or artist should not know the anatomy of the body, since his examination in it would be detrimental to his skill. I cannot think, either, that any society gives credit to such a reason, or they would not have established examinations for those who wish to enter their ranks. Construction was the duty of the first designer of a building when there was no distinction of engineer and architect. As civilisation grew, the ornamentation, or the artistic portion of the architect's work, grew also; but it grew out of construction, and should be the refining and finishing of it, and consequent to it. The best specimens we have of architecture are those which by the form and construction give necessity for the ornamentation.

DRAWBACKS TO THE PROFESSION.

It would be difficult to say that the architectural profession was not a good one for young men to enter; but it can safely be said that it would be a better profession for them to enter if its status were more assured, as it would be if they had to pass a compulsory examination, proving their knowledge and title to professional position before assuming it. It would by no means discourage those who are worth encouragement, while it would keep out the element of uncertainty and be an assurance to the public of the capability of the architect to design a building, and his capability also of seeing that the construction and sanitation were well carried out. We are often told that vested interests must be considered, and that such vested interests in the profession would mean admitting large numbers of incompetent men; but the delay in obtaining compulsory registration and examination only allows the evil to grow, and its establishment would stay it altogether, while death would, within but a few years, deal with the evil as it existed at the passing of the Act. But I personally do not agree that this vested interest is such a large factor, at least where it absolutely covers incompetent men. When Parliament intervened to protect the public from quacks, both as doctors and surgeons, and later as dentists, there was this same vested interest and incompetency—yet where is it to-day? And all this has been accomplished during her Majesty's reign. No; the real difficulty is poor humanity—poor selfish humanity—those who fancy their position is now assured and forget others, and would keep them outside the pale. There are those who, having some letters to add to their names, forget the public and the greater interests at stake for their own personal interests, and prevent, or at least do nothing to help, the cause this Society has at heart. There is a strong feeling of jealousy in some quarters, and of a dog-in-the-manger principle (forgetful of all public duty) which causes opposition to what all are bound to acknowledge would be good and beneficial if accomplished. This feeling raises difficulties of detail and petty points and enlarges upon them, and while many of them are so trivial as to have no real existence, they are used all the same to conceal the real desire not to help the cause of registration. I trust this course will not succeed in preventing the remedy being eventually obtained. It must, however, still remain for this Society to devote its energies to obtaining the support of Members of Parliament pledged to bring about registration, and to proving the great necessity of it to those who take the lead in work for the public good; for, indeed, whatever assured position it may give the professional man, it is before all necessary for the public benefit. I trust my words and earnest desire may accomplish something in the direction to which for many years I have lent my services, and I trust my poor efforts may succeed in raising an interest, a real and deep interest with the members of this society, and that this year will bring registration nearer accomplishment. I want the country members to call meetings in their own districts, to come to the Society's meetings, for the calling and holding the meetings wherever possible will bring together a weight of opinion, which will demand the attention (as earnestly as other not more important, but possibly more importunate, questions do) of your representatives in Parliament. It is so often said by the more retiring men, and by those who have not so much self-assertion as others, and sometimes, too, no doubt as an excuse by those who wish to save themselves work, "Oh! What can I do? I have no influence or position!" That is not correct; all can at least influence his neighbour, all can help to make a meeting, and can at least communicate ideas to those immediately around him, and, as every grain is necessary to the formation of the whole stone, remember that even the smallest grain of your help is often of the utmost importance to the whole. Let me then again ask

the help of all members to push forward the great work of registration, and I would ask, too, that it be freely given, so that in a few years, I hope in the reign of our gracious Queen, we can look with pride on a work done for the public good, and for the elevation of the standing of the profession to which we belong.

Mr. W. R. Mallett proposed a vote of thanks to the President for his instructive and suggestive address, in which he had dealt with many topics of immediate interest to the profession. Mr. Mallett added he would frankly admit that in earlier years he was opposed to the principle of registration; but now he saw it to be absolutely necessary for the profession, and also desirable in the public interests.

Mr. G. Gard Pye seconded the motion, which was supported by Mr. J. R. Manning and Mr. Coventry Dick (who referred to the simple system of passing building plans adopted by the Scottish Dean of Guild Courts), and having been carried by acclamation, was acknowledged by the President, who laid stress on the need for more summary procedure with light and air cases.

"THE BROKEN CONTRACT."

THE conversazione marking the opening of the fifty-first session of the Architectural Association took place on Friday evening last at the Matinée Theatre (till recently known as St. George's Hall), Langham-place, W., and was attended by a very large number of members and their lady friends. The president, Mr. Hampden W. Pratt, and Mrs. Pratt, who were supported by the vice-presidents and council, held a reception from 8 till 8·45 p.m., and in the refreshment-room were hung a number of water-colours, representing English, Continental, and Egyptian landscapes and architecture, by Mr. R. Phené Spiers, F.S.A.; also sketches and measured drawings executed by the A.A. Travelling Student, Mr. E. Hallyer Evans, of Wimbledon; work done in the water-colour class by Messrs. R. H. Weymouth, John Ormrod, J. Humphreys Jones and C. H. Duke, and others. The photographs taken during the A.A. excursion in August last to Lancashire were also on view.

The attraction of the evening was not, however, the displays of architectural draughtsmanship or photography, but the musical play, in two acts, written by Mr. F. Dan Clapham, with music by Mr. Leonard Butler, entitled, "The Broken Contract: an Egyptian Enigma," on which the curtain rose at 8.45, when the house was filled to overflowing. The play was on a more ambitious scale than anything hitherto attempted by the A.A., and was excellently staged and managed. The plot was more coherent, and was more deftly elaborated than is usually the case in such burlesques; all the performers were letter-perfect in their parts, and the performance went off without a hitch. The writing was unequal, but here and there smart, and the versification showed a Gilbertian dexterity in many-syllabled rhymes; but while the personal allusions were less pungent than has sometimes been observable, every topical hit was instantly perceived and was greeted with applause by the audience. The *dramatis personæ* were:—Professor Stonechat, F.R.I.B.A., Mr. Alfred Stalman; three young architects—Stanley Chester, Mr. Stephanos Constanduros; Arthur Travers, Mr. H. Seton Morris; and Algie de Vere, Mr. A. G. Turner; Maude and Ethel, the professor's daughters, Miss Grace Wylde and Miss K. Rimell; Painehsi, the Court physician, Mr. Frank Collins; Pempi and Merimies, builders and decorators, Messrs. F. D. Clapham and G. B. Carvill; Setnub, a foreman, Mr. J. H. Wilson; Netchemet, lady's maid to the princess, Miss Blanche Selig; Karama and Napata, lady decorators, Misses Ada Yerbury and Ethel Atkins; and Princess Nephthis, daughter of King Amenemhat, Miss Mabel Engelhardt. The chorus of Egyptian lady decorators, builders' men and boys, was sustained by about a dozen young ladies and as many youths. The play was produced by Messrs. G. B. Carvill and F. D. Clapham, and the singing and dancing were accompanied by a very efficient orchestral band, conducted by the composer. The singing and acting of Mr. Constanduros, the youthful hero of the story, of Miss Engelhardt, the princess, and of Mr. Collins, the physician (who in make-up, manner, and gestures recalled to mind a distinguished professor-president in another place), must be especially singled out for commendation, and also Messrs. Clapham and Carvill, the builders and decorators, whose delays gave occasion for the title of the story.

The curtain rose, displaying the interior of an Egyptian tomb, uncommonly spacious and well-lighted, by the way, for such a retreat, and therein were grouped the builders, their lady decorators, and foremen and workmen, together with the Court physician, a royal princess and her attendant maid. From the opening chorus and subsequent dialogue, it was to be gathered that for 4,000 years the party had been walled up by order of a king, himself long since deceased, for failing to complete the contract to build and decorate the royal vault within the appointed time—three months and three days. Fortunately for the entombed company the Court physician was accidentally immured with them, and by his magic arts was able to administer to each a potion that sent them to sleep for a hundred years, when they awakened for 24 hours and then resumed their slumbers. This being the 40th century, Painehsi recounts the facts, and reminds the peccant builders that immediately they obtained the contract they converted their firm into a limited company, whereunto was traceable the beginning of their downfall, for they ceased to take a personal interest in the work. Then they replaced the decorators who went on strike by lady students as being at once cheaper and more attractive. Unfortunately, the Princess Nephthis, who was an art amateur, was on a visit to the tomb, and with her lady's-maid and the physician suffered with the righteously condemned when the king ordered the entrance to be built up as a time penalty. The princess had gained some distinction as a dabbler in art, having carried off prizes at the Thebes School of Art, and made "a more or less satisfactory towel-horse out of a lot of meat-skewers, painted with bright-red enamel," and her visit to the tomb was the outcome of a well-meant endeavour to teach the lady decorators their art—her scheme being to paint the whole interior a brilliant grass green, with a sacred bird here and there, in a stagy and conventional attitude. A fortune-teller had told the Princess that she should marry the man who should rescue her from a long imprisonment. After a duet and some amusing recriminations between the builders, the princess, in a pleasing ballad, expresses her regrets and hopes. On the expiration of the twentieth hour of the wakeful day, the imprisoned party decide once more to explore every corner and crevice of the tomb, when a digging and hammering are heard, and, with a great burst of light, an old gentleman, in modern tourist attire, falls through a hole into the roof in the midst of the party, and at the very feet of the princess, quickly followed by three students and two young ladies, all in up-to-date costumes. In reply to the shouts of welcome and astonishment, the Professor explains that he is conducting an Egyptian exploration party, consisting of his daughters and three young architects, and that they have come upon the mummy of King Amenemhat, together with a papyrus in which was written the story of the strange disappearance of a Court physician and a young princess—a mystery the solution of which will afford pabulum for future lectures. The builders ask the professor's opinion concerning Egyptian masonry, and claim that no other firm could turn out work of such high quality; but on examining the plan he points out a serious discrepancy; the place where he came through, although specified and drawn as 10ft., proved to be only 4½in. in thickness. Pempi and Meremies are not easily floored—they lay the blame on a scamping foreman. The students enlighten the natives as to the difficulties in a modern architect's endeavours to obtain commissions during his early years of practice, and in an excellent song Stanley sketches the career of the successful and well-known architect. It is evidently a case of love at first sight between him and the princess; but, unfortunately, as Painehsi points out, she has promised to marry her rescuer, the penalty for a breach of this contract being, according to Egyptian law, death. Now her actual rescuer is old Professor Stonechat, who energetically protests that he is already married, and begs his daughters to keep the rumour of the suggestion from his wife. Both, in fact, refuse to fulfil the contract; but the wily Court physician refuses to hear of any evasion. They are given till noon of next day before the marriage must take place, or the princess be re-interred, and the curtain falls on a quintette by Arthur, Maude, the Professor, Stanley, and the princess, and chorus, in which the hard fate of the princess and her rescuer are bemoaned.

In the second act the scene shifts to the exterior of the tomb, the white dome of a Cairene palace being seen in the distance through a carved lintel. Stanley avows his love for the princess, and implores her and her companions to devise some plan whereby they may be married. As Painehsi has decided to consult the oracle about the case, the princess suggests that the Professor shall be made up to represent that character. Somewhat reluctantly, Stonechat falls in with the plan, only stipulating that not a word is to be breathed concerning his metamorphosis to his wife or the Council of the Institute in England. While the Professor is being dressed for the part, Pempi and Merimies while away the time by singing a duet concerning "Cooking," of which the first verse runs:

You may perhaps have noticed what a lot of things are done
By cooking—yes, by cooking,
And it may be that a competition is very often won
By cooking—yes, by cooking.
On plan you find there's nothing underneath a three-foot wall;
A column in the attic perhaps has no support at all,
You can make your elevations to look either low or tall,
By cooking—yes, by cooking.

For it's really very funny
How imposing plans may look,
When handled by a man who
Understands the way to cook.

Another song by Netchemet, the Princess's maid, follows, also a recitative and chorus, and it is apparent that two other engagements have been formed—between Arthur and Maude and Algie and Ethel. At length, the professor, very much disguised, is posed as the oracle, and with no uncertain sound declares that the princess fulfils all requirements by marrying one of the rescuing party. All, therefore, ends happily, with a prospective hint of wedding bells, although it is undoubtedly a "Broken Contract," and as the curtain is rung down on the closing chorus, there were loud and enthusiastic demands from the audience for the "Author," which were acknowledged from the footlights by Mr. Clapham.

BUILDERS' BENEVOLENT INSTITUTION.

THE fiftieth annual dinner of this institution took place on Thursday, November 25, in the Carpenters' Hall, London-wall. Mr. Charles Wall (president) occupied the chair, supported by a numerous company, including Messrs. H. Holloway, F. Wall, F. J. Dove, T. F. Rider, H. H. Bartlett, A. Ritchie, J.P., B. J. Lone, A. Jacob, J. C. Preston (senior warden of the Carpenters' Company), J. H. Colls, W. B. Brown, J. Randall, T. Stirling, C. Bussell, T. H. Griffiths, J. T. Bolding, F. Foxley, Nightingale, and Perkins.

The President gave the toasts of "Her Majesty the Queen" and "The Prince and Princess of Wales and the Rest of the Royal Family," which were received with enthusiasm.

Mr. J. C. Preston proposed "The Army, Navy, and Auxiliary Forces," which was responded to by Major Brutton, who added that he had now acted as secretary to the institution for the long period of 23 years.

The President, in proposing the toast of the evening, "Success to the Builders' Benevolent Institution," said that he was gratified to see so many present, which showed their interest in this useful charity. This was the Jubilee year of the Builders' Benevolent Institution, and, thanks to the generosity of those he saw around him and their friends, he believed it would be a great success. It did not require any particular eloquence on the part of the president to insure sympathy with the objects of the institution. In the walks of life some persons must always go under, and it was their bounden duty to aid those who, through misfortune, were not progressing so smoothly and so properously as their fellow-workers, and to see that they were comfortably cared for in their old age. This being the Jubilee year, as he had said, of the institution, the committee desiring to do something jubilant, had elected all the applicants who had been passed by them without a ballot. The charity required funds to allow it to carry on its useful work, and he was sure that he could commend it to the generosity of the trade.

The toast was drunk with enthusiasm.

Mr. F. J. Dove next gave "The Worshipful Company of Carpenters." He expressed the sincere gratitude of the members of the institution

to the company for their kindness in affording year after year the use of their fine hall, and in giving them a substantial annual donation. The company were also to be congratulated on the excellent technical work they were doing in connection with the building and kindred trades.

Mr. J. C. Preston (senior warden) returned thanks. The company were always glad to lend their hall for such a purpose as this, and it was a pleasure to see around him gentlemen whose names had been household words to many of them for years past.

Mr. T. F. Rider proposed the toast of "The President" in his usual humorous manner. The president of an institution like this, he contended, should be a genial man, a jovial man, and a generous man. Everyone, he believed, would admit the geniality of the president, they acknowledged his joviality, and they could all bear testimony to his generosity. It was unnecessary to add a single word to commend this toast.

The toast was very cordially received.

The President, in replying, said he considered it a privilege to be at the head of an institution like this, and he hoped that as time went on the younger builders would be encouraged to do what they could for the institution. He could not sit down without referring to the good work that Mr. George Plucknett (the treasurer), who was prevented from being present, had so long done for the institution.

Mr. J. Howard Colls, in proposing "The Architects and Surveyors," said that, in his opinion, the two bodies should be as distinct as possible. If there was anything worse than architects' quantities, it was quantity surveyors' architecture.

Mr. W. B. Church, in replying for the architects, said that they always endeavoured to do what was right as between client and builder. An architect's position nowadays was not altogether a bed of roses, for, with so many new materials and new ideas, he had to be a sort of walking encyclopædia.

Mr. Northcroft replied for the surveyors, and referred to the fact that linen-drapers and upholsterers now dubbed themselves builders. If a man liked to be a retail tradesman he had every right to sell laces behind his counter, but he had no business to interfere with the legitimate trade of a builder, and, too often, with the unfortunate results he had sometimes met with in his experience.

Mr. H. Holloway gave the last toast, "The Vice-Presidents, Committee, and Stewards," which was replied to by Mr. Ritchie for the vice-presidents, and Mr. J. T. Bolding for the committee and the stewards.

In the course of the evening Major Brutton announced the list of subscriptions, which showed total donations amounting to £741, with £12 12s. of new annual subscriptions. The president's list showed a total of £599 14s., including a donation of 100 guineas from the president himself.

An excellent programme of music was performed by students of the Guildhall School of Music.

THE L.C.C. CONDITIONS OF CONTRACT: IMPORTANT MODIFICATIONS.

In accordance with a recommendation by the special committee on the Works Department adopted by the London County Council, the General Purposes Committee of the Council have been considering what alterations should be made in the conditions which are imposed upon persons contracting for the Council's work. The committee now report a series of recommendations involving important changes in the terms of contract. In their evidence before the special committee several contractors strongly objected to the words inserted in contracts compelling them to observe "the rates of wages and hours of labour recognised and in practice obtained by the various trade unions." The committee now recommend the Council to make the clause read "recognised by associations of employers and in practice obtained by the trade unions." Some objection was taken to the radius within which the regulation as to wages and hours of labour operated. Under the old form of contract the radius is 20 miles, measured in a straight line from Charing Cross. The Institute of Builders have written suggesting that the radius should be altered to 12 miles, as that is the radius within which the agreement as to wages and hours of labour between the Central Association of Master Builders of London and the various unions operates. The committee have adopted the suggestion, and recommend the council to alter the radius to 12 miles. Objection was also taken to the provisions giving the clerk of the Council power to direct examination of the books of anyone contracting for the Council. The committee now recommend that the power of examination should be limited to the time and wages books and sheets of the contractor. At the same time, they suggest that the money penalty clause for breach of this stipulation should be deleted. The committee further recommend that no alteration should be made in the clause relating to the employment of improvers and men with physical infirmities below the full rate of wages; but they express the opinion that in the event of a contractor employing a few of such men, and showing reasonable grounds for so doing, the Council would not press for penalties. No alteration is suggested in the clause with reference to the opening of priced bills of quantities; but the clause providing a penalty for the breach of the stipulation as to displaying at the works the schedule list of wages the committee suggest should be deleted. They also submit for the Council's approval a new arbitration clause. The committee are strongly of opinion that no outside arbitration should take place, except after the completion of the works, and have drawn up a clause to carry out that opinion. This report came before the County Council at their meeting on Tuesday, and, after a long discussion and several divisions, was adopted.

NOTES ON SURVEYING AND LEVELLING.—VII.

By Walter Tester.

The intention now is, as shown on Fig. 4, to have a 3-lap cycle track and a 3½-lap running track, giving longer straights and making a better football field. The dimensions now are:—

Running track, 3½ laps to the mile = 1,508ft. 6¾in., and the semicircular ends being 130ft. radius, as before.

Length of one curve	408ft.	4¾in.
Length of other curve	408	4¾
Length of one straight	345	10⅝
Length of other straight	345	10⅝
Total length on the 1ft. line....	1,508ft.	6¾in.

Cycle track, 3-laps to the mile = 1,760ft.

Assuming for the present that the ends are semicircles, as before, 160ft. radius—

The length of one curve	502ft.	7¾in.
The length of other curve	502	7¾
The length of one straight	377	4¼
The length of other straight....	377	4¼
Total length on the line.....	1,760ft.	0in.

Width of the running-track 24ft. all round. Grass verge 6ft. wide on the straight, increasing around the curves on account of the difference in length between the straights of the two tracks, the latter not having the same centres for the semicircular ends. The cycle-track is now to be made 25ft. wide all round, except on the finishing straight, where it is to be 30ft., increasing in width from the points on the curved ends where the full banking begins to drop. There is to be a grass verge 4ft wide around the outer edge of the cycle track, and a barrier outside the verge. The cycle-track is to be banked up 8ft. 9in. on the curve above the level on the 1ft. line, which remains at 84·00 above Ordnance datum, as before and 1ft. above that level on the straight, the sections of the track being similar to the previous ones—that is, slightly round on the curves, and a straight line at the sides. This cycle-track is modelled on the system of M. Forestier, of Paris, the engineer for many of the leading French tracks, who was asked to supply a design for the New Brighton track. The edge of the barrier is to be kept a sufficient distance away from the building already existing on the additional piece of land, which is intended to be used as a club-house, and the barrier to be 36ft. away from the boundary on the south-east side. The cycle track at the north-east end is to be carried on steel girders, and underneath a building to be erected for a menagerie, aquarium, side shows, &c., necessitating a retaining wall to hold up the sand.

The surveyor has now an immense amount of work to get through, and it must be done as rapidly as possible, as the excavator has all his tackle, horses, and waggons ready to proceed with the work, and must on no account be delayed.

Previous to resetting out the tracks, he must take any notes and levels required for squaring up the quantity of sand or rock excavation done up to date from his sections, and, if necessary, he will have to take levels, and make an estimate of the further excavation caused by the alteration.

He must then proceed to reset out the tracks, and resection the site, and it must be understood that the ground is at this time in a very rough state, with heaps of sand and loose rock lying about, causing some difficulty in fixing the lines; but as there is a large flat space, as shown on the plan, Fig. 4, which is sunk down on to the formation level for the football field, he decides to utilise this to the best advantage. He commences by putting an accurate drawing of the tracks in their exact position on his survey plan, and having marked out a line, A B, on the site parallel to the boundary, he scales from his plan a dimension, A C, where the line through the centre point of the semicircular end of the running track cuts A B, afterwards setting it out on the ground. On the line A B he next marks any two points in such a position that two lines at right angles to A B will be clear of the large heap of loose stones stacked as shown on the plan, Fig. 4. Assuming that point C will serve for one of these, and calling the other D, at C and D he sets out with his theodolite two lines, C E and D F, square off the base, A B, and measuring out along these lines the distance to the longitudinal axis of the tracks, he marks two points, G and H, checking with the length G H.

He then produces H G 15ft. 8¾in. to the temporary centre of the end of the cycle track, this distance being half the difference between the lengths of the running and cycle tracks, viz.:—

	377ft.	4¼in.
	345	10⅝
2)	31	5⅝
	15ft.	8¾in.

From the centre of the cycle track he should run out a dimension to the nearest corner of the club-house to see that he has the requisite distance between the building and the barrier, and everything being correct, he can permanently fix the points G and H by driving iron bars into the rock. On the lines E J and F K the edges of the tracks should be marked at both the grand stand and popular sides, and two wires should be hung on to the iron bars at the centres for striking out the curved ends of the tracks. This is all the setting-out for this end that the surveyor can do at present, as he is anxious to proceed with the ground sections, the excavator having all his rail-roads in ready for work. For the menagerie end he produces the line G H with the theodolite, and fixes the centre point for striking out the circular retaining wall. The contour lines on the plan show the hill which has to be cut through at this end, and the retaining wall must be at once proceeded with, as the excavation from the bank is to be tipped against it up to the formation level. For measuring out the retaining wall, the ground at the centre point being considerably above the level at the wall, a convenient way of getting the measurements horizontal is to have a plumb-rule made similar to the ones used by bricklayers, but much longer, and to drive a row of nails firmly into the board.

As the radius to the inside of the wall is about 150ft., it will be best to have a wire made the required length with a loop at each end. A long iron bar being firmly driven down at the centre-point, one loop of the wire can be hung on to it, the other end of the wire being fixed over one of the nails in the plumb-rule, varying the height as the level of the ground changes by hanging it on to different nails, and the plumb-rule being fixed vertical, as many points can be marked on the ground as required. As the wire is a great length, it will have to be supported at intermediate points to prevent it sagging. This is not a very scientific method of setting-out the curve, but it will be sufficiently accurate for the lower portion, the wall being only a rough concrete one and to be faced with rockwork on the menagerie side; and as it must be accurate for the steel girders carrying the cycle track, it will have to be adjusted at the offset near the top from the correct centres for the ends of the cycle track, which will by that time be put in on the formation level.

The surveyor can now proceed with his sections. The plan, Fig. 4, shows the lines adopted, and requires little explanation. The only point that

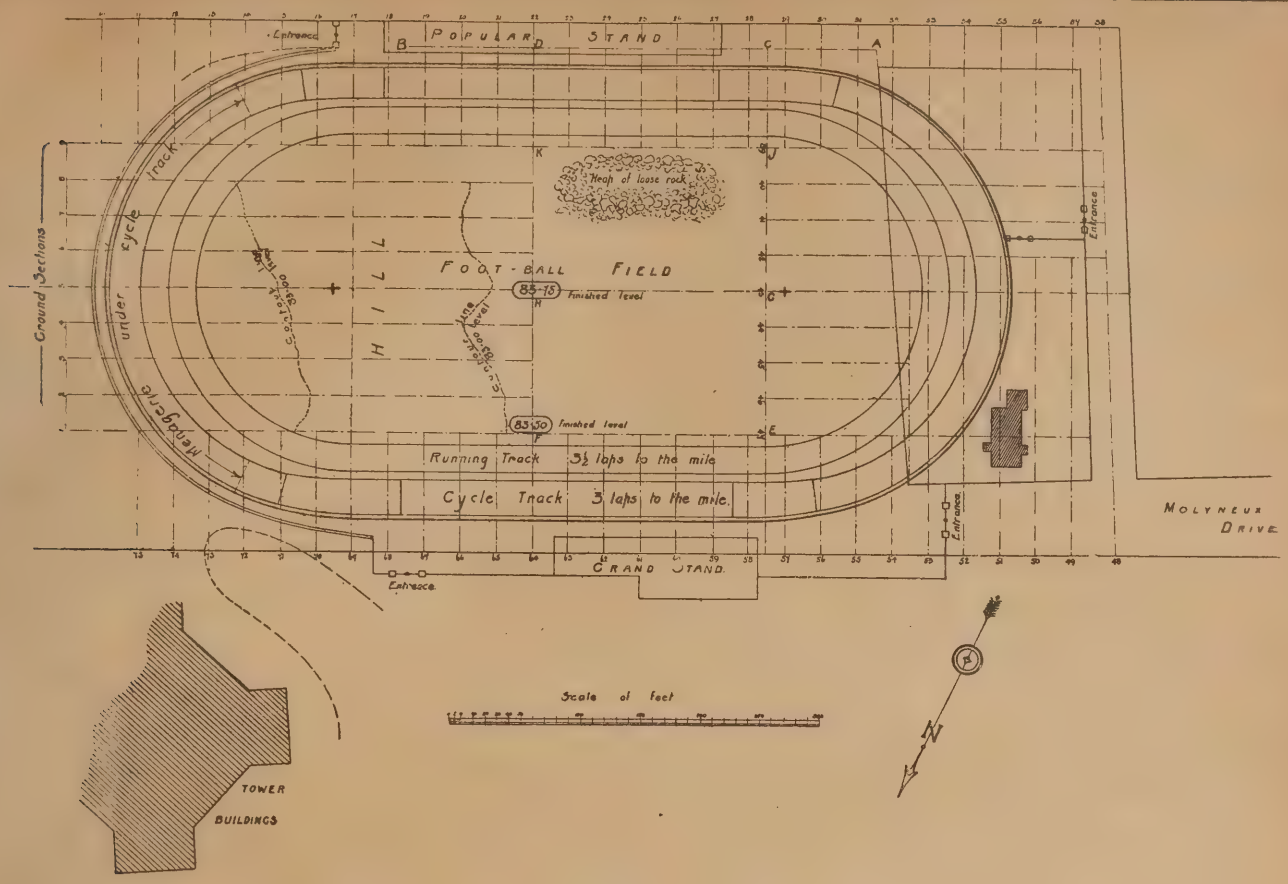

FIG. 4.

needs comment is that they are arranged so as to cut the tracks as square as possible, the short sections being chosen with that object. Near the clubhouse the longitudinal sections cannot be produced on account of a high hoarding near the original boundary-line, and are, therefore, dealt with as shown.

In order to set the lines out, the surveyor puts pegs in each side of the oblong E F, K J, the distance apart required, and he also continues J K and E F in each direction, using the theodolite for producing them over the hill at the menagerie end, and putting in pegs as before, and numbering them to prevent mistake. He can then proceed to fix his back-sight pegs, and take his section in the manner previously described, using the points on opposite sides of the oblong, and the corresponding points in J K and E F (produced) for ranging out his lines where possible, making the sections terminate on definite lines to check the chaining, and producing the longitudinal sections, over the hill at the menagerie end with the theodolite. As soon as he has taken these latter sections the excavations can commence on both sides of the hill simultaneously, and continuing in the order in which the lines are numbered on the plan, Fig. 4, the earthworks immediately commence directly the surveyor has taken the levels of the ground at all portions of the site, as the work is to be completed in a very limited time. The surveyor must take the rock sections as before as soon as it is bared; he will have no difficulty in retaining his lines, as the pegs in the sides of the oblong E F K J are on the formation level. He must also, as the excavations proceed, produce the tracks towards the menagerie, and measure out at each end the lines on which the banking begins to rise on the straight, and where it attains the full height on the curve, so that the excavator can get the ground into the correct shape for pitching. As soon as the hill at the menagerie end is removed, and the excavation for the football field sunk down to the formation level, the surveyor must adjust his centre points for the ends of the tracks, and mark out the correct lines for setting out the curves of the cycle track, and putting in the levels for the cementing of same.

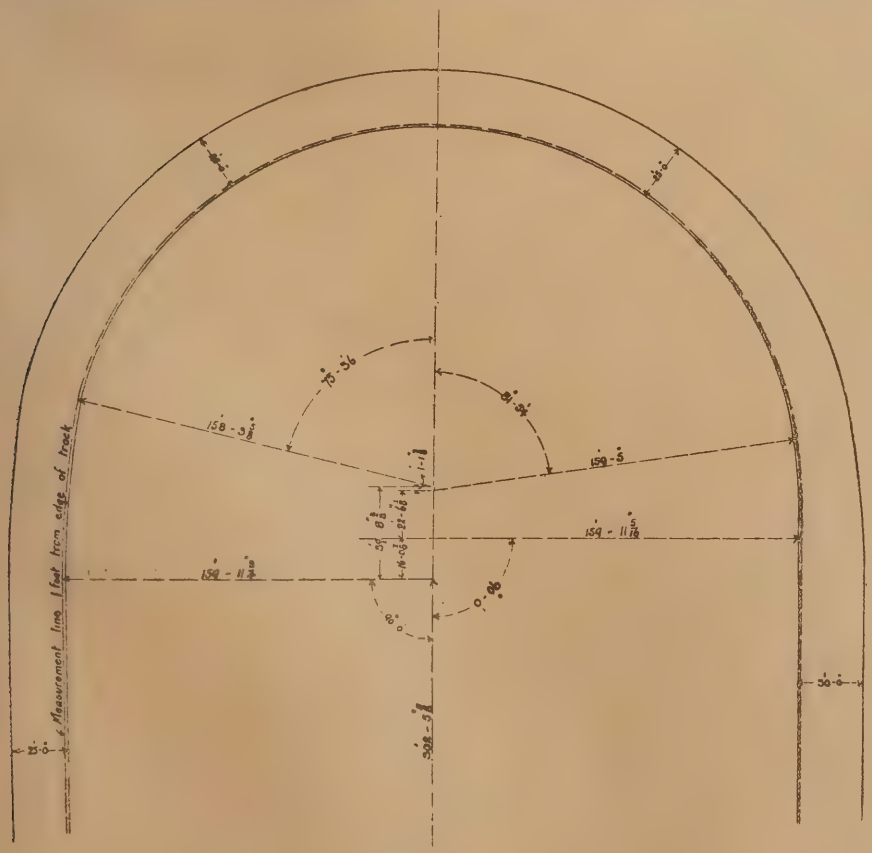

FIG. 5.

The particulars for the curved ends of the cycle track are given on Fig. 5, and the surveyor can at once proceed to measure out along the central axis line the dimensions for putting in the four points at each end required for setting out the angles of the lines, on which junction curves begin and terminate, commencing at the menagerie end by setting out and adjusting the upper portion of the concrete retaining-wall, which is by this time complete up to the offset near the top. The upper portion must be struck out from two different centres, one for each side of the axis line, in order to follow the curve of the cycle track. Having fixed the position of the top of the wall in relation to the 1ft. line, the surveyor measures out a dimension along the axis of 158ft. 3⅜in. from the 1ft. line, and then along the centre line with his steel tape sets out in succession the following dimensions:—1ft. 1⅜in., 22ft. 6½in., 16ft. 0⅞in., 302ft. 5⅝in., 16ft. 0⅞in., 22ft. 6½in., 1ft. 1⅜in., the points being marked X at the menagerie end by driving a long post firmly into the ground and hammering a nail into it at the exact spot. The theodolite is

placed at the extreme end of the line near the menagerie, and each of the other points is placed exactly on the line with the instrument. At the club house end the points have to be marked by iron bars driven into the rock. There will be no difficulty with the ends of the running track, as they are true semicircles; but the distance apart of the centre points should be checked and made correct on the formation level, and the pegs should be painted a different colour from those for the ends of the cycle track, to prevent mistake.

From the four points for the cycle track at each end the surveyor should set out with the theodolite the angles 75° 36′, 81° 54′, 90°, and 90°, retaining the lines on the formation level by posts and nails, or iron pegs, as the case may be.

PURE BITUMEN DAMP-COURSE AND SHEETING.

CALLENDER'S Pure Bitumen Sheeting has long been known as one of the best means employed to render buildings impervious to damp or water. Some bitumens are wanting in elasticity, and the artificial tar asphaltes in the market are often easily fractured, and of no permanent value for the purpose of arresting moisture. Many architects know how damp-courses of artificial asphalte or tar crack, and are therefore useless. The pure natural bitumen made by the Callender's Cable and Construction Co., Ltd., of Belvedere, Kent, and Essex-street, Strand, is without any such admixture of tar or other products of an injurious kind; it is elastic and will not crack when bent by the settlement or fracture of a wall. It is made in lengths of 24ft. of any width up to 72in. wide. The illustrated catalogue of the company is an interesting little treatise describing and illustrating the Asphaltum Lake, Trinidad, from which this material comes, and giving many useful facts about the bitumen. For covering railway bridges of iron and brick, arches of masonry, the value of the pure bitumen sheeting is evident. Any of the artificial products would soon crack under the vibration from trains; but this sheeting, being elastic, yields easily, and becomes an impermeable laying, keeping the brickwork and piers quite dry. For the seatings of girders and columns in place of sheet lead; for lining storage and collecting tanks and reservoirs; for lining swimming-baths, protecting cellars; for introducing between concrete layers for reservoirs and basements; for flat roofs, and many other purposes, no material is better adapted. Admirable photo. illustrations give views of the Tower Bridge and piers; Carlisle Station; St. Enoch Station, Glasgow; Forth Bridge, and other buildings in which Callender's pure bitumen sheeting has been used. The mode of laying vertical damp sheeting in basements and vaults likely to be flooded is shown by sections. Many houses and basements that have been rendered uninhabitable by the recent floods might have been saved by the employment of horizontal and vertical linings of this bitumen, which is also used for sewer and pipe-jointing. Messrs. Callender and Montgomery, Essex-street, Strand, supply the material.

IRON AND HARDWARE.

THE illustrated catalogue of Messrs. Colledge and Bridgen, iron and hardware merchants and lock manufacturers, of Church-lane and Powlett-street, Wolverhampton, will be found a useful illustrated *répertoire* for builders and architects in specifying. The locks of this firm have a wide repute, and have been used in great hotels at Brighton, Dover, Folkestone, and in many in London; also hospitals, town-halls, institutes, banks, schools and other buildings. These comprise two-bolt rim-locks, double-handed locks, wrought case rim-locks, also of brass; stock-locks, drawback, mortise locks, &c. The upright mortise-locks and night-latches are very secure and neat. The automatic sliding-door mortise-lock is effective, and these are made in great variety and size and of various prices. The illustrations, which are very numerous, include door furniture, finger-plates of brass, ebony, and oak, lock-plates of richly modelled and chased designs, iron bolts of all kinds, patent shelf-fittings, door-knockers, ventilators, and other builders' ironmongery. An alphabetical index makes the catalogue a complete price-list of locks and builder's hardware, which can be easily referred to.

COMPETITIONS.

BLACKBURN.—From the designs sent in for a new infant school in Dean-street, Blackburn, the building committee have selected those of Messrs. Cheers and Smith, of Richmond-terrace, Blackburn, for the first place, and these architects have been instructed to carry out the work. Mr. J. W. Shorrock, of Simmons-street, was awarded the premium for second place.

BYFLEET.—Ninety-two sets of drawings have been sent in for a village hall and workmen's club to be built at Byfleet, Surrey. The referee, Mr. W. H. Seth-Smith, has decided in favour of the design under the motto of a "Red Star" as most completely fulfilling the conditions and other requirements of a village hall, and recommends that it should be awarded the premium of 25 guineas. The authors are Messrs. Ashley and Armstrong, of 50, Berners-street, London, W. The referee adds the following to his award: "May I be permitted to suggest that, in inviting tenders for the building, builders only of standing be invited to compete."

EDINBURGH.—At a meeting of the Public Health Committee of Edinburgh Town Council on Monday the competitive schemes, which had been lodged with the City Superintendent of Works for the heating and ventilation of the City Hospital, were submitted. A premium of £50 had been offered for the most suitable scheme. Thirteen schemes had been sent in, and, after consideration, they were remitted to a sub-committee for report, power having been given to employ an export.

HARRISBURG, PENN. — The Pennsylvania Capitol Competition Case came before the Supreme Court of the State on an appeal from the decisions of the Dauphin and Lancaster County Courts taken in the cases of Messrs. Cope and Stewardson, of Philadelphia, Alden and Harlow, of Pittsburgh, and James H. Warner, of Lancaster, against the Capitol Building Commission. Justice Mitchell dismissed the appeals and sustained the decisions of the lower courts. The decision is regarded as removing all cause for further delay in the building of the Capitol, for which Mr. Henry Ives Cobb, of Chicago, has been appointed architect, as heretofore noted in these columns.

LONDONDERRY.—An adjourned meeting of the Londonderry District Asylum Board of Governors was held on Nov. 25, to meet a deputation from the Board of Control for the purpose of conferring respecting the plans for the new asylum at Gransha. The Right Rev. Dr. Chadwick, Bishop of Derry and Raphoe, presided. The members of the Board of Control in attendance were:—Dr. O'Farrell, Dr. Courtney, and Mr. S. Ussher Roberts, C.B., their consulting architect. Dr. Hetherington, resident medical superintendent of the asylum, read a letter from the Board of Control and a resolution of the governors. The resolution drew the attention of the Board of Control to the fact that the accepted plans in the recent competition for architectural designs for the Gransha Asylum meant a large excess of expenditure above the sum which it was originally agreed the new buildings were to cost. The Board of Control were asked as to whether a modification of the plans for economic purposes could not be made, and a reply was received that one of the architects declined to modify his plans, as it was a practice contrary to professional etiquette. The inspectors and the consulting architect from Dublin were then shown into the boardroom, and the chairman, addressing them, said the governors were met to ascertain what help the deputation could give them, so that they would be enabled to have the new building carried out on the understanding that it would not exceed a certain fixed sum when completed. The sum of £102,000 was the amount at first computed to cover the cost, but it had since been raised to £110,000, beyond which the governors could not go. Dr. O'Farrell said that when the inspectors were in Derry and met the governors on the last occasion, it was decided that the two successful architects, who were placed first and second in competition, were to be asked to revise their plans and bring them within the limits of expenditure. The Board of Control were at one with the governors in limiting the expenditure, and they were quite determined that the cost of the new asylum buildings shall not exceed £110,000. However, the negotiations to have the accepted plans revised have fallen through, inasmuch as one of the architects, Mr. Byrne, refused to amend his plans, moved by professional etiquette to refrain from so doing, and probably also influenced by a feeling of personal honour, which did him the greatest credit. He had, at any rate, refused to enter into any further competition, and so there only remained the architect's plans who was placed first by the assessor, and as the estimate for the work was very high, the deputation came down to confer with the governors as to what steps should be taken next. Mr. Scott proposed:—"That the estimate of plans being in our opinion excessive, no further steps be taken at present in reference to the new asylum." He said he had no wish to postpone this matter indefinitely. He did not intend that there should be more than six or twelve months' delay. Colonel Knox seconded the motion. Dr. O'Kane proposed as an amendment, "That we employ an architect with instructions to make a plan of a new asylum not to exceed £110,000, and that as Mr. Byrne is a competent architect, that he be appointed." After some further discussion, the following decision was come to, on the motion of Mr. Stevenson, seconded by Rev. Thos. Thompson:—"That Messrs. Owen and Byrne, or failing the latter, Messrs. Owen and Fuller, be requested to prepare plans in accordance with the suggestion of the Board of Control at a cost not exceeding £110,000 to accommodate 600 patients, such plans to be submitted to a future meeting of this board for its consideration." The proceedings then terminated.

NEW YORK PUBLIC LIBRARY.—The jury of award have decided unanimously that the design of Messrs. Carrère and Hastings, of New York, shall be the one used in building the new Public Library building on the site of the old reservoir. This is the result of the second competition, in which 12 architects took part. The jury placed second the design of Messrs. Howard and Cauldwell, and third those by Messrs. McKim, Mead, and White. The work of preparing the plans for the building has been going on for more than a year, and two competitions were held, both of which were conducted with the greatest care and fairness. Eighty architects competed in the first competition, and twelve of them were given premiums. Six of these prize winners were selected and asked by the committee to compete with six architects, with the result given above. The building is to cost about £340,000 sterling. Messrs. Carrère and Hastings have also been awarded the only premium in the competition for the National Academy design at New York.

WALSALL.—At the last meeting of the School Board the adoption was unanimously agreed to of the plans marked "Square" for the erection of the proposed schools at Whitehall, in accordance with the recommendation of the General Purposes Committee. It was explained that the Board, taking a new departure, had had the assistance of Mr. Chatwin, Birmingham, as assessor, and that he had placed the "Square" plans first—a decision which was entirely in harmony with the judgment of the Board. The plans were found to be the work of Messrs. Bailey and McConnal, Walsall.

The Workington Town Council have resolved to contribute £100,000 towards the cost of constructing a new deep-water dock. The estimated cost is £300,000.

The Lords of the Committee of Council on Education have promoted Dr. Hoffert to be a senior inspector under the Science and Art Department, and have appointed Mr. S. J. Cartlidge—at present headmaster of the Hanley School of Art—to the vacant inspectorship.

The new waterworks which have been constructed by the Evesham Rural District Council at Broadway for providing a large number of adjacent villages with an adequate and continuous supply of water were publicly opened on Friday by the Earl of Coventry. The scheme is stated to be the largest and most important of its kind ever undertaken by a rural district council in the United Kingdom. Mr. J. Edmund Wilcox, C.E., of Birmingham, is the engineer. The works have been carried out by Mr. Thomas Vale, of Stourport, whose contract was for £6,190. The iron pipes were supplied by Messrs. J. and S. Roberts, of West Bromwich, whose contract amounted to £6,062. The valves and fittings were supplied by Messrs. Blakeborough and Co., of Brighouse, Yorkshire. The resident engineer, Mr. Henry C. Adams, has superintended the works throughout.

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BURY ART GALLERY AND PUBLIC LIBRARY.—PADSTOW HOTEL.—THE PASSMORE EDWARDS PUBLIC LIBRARY, SOUTHWARK.—MEMORIAL LYCH GATES AT BAXTERLEY.—NEW PREMISES FOR THE BIRMINGHAM PHOTOGRAPHIC CO.—SALOON IN A COUNTRY HOUSE AT GRATZ.

Our Illustrations.

SELECTED DESIGN FOR ART GALLERY AND FREE LIBRARY, BURY.

We publish to-day the view, plans, elevations, and sections of the Bury Art Gallery selected design by Messrs. Woodhouse and Willoughby, of Manchester. The arrangement of the art galleries is *en suite*, well contrived for supervision, and all steps are avoided. The lavatories are contiguous to the entrance hall, and are well screened from view. The entrance hall forms a sculpture gallery, and affords space for crush room. The exhibition rooms are lofty and well lighted. A curator's room is provided, and ample storage is located in the basement. The architects claim that the elevations are the natural expression of the plans, and no sacrifice of internal convenience or economy has been made for the sake of artistic effect. The staircase is 6ft. 6in. wide, and has a large mullioned window to light it. The entrance to the library is 13ft. wide, direct from the street. The library is well planned, and is amply lighted. The elevations, treated after the manner of the Renaissance style, are to be executed in Aspatria (Cumberland) red stone. The cost is estimated at £16,000. We shall give illustrations from the other promiated designs next week.

PADSTOW HOTEL.

This hotel is to be erected on the north coast of Cornwall, a locality well-known to visitors during the summer months, and now recommended by the medical profession as a winter resort, rivalling in a sense the Riviera for its mild and equable climate. As shown on the plans, the hotel comprises, on the ground floor, the reception-rooms, and on the first and second floors 30 bedrooms for visitors, in addition to private sitting-rooms and suites. The lower ground-floor, which, in consequence of the sloping nature of the ground, is not above the ground level, contains all the administrative part of the hotel and the billiard-room and lavatories. The materials for the walls will be local stone, rough from the quarry near the site, and the roofs will be covered with thick rough slabs of Delabole slate, local materials being used to harmonise with the rough and rugged nature of the surrounding country. Internally, the finishings will be simple, comfort and convenience being their principal features. The hotel is being built for Mr. Alfred Curphey, of 28, Victoria-street, Westminster, and the architects are Messrs. Crickmay and Sons, of 13, Victoria-street, Westminster, and Weymouth.

THE PASSMORE EDWARDS PUBLIC LIBRARY, BOROUGH ROAD, S.E.

The foundation-stone of this library was laid yesterday by the donor, Mr. J. Passmore Edwards. The building, which is now in course of erection, occupies a corner site on the north side of the Borough-road, within a few yards of St. George's-circus. It is set further back than the sketch indicates, and it is the intention of the Commissioners to turf and plant the space between the building and the boundary walls. On this space will be placed stands, on which the advertisement sheets of newspapers can be fixed before the library is opened in the morning, for the convenience of those who wish to refer to them as early in the day as possible. The building consists of a basement with two floors over. In the basement space is provided for the storage of books and papers, and a certain portion will be set apart for repairing and unpacking rooms. This basement is well lighted by an area which extends completely round the building. On the ground-floor are the newsrooms, lending library, ladies' room, and boys' room, all of which are under the direct supervision of the staff engaged in the lending library. There is also a private entrance for the librarian and the staff. On the first floor is the reference library, with book-store attached, the committee-room, and a portion of librarian's residence, the remaining part of which is on the attic floor above. The residence comprises drawing-room, dining-room, three bedrooms, bath-room, kitchen, scullery, &c. The front and two end elevations are of red brick with terracotta dressings. The west-end gable terminates in a memorial of H.M. the Queen, in low relief. The figure subject over the entrance is illustrative of Art, Science, Literature, and Music; and that in the gable over includes the Tree of Knowledge, with crowning figure of Wisdom and the Arms of the City of London. The shields on either side bear respectively the Arms of Bermondsey Abbey and the Badge of Vestry of St. George-the-Martyr, Southwark. The architects are Messrs. C. J. Phipps and A. Blomfield Jackson, 26, Mecklenburgh-square, London, from whose designs the building is being erected by Messrs. J. Smith and Sons, of Norwood.

MEMORIAL CHURCHYARD GATES, BAXTERLEY.

These gates have been erected in memory of the late Vice-Chancellor Bacon. The lych-gate stands at the main entrance to the churchyard, with a small swing-gate at the side leading to a public pathway across the burial ground. The smaller gate is placed at the opposite end of the pathway. The whole of the woodwork is in English oak, and the roofs are covered with stone slabs. The architect is Mr. Alfred Bickerdike, of London.

NEW PREMISES, STECHFORD.

This building has been erected at the corner of Albert-road and a new road at present unnamed at Stechford, a rural district about four miles from the city of Birmingham. The offices are arranged in such a position as to enable the whole of the departments to be supervised and controlled therefrom. The upper floor is almost a repetition of the ground floor; the walls are faced externally with wire-cut local bricks dressed with Monk's Park stone. The general contractor for the work, which has cost about £4,000, is Mr. J. W. Smith, of Small Heath, Birmingham; Messrs. Rosser and Russell, Limited, of London, and Colmore-row, Birmingham, have undertaken the heating arrangements, and the whole has been erected from the plans prepared by and under the superintendence of Mr. F. Edwards, architect, 1, Newhall-street, Birmingham.

SALOON IN COUNTRY HOUSE AT GRATZ, AUSTRIA.

The chief feature in the apartment herewith illustrated is the handsome doorway, of grand proportions, which is of wood, decoratively treated on the flat surfaces, such as the panels and stiles of door. A high panelling is carried round the room, and a wooden ceiling, deeply coffered, is just in the view, the cornice to same being divided by an alternate cartouche and bracket. The floor is of simple design in parquetry, and the chairs, of a good plain Italian character, are further items of interest. The architect is Herr Karl Lacher, and our drawing is taken from the pages of the "Weiner Bauten-Album."

Extensive additions have been made to the Wesleyan Chapel at St. Day, Cornwall, including an organ-chamber and orchestra, with choir vestry, &c., beneath. The work has been carried out by Messrs. Moyle, Chacewater, and Gray, Redruth, from plans prepared by Mr. S. Hill, architect, Redruth.

Engineering Notes.

The South Wales Direct Railway.—The first sod of this railway was cut by the Duchess of Beaufort on Monday. The new line, which is being built by Sir Weetman Pearson for the Great Western Railway Company, will be 33½ miles long, from Wootton Bassett to Patchway, a few miles below the Severn Tunnel, including Filton loop and the junction loop with the Midland Railway near Yate. By means of it the distance from London to Newport, Monmouthshire, will be reduced to 132 miles, as compared with 143 *viâ* Bath and Bristol, and 158 miles *viâ* Gloucester. The average gradient from London to Newport will be but 1 in 300. The construction will involve the making of three tunnels; the first, through the Cotswold between Acton Turville and Chipping Sodbury, being 2½ miles long, the second near Alderton, a quarter of a mile, and the third, near Wootton Bassett, an eighth of a mile. Four viaducts and about 100 bridges will be constructed, and there will be the seven stations following—Brinkworth, Somerford*, Hullavington, Badminton*, Chipping Sodbury*, Coal Pit Heath*, and Winterbourne. At such of these as are marked with an asterisk there will be four running lines, so that expresses may pass through along the middle line while a stopping train is at rest at the platform. The work is expected to cost one and a quarter millions, and will be concluded in about three years. Mr. Inglis, the chief engineer to the Great Western Company, prepared the plans, and the contractor will be represented on the works by Mr. George Hay.

CHIPS.

Mr. L. A. Selby-Bigge, assistant Charity Commissioner, held an inquiry at the Guildhall, Looe, on Friday, in respect of an application from the trustees of West Looe Trust Property for permission to borrow the sum of £1,800 for providing a new water supply.

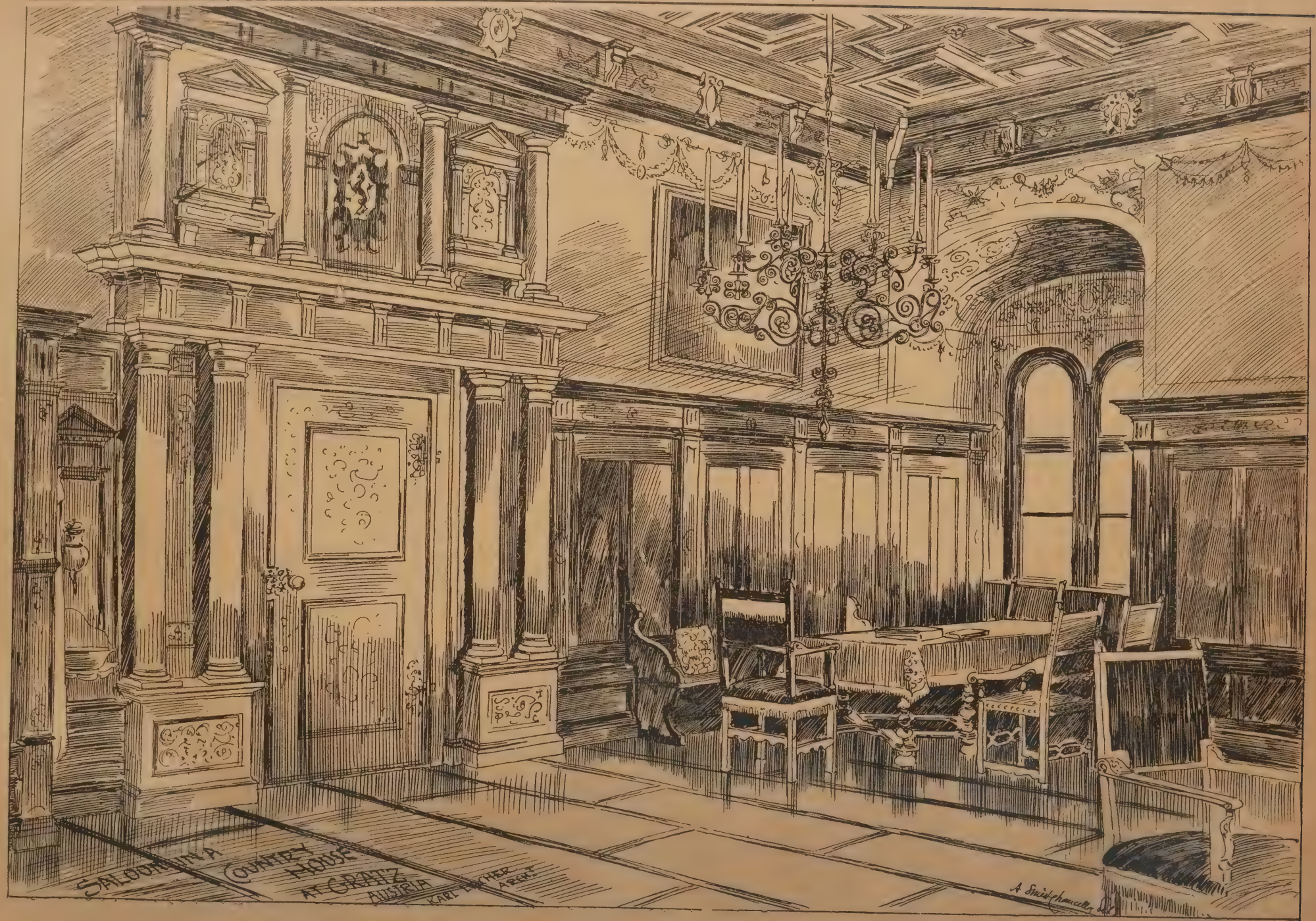
The new Technical Institute for Grantham and district is nearly completed. The institute is at the rear of the Guildhall, and was formerly a gaol, afterwards being used as a cigar factory. Mr. F. J. Morris (the borough surveyor), planned the alterations, which have been carried out under his superintendence by Messrs. Walker Bros. and Parks, the contractors.

Extensive additions and alterations have been made to 31, George-square, Edinburgh, to provide a residence for lady students and a "union" for all the ladies attending the University. These have now been completed, and the Masson Hall, as it has been called, was formally opened on Friday by Miss Balfour, of Whittinghame. The present scheme gives accommodation for 15 resident students. Mr. James Jerdan, Castle-street, Edinburgh, was the architect.

At the annual meeting of the Lancashire Asylums Board, held at Preston on Friday, it was reported that the tender of Messrs. Robert Neill and Sons, of Manchester, for the erection of the new asylum at Winwick for the sum of £253,000 had been approved. The chairman said the patients' blocks would be completed in about two and a half years, and the whole building in three and a half years. They would be able to receive patients in about two and a half years. It was resolved to grant £5,900 for purposes of enlargement at Rainhill Asylum, and £7,500 for altering and relaying the drains and treating the sewage at Whittingham Asylum, where it is intended to substitute water-closets for the pail system which has prevailed hitherto.

The lighting apparatus in the tower at Tod Head, Kincardineshire, has now been fitted up under the superintendence of Mr. Burness, inspector of lights for the commissioners. The light is a flashing one, showing six flashes in quick succession during a period of about 15 seconds, followed by a period of darkness of 15 seconds. It was designed by Messrs. Stevenson, civil engineers, Edinburgh, and constructed by Mr. Henry Leparte, Paris, and Messrs. Milne and Sons, (Limited), Edinburgh. The apparatus makes one revolution in half a minute.

At Windisch, the old Roman colony of Vindonissa, in the Swiss Canton of Argovie, excavations recently carried out under the auspices of the Swiss Archæological Society have yielded important results. Large Roman villas and an amphitheatre have been disinterred, and, besides a large quantity of coins, pottery, bronze, and ironware, some large silver vessels have been discovered which are said to only have their equals in the famous treasure-trove of Hildesheim in Germany, brought to light in 1868.


SALOON IN A COUNTRY HOUSE AT GRATZ AUSTRIA
KARL LUCHER ARCHT.
A. Smith chancellor

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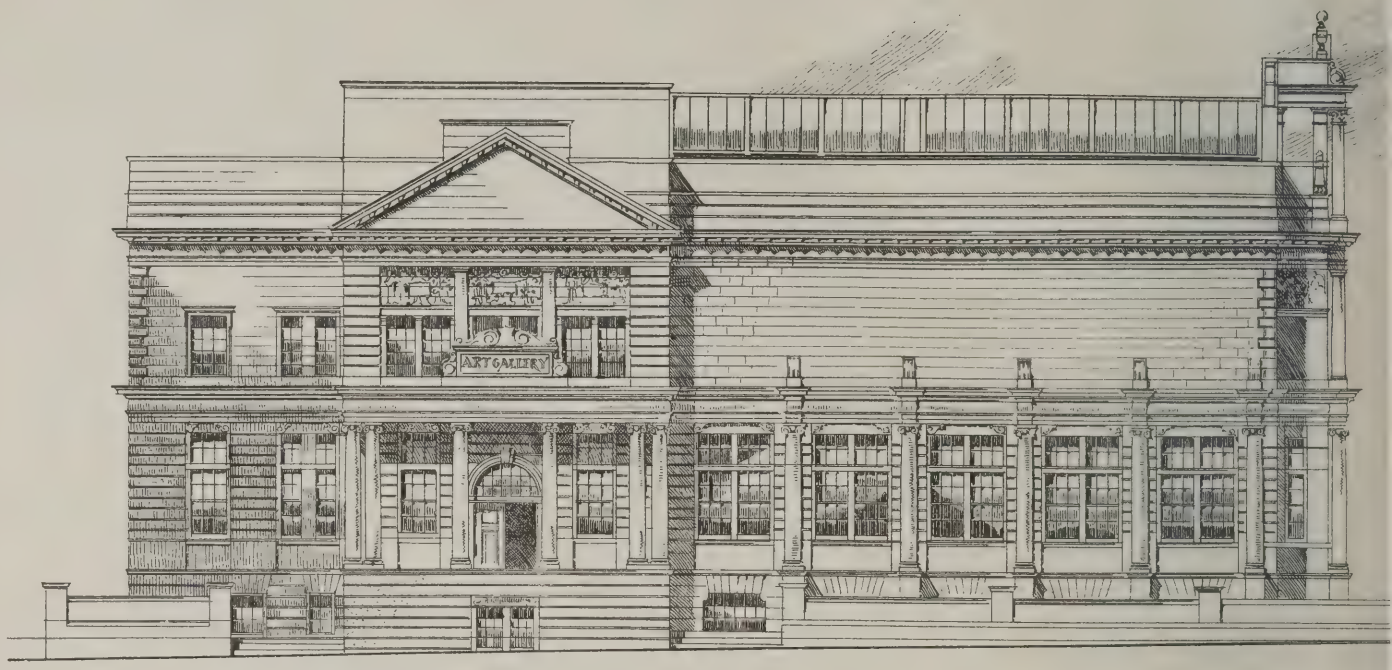
Alfred Bickerdike Architect
10. Culworth St. Regents Park
London N.W.

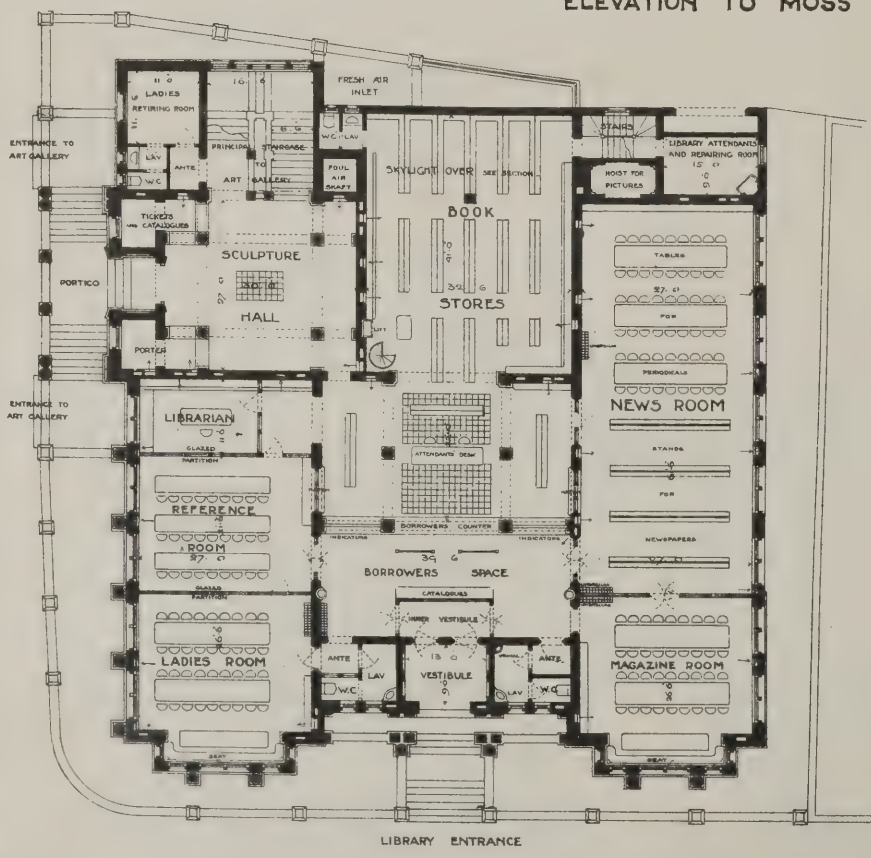
Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.



ELEVATION TO MOSS STREET.

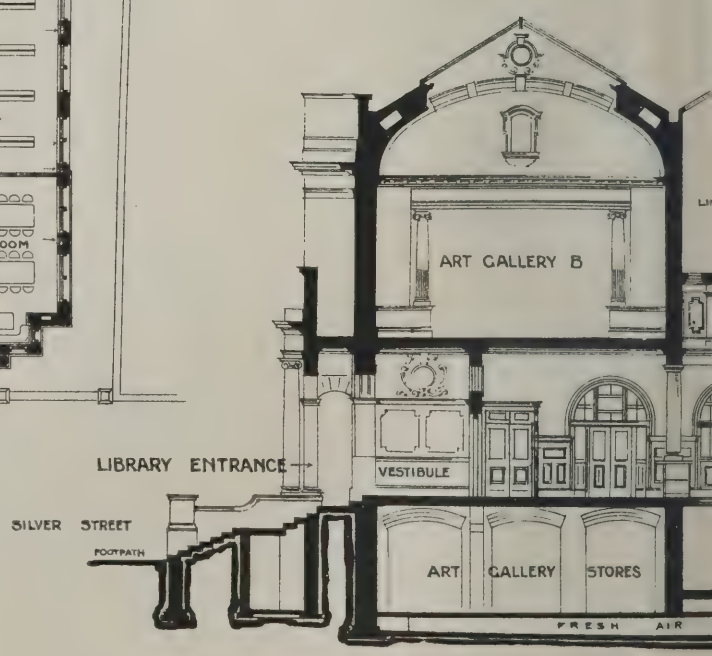
BURY ART GALL

FIRST PREMIATED & SELECTED DESIGN



GROUND FLOOR PLAN

PUBLIC LIBRARY



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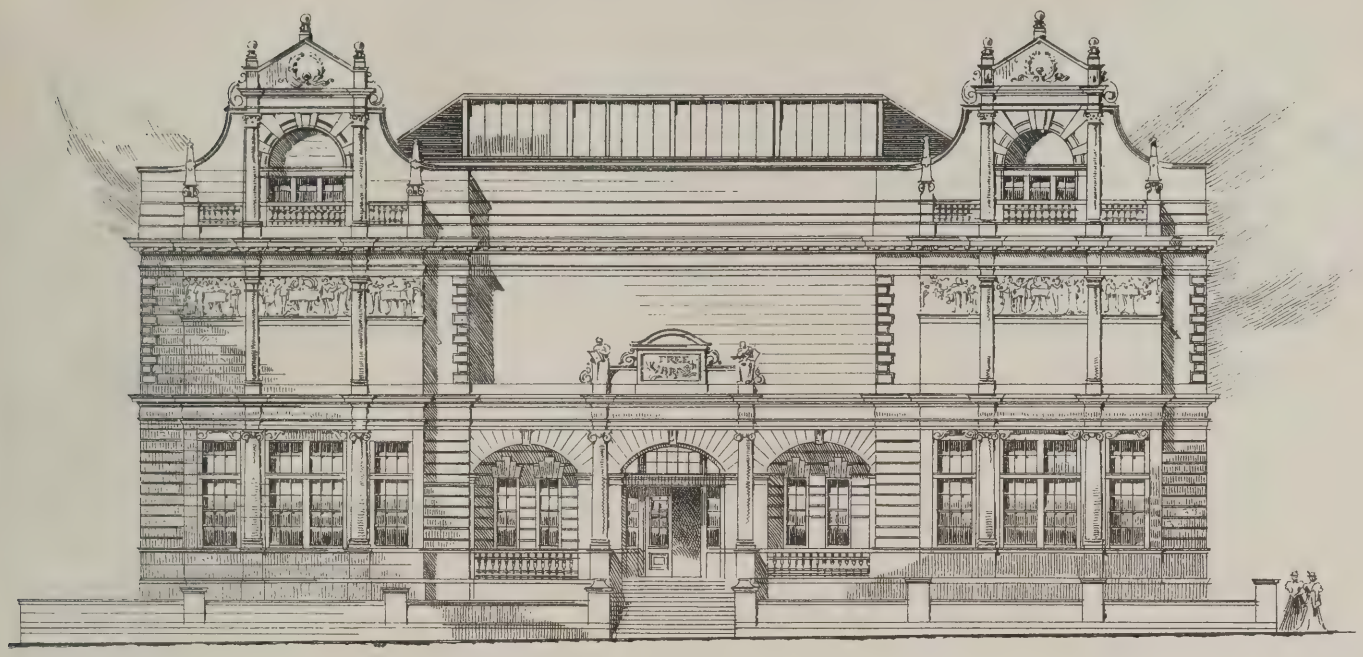
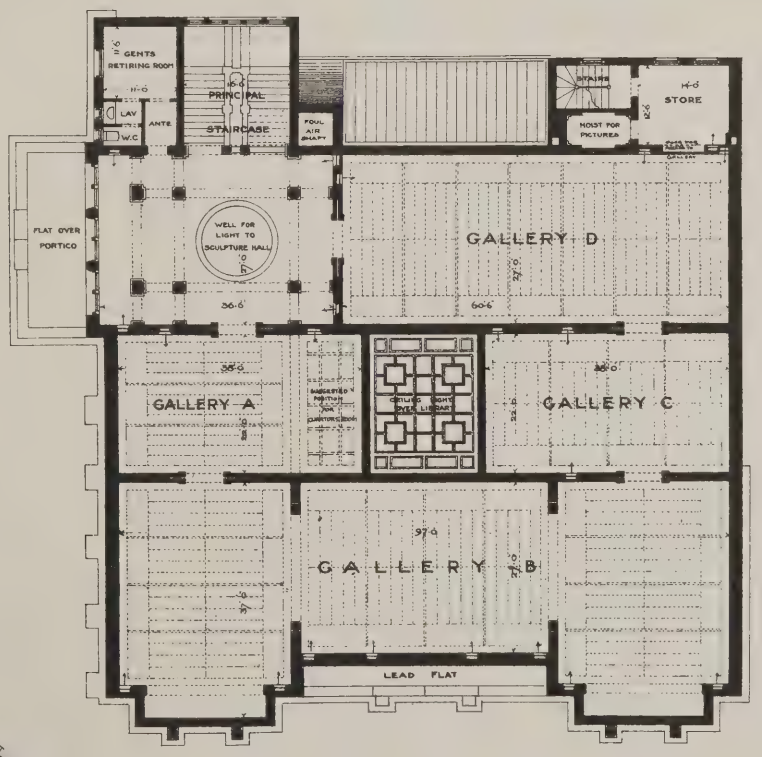


ELEVATION TO SILVER STREET.

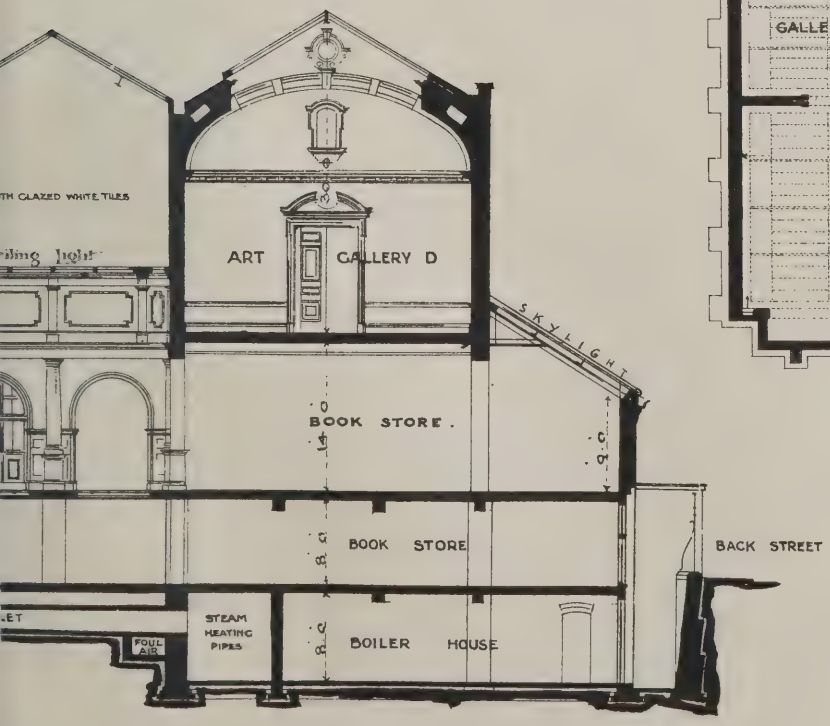
ry · & · Public · Library ·

· Messrs Woodhouse & Willoughby Archts



FIRST FLOOR PLAN

ART GALLERY



DINAL SECTION

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BURY · ART · GALLERY

FIRST · PREMIATED & SELECTED DESIGN · BY · M

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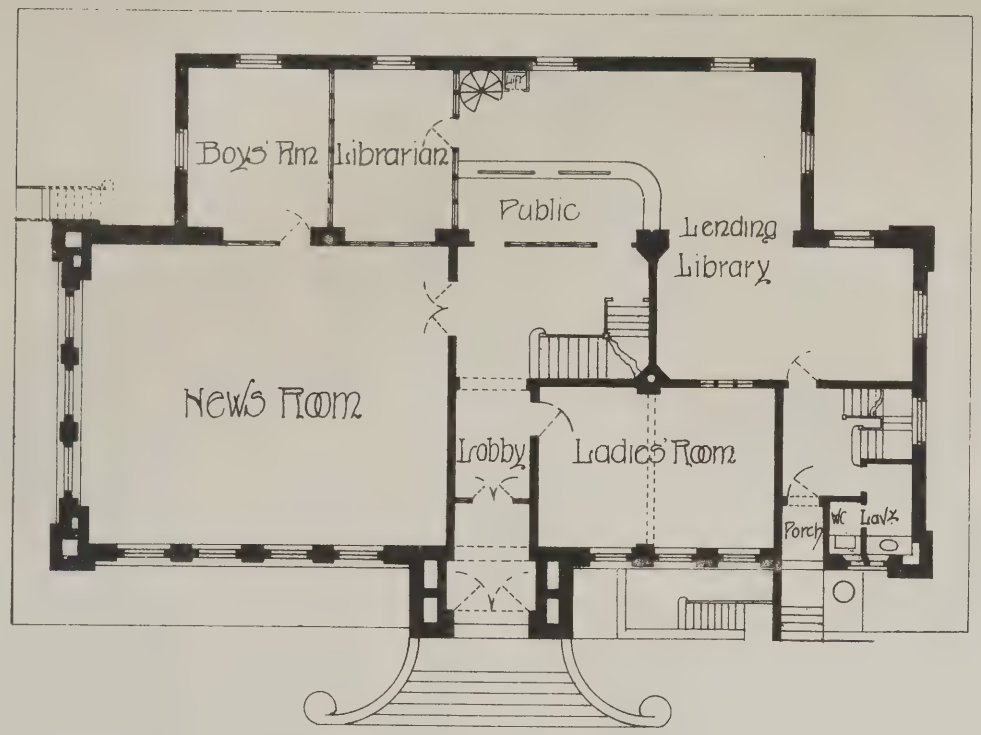
Srs WOODHOUSE & WILLOUGHBY ARCHTS

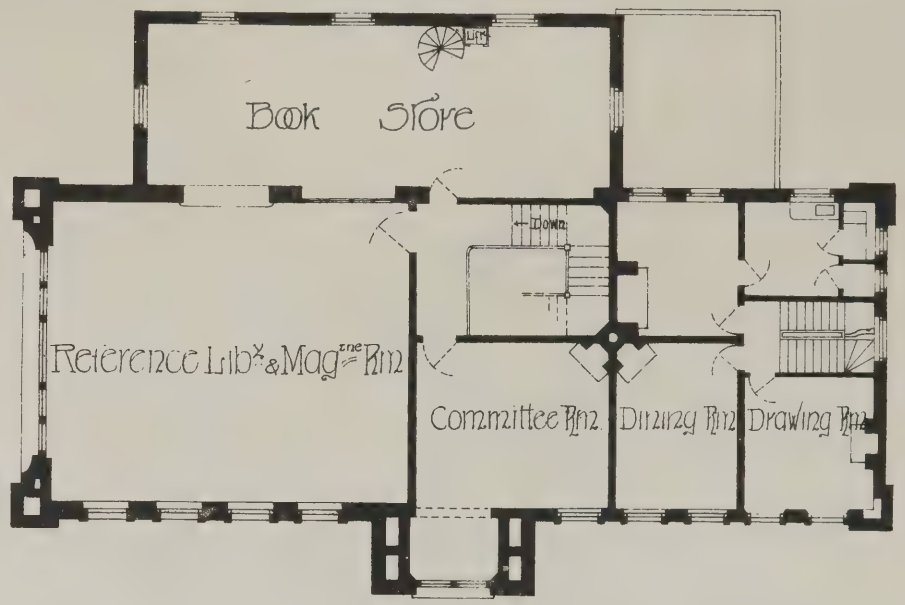
PASSMORE EDWARDS FREE LIBRARY

Passmore Edwards Public Library, Borough Road, S.E.

Messrs C. J. Phipps & A. Blomfield Jackson, Architects.

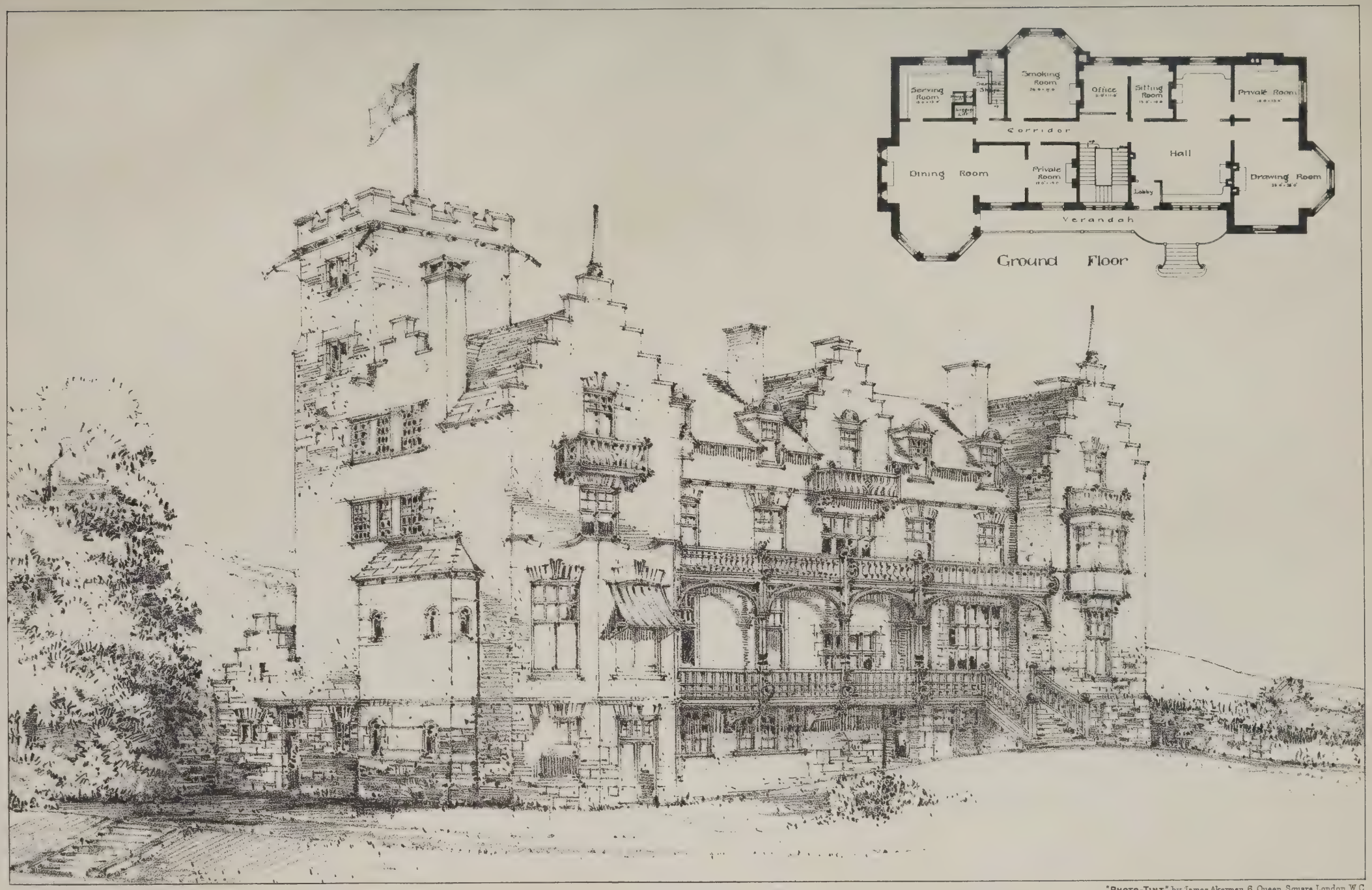


Ground Plan



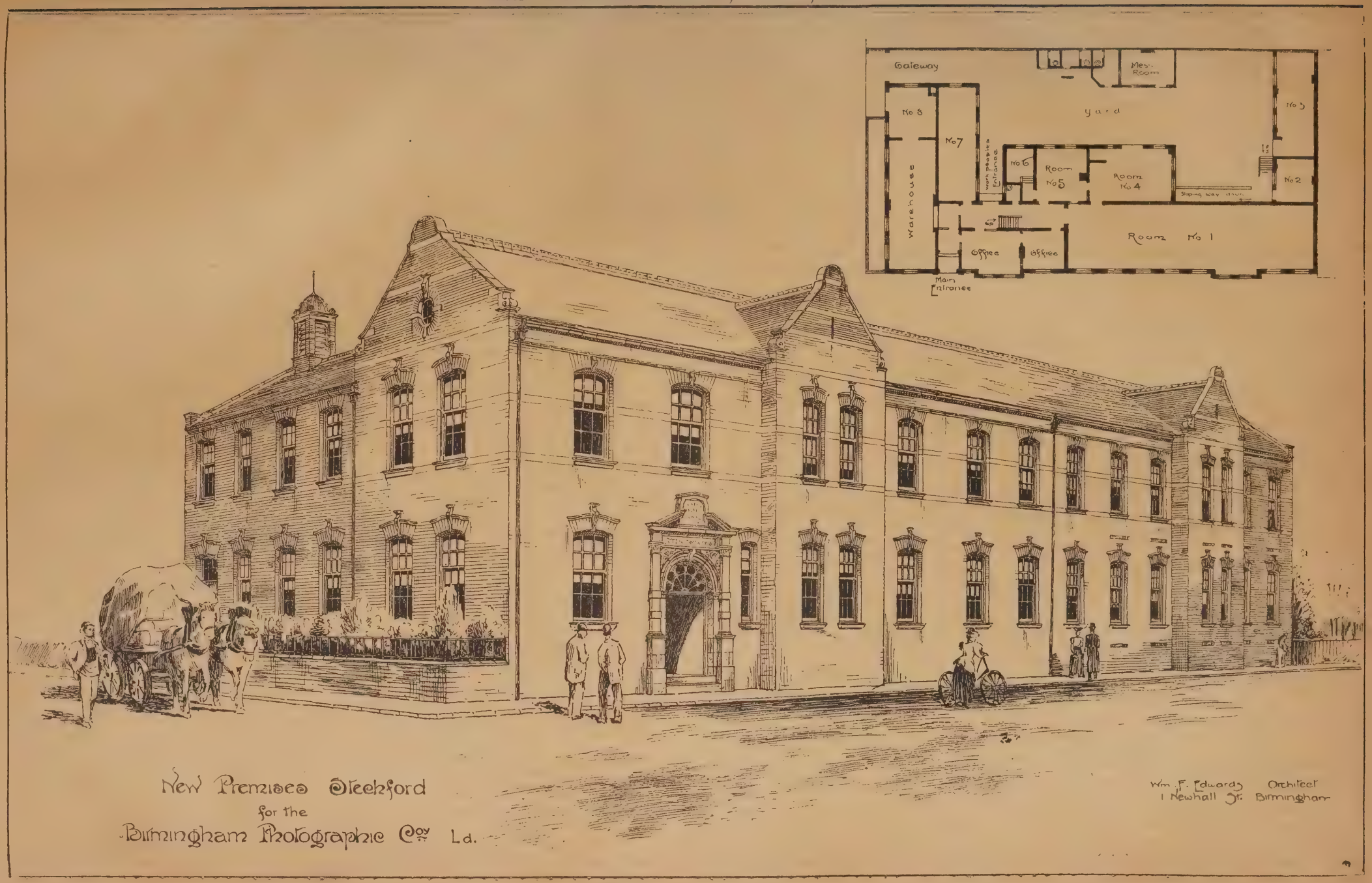
First Floor Plan

Photo-Lithographed & Printed by James Akerman 6, Queen Square, W.C.



"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.

HOTEL AT PADSTOW. MESSRS CRICKMAY & SONS ARCHTS


Gateway
Mess Room
Yard
No 8
No 7
No 6
Room No 5
Room No 4
No 3
No 2
Warehouse
Work people Entrance
Sloping Way
Room No 1
Office
Office
Main Entrance
New Premises Steckford
for the
Birmingham Photographic Coy Ld.
Wm. F. Edwards Architect
1 Newhall St. Birmingham

Building Intelligence.

Annan, N.B.—For some time negotiations have been in progress between Messrs. Cochran and Co., the well-known engineers and iron-founders, of Birkenhead, and the representatives of Mr. Mackenzie, of Newbie, for a site at Annan to establish engineering works on a large scale. The negotiations have now been all settled as between the firm and the proprietor of the Newbie estate. Messrs. Cochran and Co. have decided to remove their entire works from Birkenhead to Annan. The site selected is the harbour at the mouth of the River Annan, and opens right into the Solway Firth. The land marked out for the works extends to 13½ acres, and lies on the west side of the river. A railway siding at present connects the projected works, and joins the main line of the Glasgow and South-Western Railway, half a mile to the west of the railway station at Annan. The Board of Trade has just granted powers to the harbour trustees to convert the harbour into a public port. Two hundred dwelling-houses are to be immediately erected at the works for the accommodation of the employés of the firm. The works have to be pushed forward with all haste, as the firm have entered into possession of the ground this week.

Edinburgh.—The opening of the McEwan Hall at Edinburgh University takes place this (Friday) afternoon. The hall, which we shall illustrate shortly, has been built from designs by Dr. Rowand Anderson, of Edinburgh, the architect of the University buildings, and has cost the donor, Mr. W. McEwan, M.P., about £70,000. It is seated for 3,000 persons, and is on plan semicircular, being based on the form of an ancient Greek theatre. The steel roof, which has a distance of 134ft. by 106ft., was specially designed by Messrs. Cunningham, Blyth, end Westland, civil engineers, Edinburgh. The decoration of the hall has been carried out by Mr. W. M. Palin, of London, who has been engaged for about four years on the undertaking; some of the full-length figures in the dome panels were illustrated in our issue of December 11, 1896, and January 22, 1897.

Manchester.—A scheme for providing additional workmen's dwellings, now under the consideration of the Improvement Committee, has been rendered necessary by the demolition of property for public improvements in Gaythorn and Rochdale roads. The committee have two sites in view. One, at Miles Platting, was secured some time ago, and upon this the erection of some 60 cottage houses is contemplated. A second site is near Moston-lane. The ground already belongs to the Sanitary Committee, and the City Surveyor has been asked to report upon its suitability. A further scheme, which has already been sanctioned by the Council, relates to dwellings to be erected upon cleared land in Pott-street (Ancoats), Oldham-road, and Chester-street (Hulme). It also provides for a lodging-house in Harrison-street, Ancoats. The committee will shortly invite tenders for the erection of these dwellings.

Partick.—On Saturday the memorial-stone was laid of a United Presbyterian church, which is being erected at the corner of Lawrence-street and Alexandra-street, Partick, near Glasgow. The style adopted is 13th-century Gothic, with massive treatment, and simple and severe detail. Between the main gable and that of the hall is an octagonal turret, forming the gallery and hall-staircase. The halls and accessory-rooms are placed to the west of the church. The side elevations of the church show a series of low four-light windows with square heads in the lower stage, and in each bay over these, divided by broad piers, are tall two-light windows of lancet shape. The organ chamber is projected in the chancel form to the north. Internally, the nave is divided from the aisles by splayed stone piers, one only on each side, springing from which are moulded arches of wide span. The principal roof timbers will be shown, and the ceilings will be lined with wood panelling. The number of sittings provided is 740, and there are also halls for 400 and 200, classrooms, ladies' room, vestry, kitchen, &c. The cost will be £7,500. The architis Mr. John B. Wilson, Glasgow, Mr. Thomas Todd acting as clerk of works.

Sandbach.—The formal opening of the Marriott House and grounds, which were presented to the town for the purpose of technical schools and park by the Marriott family, took place on Tuesday week. The house has been rearranged inside, and wholly overhauled and renovated. The ground floor consists of a large room at the front, which is used for dressmaking classes; a smaller room for the use of classes; a room for the carving class, out of which there has been thrown a square bay window; the whole of this room has been fitted with benches; and a room for teaching laundry work and cookery, and four caretakers' rooms are provided. We must not omit to refer to the entrance-hall and cloakroom, from whence rise the handsome old stairs, which are very fine indeed, being made of English oak, with dado on the wall side. There is also a side entrance from the garden. Upstairs there were originally four bedrooms on the front, which have been converted into one large classroom, fitted with a set of sliding partition glass doors, dividing it into two rooms when necessary. When these are thrown open it gives a room measuring 60ft. by 16ft. 3in. The alterations have all been designed by Mr. Alfred Price, architect, of Elworth.

CHIPS.

Lieutenant Colonel Albert C. Smith, R.E., one of the Local Government Board inspectors, held an inquiry on Friday at the Croydon Town Hall respecting the application of the council to borrow £13,450 for street widening and extension of the electric lighting works, the demand for electric lighting exceeding expectation.

A Divisional Court of Appeal was asked on Friday to decide the principle upon which the value of public-houses taken for the purposes of the southern approach to the Tower Bridge should be ascertained. The judges (Justices Wright and Kennedy) were of opinion that the arbitrator should consider the value of the tied covenant of the lease, and not the takings and payments of the lessee.

Mr. John Cassidy, sculptor, has just completed a statue of the late Dr. James Dorrian, the well-known philanthropist of Bolton, which, as the inscription on the base will record, is to be "erected by public subscription to commemorate a life of usefulness." The statue, which is of heroic proportions, and is hewn out of a block of Portland stone, represents Dr. Dorrian standing with his arms folded, one hand clasping a book.

At St. Mary's (Welsh) Church, Aberystwyth, a window erected to the memory of the late Dean of St. David's (Dr. Phillips), formerly vicar of the parish, was recently unveiled. It is of stained glass, is placed on the north side of the nave, and consists of two figures, those of St. Mary and St. David. The design was carried out by Mr. A. O. Hemming, of Margaret-street, W.

Mr. Alfred Waterhouse, LL.D., R.A., has been elected treasurer of the Royal Academy in the place of the late Mr. J. C. Horsley. Another architect, Mr. T. J. Jackson, R.A., ran him close for the appointment, which was only determined in Mr. Waterhouse's favour by the casting vote of Sir Edward J. Poynter, the president.

While following Lord Fitzwilliam's hounds near Maltby on Wednesday week, Mr. George A. Wilson, surveyor and architect, Sheffield, rode at a fence along which, unknown to Mr. Wilson, were two strands of barbed wire. The horse caught its feet, and Mr. Wilson was flung out of the saddle. He had to be conveyed home in an ambulance, a subsequent examination disclosing the fact that he had sustained a slight concussion of the spine. Mr. Wilson is secretary of the Rotherham Racecourse Company, and has been most active in trying to abolish barbed wire in the Fitzwilliam hunting country.

The annual distribution of prizes and certificates in connection with the Salisbury School of Art took place on Thursday evening in last week, when an address on art and technical education was delivered by the Earl of Carlisle. The annual report stated that good work was being done in the school under the tuition of Mr. Joseph Harris, the headmaster.

Mr. Thomas R. O'Connor has offered to present a two-light stained-glass east window to Clonfert Cathedral, in commemoration of the Queen's Diamond Jubilee. He also contemplates presenting the cathedral with a carved oak pulpit.

Mr. Henry Clarke, a member of the Corporation, having expressed a desire to contribute a painting of the value of one thousand guineas, commemorative of the Queen's visit to the City, for the Art Gallery at Guildhall, the commission has been intrusted to Mr. A. C. Gow, R.A. The picture will represent the Jubilee service outside St. Paul's Cathedral, and include the whole of the façade of the cathedral and the personages assembled there, including the cavalcade of princes. The work will not be completed until 1899, when it is expected that it be included in the exhibition of the Royal Academy.

Sir Walter Besant opened, on Wednesday, the new residence which has been erected in the Barking-road, Canning-town, for the accommodation of workers attached to Mansfield House University Settlement.

A stained-glass window of three lights representing in the centre our Lord as the Good Shepherd, and on either side the figures of the Virgin and Mary Magdalene, has been placed in the chancel of the parish church of Burlescombe. The work was executed by Mr. F. Drake, of the Close, Exeter.

The Metropolitan Asylums Board have accepted the tender of Messrs. D. and J. Tullis for the laundry machinery and fittings, in connection with the Grove Hospital at Tooting-hill.

At Wallasey Petty Sessions, on Friday, an architect named John Chopping, of 29, St. Elmo-road, Egremont, was summoned by the Wallasey District Council for using the Egremont Ferry, not being a contractor, otherwise than by the turnstile, on the 10th and 11th inst. An inspector proved the case, and stated that defendant gave a false name and address when challenged. A barrister appeared for the absent defendant, and, admitting the facts, pleaded that defendant was absent-minded, and it was through this physical failing that he had committed the mistake. Defendant was ordered to pay a fine of 40s. and costs for the first offence, and 20s. and costs for the second, £3 17s. in all, or go to gaol for 14 days on each charge.

A Local Government Board inquiry into the application of the Exeter City Council for leave to borrow £40,000 for the construction of the septic system of sewage disposal, invented by Mr. D. Cameron, the city surveyor, was held on Tuesday, Wednesday, and Thursday of last week, before Gen. Crozier and Dr. Thompson, at the Guildhall.

Last week was a satisfactory one at the Auction Mart, the aggregate amount of sales effected being £133,948, which compares favourably with the amount registered in the corresponding week last year—£104,621. The most encouraging feature of the market was the improved demand for land possessing elements of value for building purposes. Two or three years ago this class of property was almost a dead-letter, but a different state of things now prevails. Speculative enterprise has revived, and a considerable amount of capital has been forthcoming for investment in estates near London, offering facilities for the creation of ground-rents or for retail re-sales.

Dr. von Sallet, the well-known Berlin Professor of Numismatology, and especially famous for his works on medals by Albert Dürer, died on Thursday in last week, aged fifty-five.

The total number of private Bills of which notice has been given for next session is 335, 44 being promoted by county councils, corporations, and other public authorities, and 78 by dock and railway companies; 54 relate to gas and water undertakings, 11 to tramways, eight to harbours and navigation works, 86 to electric lighting provisional orders, and 29 are of a miscellaneous character. Thirty-six of the Bills directly affect the Metropolis.

The Edinburgh Town Council adopted, on Tuesday, a report from the electric lighting committee recommending large extensions of the electric lighting system in the city, the capital involved being about £20,000. The council sanctioned the acquisition on feu of ground for a new power station at M'Donald-road, and authorised the convener (Bailie Mackenzie) to go to London to consult with Professor Kennedy as to considerable additions to the machinery.

The Bristol memorial of Bishop Ellicott's episcopate in the diocese of Gloucester and Bristol, which extended over a period of thirty-four years, is to be a reredos in Bristol Cathedral, designed by Mr. John L. Pearson, R.A. The cost will be £2,400, and nearly the whole sum has been subscribed.

One of the principal railway schemes promised to be brought forward next session will now lie in abeyance, the Wirral Railway Company having failed to deposit plans in time, in connection with their notice of application for Parliamentary powers to extend their system to Rhyl. It was proposed to throw a cantilever bridge over the Dee estuary from Hoylake to Point of Ayr, a distance of three miles and a half, and thus open up the Dee estates (Mr. Hooley's recent purchase) and a considerable extent of virgin country, the journey from Rhyl to Liverpool being reduced from 50 to 24 miles.

The insurance companies affected by the recent fire, who are associated in the loss on the bulk of the buildings destroyed, have intrusted the adjustment of the claims against them to Mr. Robert Willey, F.R.I.B.A., surveyor to the Hand-in-Hand Insurance Company, of 33, New Bridge-street, Blackfriars, and J. R. Cooper, F.S.I., the senior partner of the firm of Ventom, Bull, and Cooper, surveyors, 35, Old Jewry, E.C.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Birmingham Master Builders' Association.—The annual meeting of this association was held on Thursday, Nov. 25, at the Grand Hotel, Birmingham, Mr. B. Whitehouse (president) in the chair. Among those present were Messrs. C. H. Barnsley, John Bowen, J. Goodman, J. S. Surman, T. Hallgarth, G. Raby, Alfred S. Smith, Albert S. Smith, R. Newell, J. Archer, F. J. Whittall, G. Trentham, R. Bulley, J. B. Whitehouse, and W. S. Edwards (acting secretary). The committee, in their report for 1897, recorded the continuance of the improvement in the general state of trade of the country referred to in their last report. The building trade had to some extent participated in that improvement; but contractors had been seriously handicapped by the increased prices of all materials. In November last notices were received for alterations in the rules from the carpenters, bricklayers, masons, plumbers, plasterers, and labourers, the labourers being the only branch asking for an increase in wages. A general meeting of employers and operatives was held on January 13, to endeavour to make the notices received as to hours of work and paytime uniform. That end was practically attained, and uniformity on those two points was imperative. Notices had again been received from the carpenters, masons, plasterers, plumbers, and labourers, asking for alterations of rules and a considerable advance of wages. These notices would receive the careful consideration of the committee. The Workmen's Compensation Act would throw serious responsibilities on employers, and a circular would be issued to architects suggesting the addition to bills of quantities of a clause making provision to cover the enormous risks incurred by contractors under the Act, which will come into force next year. The balance-sheet showed total receipts for the year £130 4s. 6d., which, with the balance from last year, made a total of £270 3s. 7d.; and the various disbursements were £117 7s., leaving a sum of £152 16s. 7d. to the credit of the association. The chairman moved the adoption of the report and the balance-sheet. Mr. C. H. Barnsley seconded the motion, which was carried. On the proposition of the chairman, seconded by Mr. Albert Smith, County Alderman J. Bowen was elected president for the ensuing year. Mr. F. G. Whittall was elected vice-president, Mr. G. Twigg, treasurer, Mr. E. J. Bigwood, secretary, and Messrs. T. Johnson and J. S. Surman, auditors. The annual dinner was held in the Grosvenor Room at the Grand Hotel in the evening. Alderman John Bowen presided over a large attendance. Mr. J. C. Nicol submitted "Success to the Birmingham Builders' Association," to which the president responded. Other toasts were "The Architects and Surveyors," proposed by the president, and replied to by Mr. C. E. Bateman; "The National Association of Master Builders of Great Britain," proposed by Mr. Alfred S. Smith, and replied to by Mr. C. H. Barnsley; "The Vice-President and Officers," proposed by Mr. Albert S. Smith, and replied to by Mr. F. G. Whittall.

Leeds and Yorkshire Architectural Society.—Mr. Stephen Adam, of Glasgow, delivered a lecture before this society on Monday evening, on "Stained Glass—Mediæval and Modern: its History and Varied Processes." Mr. W. H. Beevers presided. Mr. Adams proceeded to give a short history of glass-staining from the 10th to the 19th centuries, pointing out the features of the Mediæval as compared with the modern. He strongly advocated the mosaic method of the 12th and 13th centuries, which, he said, was the only style fitted for permanent work. He went on to describe the various processes of glass-staining. In the simplicity of the material, he said, lay its durability. Thanks to science, the modern glass-stainer had material at his command which compared with, if it did not excel in beauty, that used in ancient days. It might be said with some truth that there was nothing in art or nature that was imperishable, but certain stained-glass windows of the 10th, 12th, and 13th centuries, in English and Continental cathedrals, told, in glowing mosaic colours, through which the light of centuries had streamed, that stained glass could be "a joy for ever," long after tombstone memorials had crumbled into dust.

Manchester Society of Architects.—The thirty-third annual dinner of this society was held on Thursday evening in last week at the Queen's Hotel, Manchester. The president of the society (Mr. John Ely) occupied the chair, and the company included the President of the Royal Institute of British Architects (Prof. Aitchison, A.R.A.), Mr. John Holden (ex-president of the society), Mr. Edward Salomons, Mr. W. A. Royle, the president of the Liverpool Society of Architects (Mr. Willink), Mr. R. I. Bennett (vice-president of the society), Mr. Alfred Darbyshire, Colonel Eaton, Mr. Paul Ogden, and Mr. E. Hewitt (hon. secretaries); Mr. C. Heathcote, Mr. G. H. Willoughby, Mr. F. Mee, Mr. P Barker, Mr. J. D. Glass, Mr. J. D. Mould, Mr. A. J. Murgatroyd, Mr. J. D. Harker, Mr. M. Robinson, Mr. W. R. Sharp, and Mr. A. J. Sharp. The President proposed "The Royal Institute of British Architects and its President." Professor Aitchison, in his reply, urged the importance of architecture as a factor in a nation's progress, and pointed out how difficult it was for architecture to advance unless the public took an interest in it. There were special difficulties in the way of the architect, for whereas the products of genius in music and in painting could be exhibited all over the world, the works of the architect could not be so treated. Unless there was some strong love for a thing, or some considerable appreciation of it, he did not see how it was possible to expect persons to devote their whole lives to it, and more especially those who had a natural genius for it. Mr. A. Darbyshire proposed "Our legal friends." His Honour Judge Parry responded in a humorous speech. The remaining toasts were:—"The allied societies," proposed by Mr. Holden, and responded to by Mr. Willink; "The President," proposed by Mr. W. Goldthorpe, and acknowledged by Mr. Ely; and "The honorary secretaries," proposed by Mr. Bennett, and replied to by Mr. Hewitt.

CHIPS.

The Glasgow and South-Western Railway Company intend to enlarge the best of the Glasgow stations. The St. Enoch station has six platforms now, but they are to be increased to twelve. Two streets are to be taken in, and courts and lanes included, whilst tunnels are to be enlarged and bridges widened.

The work of conservation and restoration of the old stained glass in St. Deny's Church, York, has been brought to completion by the reinsertion of the third window of the north aisle, which is of similar style to the other two windows in the aisle. The artist is Mr. J. W. Knowles, of Stonegate, York.

An application will be made to Parliament next session by the Honourable Society of the Inner Temple for an Act to modify and amend section 28 of the Thames Embankment Act, 1862, and to authorise the society to erect and maintain buildings upon so much of the reclaimed land belonging to them as lies between the southern extremity of the buildings proposed to be erected in extension of King's Bench-walk and the northern side of the tunnel of the Metropolitan District Railway.

At a meeting of the directors of the Edinburgh Building Trades' Exchange, held on Friday, the following motion was agreed to:—"It being currently reported in building circles that the estimates for work at the infirmary have not been settled in a satisfactory manner, the directors of the Exchange take up the matter, and instruct their secretary to communicate with the secretary of the infirmary, and ask him, for the satisfaction of the building trades, to forthwith publish a list of the estimates received."

Holy Trinity Church, North-front, Kingsland, Southampton, was reopened last week after undergoing alterations and restoration. A porch has been added near the north-west angle, the font has been removed and placed in a baptistery, while the front of the choir stalls consists of new carved work, the whole of this having been carried out by Mr. J. Potts, of Bargate, Southampton. A new window has been cut in the north side of the baptistery, the stonework having been executed by Messrs. Garrett and Haysom, being a copy of one in Romsey Abbey. It will be filled in with stained glass. Stained glass has been substituted for plain glass in the windows in the chapel, this work having been carried out by Messrs. F. and J. Young, of St. Mary's-road, Southampton. The cost has been £400.

Among the commissions which Messrs. Hems and Sons, of Exeter, are executing for across the seas is a memorial to the Venerable Archdeacon Lough, which is to be erected at Hamilton, on the Island of Bermuda. The monument is of Celtic character, fashioned in grey Dartmoor granite. It is a replica of the one placed over the late Lord Frederick C. Cavendish, at Bolton Abbey, Yorks.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the Building News, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Front-page Advertisements 2s. per line, and Paragraph Advertisements 1s. per line. No Front-page or Paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

Situations.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is One Shilling for Twenty-four Words, and Sixpence for every eight words after. *All Situation Advertisements must be prepaid.*

NOTICE.

Bound copies of Vol. LXXII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

M. S. A. (The competition certainly does not seem a very inviting one.)

Received.—A. F. R.—G. T. B.—B. J. and Co.—G. T. S.—P. O. B.—A. T. R.—W. A. W. R.

Correspondence.

SURBITON MUNICIPAL OFFICES COMPETITION.

To the Editor of the Building News.

Sir,—We have read your review of the designs submitted in this competition in your last issue. We shall be much obliged if you will kindly make the following correction in your next number. Our design No. 25 was cubed at 9½d., and No. 11 at 7d. Your report stated the reverse of this.—We are, &c.,

Forsyth and Maule.

16, Great Marlborough-street, W.

WALTHAMSTOW BATHS COMPETITION.

Sir,—Half a story is very misleading, and had you known the whole we scarcely think you would have made the remarks you did in your recent issue.

In December, 1895, the council's surveyor sent us a plan of the site, and we then prepared a plan of the proposed baths, and laid it before the council, when we were requested to attend a subcommittee to settle the details of the scheme.

We therefore considered we were appointed architects to the baths; but ultimately Mr. Dunford, a local architect, was brought on the scene. Under the circumstances we do not think any competition should have taken place. However, we took part in the competition, and we have since been informed that when Mr. Rowland Plumbe's report was received, the council determined to place the work in our hands; but owing to a change made in the *personnel* of the council,

the new board, which contained a majority of Mr. Dunford's supporters, determined to have his plans adopted, with what result you know. We have not seen Mr. Plumbe's report; but we were told that he considered our design the best.

However, when we heard that Mr. Dunford was to be intrusted with the work, we did not move in the matter, either directly or indirectly, and we were much surprised to receive an invitation from the council in June last to meet the works committee to discuss the details of our design. Trusting you will insert this letter,—We are, &c., Spalding and Cross.

"FIREPROOF" BUILDINGS.

Sir,—Having been an eye-witness of the late disastrous fire, I should like to draw attention to the absolute unreliability of the so-called fireproof buildings. From my observation, I noticed that in nearly every case the fire commenced at the roof and spread downwards, excepting those buildings which were immediately opposite a burning structure, in which cases the premises caught fire through the window-frames getting alight and shivering the glass.

In the preparation of plans for a small warehouse, I am adopting the following precautions, which I hope will tend to make the building really fireproof:—

1. All stanchions are detached from outer and party-walls, and entirely surrounded by fireproof composition.

2. Where it is impossible to carry the girders on piers of sufficient width, the girders will rest on stanchions, the ends being bedded in the piers, with space for expansion; all girders cased with fireproof plaster.

3. The cement plastering will be on metal lathing kept 2in. away from all outer and party-walls, this space being left from top to bottom of building, a perforated water-sprinkler will be fixed at level of ceiling of top floor, so as to allow of a constant current of water being turned on to outer walls in case of fire.

4. The roof, instead of being constructed of wood, felt, and deal laths, will be formed of light iron framing covered with plaster, in which tiles will be bedded. No dormer windows will be fixed, but where top light is required, metal skylights will be placed, having iron outside shutters. The roof will have a very flat pitch, so as to allow firemen to get all round the building without difficulty or danger.

5. All window openings have double oak sashes, glazed with plate-glass, the outer built in 9in. reveal, the lintel over perforated to allow of water-sprinkler acting on the glass.

6. The concrete stairs incased in brick walls givess access to the various floors, with iron doors on each landing.

7. The floors will be constructed of rolled steel joists, 2ft. apart, with Picking's blocks and coke-breeze, covered with solid wood-block flooring.

As the drawings will not be completed until the middle of December, I should be very glad to receive any suggestions which may occur to your readers.—I am, &c.,

J. Hatchard Smith, F.R.I.B.A.

41, Moorgate Station Buildings, E.C.

Nov. 25.

SHODDY v. FIREPROOF CONSTRUCTION OF BUILDINGS.

Sir,—Since the recent great fire in Cripplegate, the papers have been replete with sensational descriptions and censorious correspondence condemning the said inefficiency of our fire-brigades and their alleged obsolete extinguishing appliances, also the erection of high buildings in narrow streets, &c., whilst the unnecessary employment of combustible materials for their interior construction appears to have been ignored. As the wisdom of the adage "Prevention is better than cure" is generally admitted, this oversight seems ramarkable. It is an undisputed fact that a vast quantity of inflammable materials is still unnecessarily used in the construction of most (even modern) buildings. Indeed, many seem veritably designed to catch fire and get burned out.

Everywhere around us we see evidence of this deplorably cheap and conservative practice in the dangerous forms of wooden roofing, flooring boards and joists, staircases and landings, stud and lath partitions, matchboard ceilings and linings and divisional compartments, &c. (lead gas-pipes, &c.), when an additional outlay on the structure of not more than 10 per cent. could insure the employment of fire-resisting materials throughout, which would render the building practically fireproof.

With our present system of "jerry" building it is wonderful that greater loss of valuable lives and properties does not occur than is the case. As there are numerous approved and tested fire-resisting constructions and fittings in the market, it seems high time that legislation should be brought to bear to prohibit the use of unnecessary inflammable materials in buildings.

At length a "Fire-Prevention Committee" has just been inaugurated in our metropolis, with the view, among other laudable aims, of pressing for some such reforms with reference to building construction. Of late the authorities have awakened to the fact that priceless treasures are still stored in some of our museums of the combustible nature at issue, and a select committee has recently reported to Parliament on the subject; but as yet, I believe, no decision as to the amelioration of this risky state of affairs has been arrived at. The dearth of papers which have been read before our learned and technical societies and institutions on the matter is rather remarkable. I understand, however, that one is shortly to be read before the Society of Arts on this subject.

From 1853 until 1891 I am informed not a single paper on the subject in point was presented or read before the Inst. of C.E., and I know of no other since that date. In this respect we seem to be behind many other nations, as also with regard to fireproofing tests and experiments.—I am, &c.,

London, Dec. 1. J. B. Smith.

CHIPS.

The extension to the Toxteth Union Infirmary, Liverpool, is being warmed and ventilated by means of Shorland's patent double-fronted Manchester stoves with descending smoke-flues, those previously supplied having given every satisfaction.

At the Birmingham Police-court on Friday an application was made on behalf of the town clerk for a certificate for the new meat-market in Bradford-street. Mr. J. C. Nicol (Messrs. Essex, Nicol, and Goodman, architects) gave details of the buildings and the area covered by them. Including the site, the cost of the new meat-market would be £110,839. The market was ready for use, and would be opened at the end of next week. The Bench, after visiting the buildings, have signed the certificate.

At the Chester Consistory Court on Friday, Lord Tollemache, lay rector and owner of the chancel of the parish church of Acton, was granted a faculty for erecting a new roof over the chancel, a chancel screen, and for effecting other internal sfructural alterations, the cost of which (£1,200) would be borne by the applicant. A further faculty in respect of the same church was granted to the vicar and the churchwardens to construct a vestry at the west end of the nave, to build an organ in the new organ-chamber, and to carry out other alterati ons.

The General Purposes Committee of the Huddersfield Corporation elected on Friday a borough surveyor to succeed Mr. R. S. Dugdale, who retires at the end of the year. Seven candidates had been selected from the numerous applicants. The first round of voting was 44 for Mr. Kenneth Campbell, borough surveyor, Stockton-on-Tees; 24 for Mr. M. H. Sykes, borough surveyor, Morley; 19 for Mr. E. Paley Stephenson, surveyor to the Llandudno District Council; 15 for Mr. E. Nicholls, city surveyor's office, Leeds; and 12 for Mr. W. Howard Smith, recently city surveyor, Carlisle. Mr. Campbell was eventually elected. The salary attached to the office is £500 per year.

The Suffragan Bishop of Southampton consecrated on Friday a new cemetery at Bournemouth. The cemetery, which is situated at the eastern side of the borough, occupies between 30 and 40 acres, and including £14,000 for the purchase of the land, has cost over £20,000. Some 25,000 grave spaces are provided.

Some time ago, when the Crown authorities announced their intention of inclosing a further portion of Dean Forest, some opposition was raised because the old Roman-road ran through it. The Crown officials have just informed the East Dean Parish Council that it would be impossible to go to the large expense of fencing both sides of the Roman-road from Soudley to Howbeach—some three miles. The Crown authorities are prepared to do all they can to preserve this fine old road to the public, and will have gates put at each end, and will not allow any of their timber to be hauled along the road. If the public prefer, they will not plant any timber between the banks, and will clear the road, so that it may induce people from a distance to view it.

Intercommunication.

QUESTIONS.

[11850.]—**Raising Water.**—It is required to raise water from a well 100ft. distant by means of a pump fixed in the house The ground-level at well is 3ft. higher than at house. Level of water is 12ft. below top of well. Will there be any difficulty if pipe is connected direct from well to pump? Can the pipe follow the slope of the ground, or should it be laid with a fall to well?—Student.

[11851.]—**Cesspools.**—Can any of your readers tell me of a reliable work on isolated drainage for small country houses, giving more particularly the best methods for constructing cesspools and disposal of the contents? All articles, books, &c., which I have read condemn cesspools altogether, without giving any alternative except costly systems which are out of the question for small houses.—Limited.

[11852.]—**Slate Roofs.**—Will any practical correspondent of the Building News (and I know there are many) give me any information about the mode of laying slates, where the nail-holes should be made, what gauge is necessary in roofs of square pitch, whether battens or boarding is preferable?—also the number of Countess slates required per square of roofing, how the hips and valleys ought to be covered? Textbooks give very little advice in these details, and treat them as if they were beneath notice.—A Novice.

[11853.]—**Fireproofing Iron Columns.**—I should be glad to know if any kind of vitrified ware is made for incasing iron columns, and whether there is any particular kind of clay suitable? Is cement plastering any good as a protection, and how should it be applied?—A. S. T.

[11854.]—**Zinc Roofing.**—Is it true that zinc does not deteriorate quickly — that its oxidation is not so destructive as that of iron?—L.

[11855.]—**The City Fire.**—Being interested in fireproof structure, I should like to know what (if any) protection was used in any of the iron structures which have been destroyed or wrecked; also, whether steel or ordinary iron beams have suffered the most? It is difficult to obtain information; but some of the readers of the "B.N." may be able to give some reliable information on the action of the fire on any of the ironwork. A great many walls, front and back as well as party walls, appear to have fallen, or been since demolished. Probably the iron girders and beams had something to do with this.—Waiting.

[11856.]—**Treads for Stairs.**—The experience of any reader as to the wear of any kind of treads and their relative durability will be received with thanks by—G. G.

[11857.]—**Concrete Flooring.**—The opinion of practical architects (not patentees) having had experience in the construction of concrete warehouse floors is invited, and will be esteemed, as to following points:—Assuming the main beams to have 20ft. span, and placed 16ft. from centre to centre; dead load, 3cwt. per square foot. 1. At what distance apart should the transverse R.S. joists be placed? 2. Should the concrete be cambered or flat on the underside? 3. What are the relative merits or demerits of concrete flooring in compression and in tension? 4. Should the steel-work be wholly encased in concrete or partly in concrete and terracotta or fireclay? 5. Is it best to make the concrete of Portland cement and stone, or is it preferable to substitute coke-breeze or clinkers for stone where strong substantial work is required? 6. What are the practical advantages of the various paraphernalia now upon the market in the form of differently-shaped cylindrical fireclay and stoneware centring blocks, which seem, owing to the nature of the material, practically to fix the distance apart of the transverse R.S. joists at 2ft.? Is it only in buildings likely to get on fire that they are useful? In mill work flat concrete flooring with light transverse metallic joists 2ft. to 3ft. apart seem to be largely in vogue, and in other cases the joists are placed at 3ft. centres, with the concrete cambered on the under side. 7. What would be a proper thickness of concrete to adopt for P.C. and stone, and P.C. and coke-breeze, concrete respectively, with loads of 2, 3, or 4cwt. per square foot of dead load? The above are questions of great interest to the profession; but, to be of any real value, it is of the utmost moment that the replies must be from practical persons with—No Axes to Grind.

[11858.]—**Rough-Cast.**—Will someone give specification of cement rough-casting, which will finish either white or a very light colour? Also for the same, pebble-dashed?—W. W.

REPLIES.

[11833.]—**Painting of Galvanised Iron.**—I have read "H. C. S.'s" reply to mine, which appeared in your issue of the 19th November, and note the description he gives of the action of the chemicals when applied to the galvanised iron; but, not being a chemist, I am unable to fully appreciate all he states. I notice, however, he admits that there is a destructive action set up when the chemicals come into contact with the zinc. This I have found to be so from practical experience, and as there is but a very thin fim of zinc on the iron, I have found that this film becomes completely destroyed.—C. T.

[11846.]—**Blisters.**—As the door has been repeatedly painted, I would suggest that the paint be all burned off or scraped off, and then a coat of good, quick-drying hard copal varnish laid over the knots, and where the blisters have shown themselves in the paint. When this varnish is dry to the touch, proceed to paint the door in the usual way.—H. C. S.

[11847.]—**Lap to Tile Roofs.**—A reference to any good textbook would show that the "lap" is always measured from the top or head of the tile. During a long experience I have never heard of measuring the "lap" from the nail-holes, nor have I known leakage to proceed from rain finding its way through the nail-holes, these always being covered by a double lap of the tiles.—Building Surveyor.

[11847.]—**Lap to Tile Roof.**—There is some misunderstanding about this question. The lap of a tile,

like that of a slate, is generally taken to be the distance measured from the head of tile which is nailed to the batten, to the tail of the second one above it—generally 2½in. to 3in.; but slaters deduct the part of slate above the nail-holes when they are nailed near the head, about 1in. According to this rule, the 1in. is deducted from the length of slate, and is not included in the lap. The method adopted by the slater in finding the position of nail-hole is: gauge + lap + ½in. = distance of nail-hole from tail; or the lap is added to gauge, which is the distance between nails or battens, allowing ½in. for clearance. But for middle nailing the nail-hole is disregarded. For effective lap, it should be taken from nail-hole, and this rule applies to tiles for the same reason.—G. H. G.

[11847.]—**Lap to Tile Roof.**—In slating, the "lap" is the distance between the nail of the under slate and the lower end of the upper one which overlaps. The same rule applies to tiles, except when the peg-holes are replaced by studs cast with the tile. The object of a lap is to make a waterproof roof, and this can only be effectually done by covering the nail-hole or peg. Of course, this method of measuring from nail-hole is more expensive, as more tiles are required.—Gamma.

[11848.]—**Temporary Structures.**—I am not aware of any textbook treating of this particular kind of structure, except some modern books on carpentry. Nowell's "Carpentry and Joinery," I believe, gives a few examples of wooden buildings. "Surrey" will not find much difficulty in the matter. If he wishes to erect a temporary wooden building, he has only to build the necessary sleeper walls and erect the timber studs and braces with the usual filling-in, lap or clasp-board the outside, and match-board the inside; the roof may be of iron of the ordinary type, king or queen post. The uprights are framed into a sill piece, which rests on the sleeper wall—say, 9 by 9; also into a head-piece of the same scantling, upon which the principals of roof rest. Examine a few wooden or corrugated iron structures.—A. L.

CHIPS.

Mr. Walter Morrison, M.P., will introduce a Bill in next session of Parliament to amend the law relating to boundary fences.

The extensive sawmills at Old Ford-road of Messrs. Esdaile and Company (Limited) were partially destroyed by fire on Friday. From some undiscovered cause a building 120ft. long by 50ft. wide caught fire, and the flames spread very rapidly.

At Wolverhampton, on Friday, William Ebdon, described as a speculative builder, was ordered to pay in fines and costs £18 4s. for contravening the bylaws by not properly erecting a dwelling-house. The case was proved by Mr. Bradley, the borough surveyor, and supported by Mr. H. Willcock, builder, of that town. It was stated by the town clerk that the defendant had erected a number of buildings in the borough; but in the cases in question the walls were not properly bonded together, and in one instance a new building had become cracked.

An endeavour will shortly be made to raise funds for the enlargement of the Church House, Westminster, by the erection of a west-front block from plans by Sir Arthur W. Blomfield, A.R.A., at a cost of something like £18,000, of which over £5,000 has already been subscribed without any public appeal. The section will commemorate the late Mr. Henry Hoare, who was a prominent figure in the revival of Convocation, and will contain the hall for the use of the House of Laymen, and 19 other rooms available as offices for various societies and agencies connected with the Established Church. In the great hall an organ is being built by Messrs. Lewis and Co., of Brixton.

Experimental filtering operations are being carried on at the Knostrop sewerage works of the Leeds Corporation under the supervision of Mr. W. J. Dibdin. Mr. Dibdin has prepared a report to the effect that the effluent obtained is practically clear of suspended matter. The experiment which is being tried at Knostrop is similar to one which Mr. Dibdin has for some time past been engaged in carrying out at the Northern outfall precipitation works, under the direction of the Main Drainage Committee of the London County Council. A one-acre coke-breeze filter is used.

In order to render wood waterproof and fireproof, the following "silicification" process is made use of, according to the *Gewerbe*. The small boards are first laid in a waterglass solution of 5° to 10° Bé., where they are left ten to twelve hours, when they are taken out and allowed to drip off. After drying, they are placed in a solution (gravity 2° to 3° Bé.) of calcium chloride, magnesium chloride, and ammonium chloride. In this they are left four to six hours, and after dripping off and drying again, they are ready for use.

On behalf of the Manchester Corporation an application was made on Friday to the stipendiary magistrate at the county police-court in that city, for a six months' extension of the order calling upon the corporation to carry out further works for the purification of the sewage of the city. The Mersey and Irwell Joint Committee agreed to an extension. The magistrate expressed the hope that the new Rivers Committee would get seriously to work, and produce a scheme before the 25th March next, to which day he adjourned the matter.

LEGAL INTELLIGENCE.

Sewer or Drain.—Vestry of St. Matthew's, Bethnal Green v. School Board for London.—This appeal, from a judgment of the Court of Appeal affirming a decision of the Queen's Bench Division, was heard by the House of Lords (the Lord Chancellor and Lords Herschell, Davey, Morris, and Shand sitting) on Friday. The London School Board originally applied for a mandamus against the Vestry of St. Matthew's to compel them to repair a certain pipe, which was constructed in 1866 and received the drainage of several houses. It did not appear that the previous approval of the Metropolitan Board of Works, or that any order of the vestry had been obtained for its construction. The question was whether the pipe was a "drain" or a "sewer" within the definition of those words in section 250 of the Metropolis Management Act, 1855. In the event of it being a sewer it would be repaired by the vestry, but if it was found to be a drain the repair devolved upon the School Board, as the owners of premises. The Court of Appeal affirming the decision of the Divisional Court, held that the pipe was a sewer, and the fact of the requisite consent not having been obtained for its construction did not make it less a sewer, and the vestry were, therefore, bound to repair it. From that judgment the vestry now appealed. The Lord Chancellor, in delivering judgment, said the parties did not seem to have recognised the importance of bringing the whole system of drainage before the House, and of at least submitting a plan of the immediate neighbourhood. It was clear, apart from statutory definitions, that this was what everybody would understand to be a sewer. He had not the smallest doubt that the officers of the vestry perfectly well knew what was being done. It was not a small operation; the highway must have been taken up, and the local authorities must have been fully aware of the purpose and effect of the work. If, then, this was a sewer, it was impossible to avoid the application of the language of the Act of Parliament, or the conclusion that the sewer was vested in the vestry, and must be repaired by them. A combined system of drains might be constructed under an order of the vestry by a private person. In such a case, the combination would still be a drain and not a sewer; but there was no evidence of such a state of things. It was clear that those who alleged that this was a drain and not a sewer must prove that such an order of the vestry was made; but no such order was produced, and he did not believe that any order of the kind was made. He came to the conclusion that the judgment of the Court of Appeal was right and must be affirmed. The other Lords concurred, and the appeal was dismissed with costs.

Claim Against the London School Board.—Mr. Undersheriff Burchell and a special jury, at Red Lion Square, Holborn, on Wednesday heard the case of Hurle v. the School Board for London—a claim for £1,750 for freehold houses and land at Homerton, taken under a notice to treat, served as long ago as 1895. Mr. F. Meakin, Mr. A. R. Stenning, and Mr. E. F. B. Fuller were the valuers for the claimant; Mr. Samuel Walker and Mr. G. A. Wilkinson were the experts for the Board, on behalf of which evidence was tendered that the property was worth about £1,100. The sealed offer of the Board was £1,200. The jury awarded £1,280.

Repairs to Cottage.—Osborne v. Peck.—The plaintiff in this case, heard by Mr. Justice Ridley, on Friday, was a builder, and the defendant a well-known trainer of racehorses, who rented for training purposes a large part of the Howbury Hall Estate, at Renhold, in Bedfordshire. It was said in the course of the case that the defendant paid about £800 a year for rent, and that he had spent £7,000 or £8,000 upon the property. The plaintiff sued to recover £96 6s. 2d. for repairs done to a cottage on the estate called Ladyfield, and in which a Mr. Wright, who was then secretary and farm bailiff to the defendant, lived. It appeared that Mr. Wright gave orders for the repairs to be done; and one question raised was, whether he had any authority to give orders for the repairs so as to bind the defendant to pay for them. Another point in dispute was whether the repairs were to be done at the expense of the defendant or at the expense of the mortgagees of the estate. Mr. Justice Ridley said that the dispute had arisen in consequence of the parties having misunderstood each other. He had come to the conclusion that the defendant must pay for the repairs which had been done. Judgment for the plaintiff for the amount claimed.

Personal Inspection Required of District Surveyors.—Messrs. Patrick and Son, builders, of Westminster Bridge-road, were again summoned, on Tuesday, at Southwark Police-court, by Mr. Bernard Dicksee, district surveyor, for the non-payment of £23 12s. 6d., his fees for inspecting a number of stands erected by the defendants within the premises of Messrs. Day and Martin, Ltd., Borough-road. At previous hearings evidence was given that the stands were inspected on the complainant's behalf by a young man named Brown, who was not a qualified surveyor, and it was contended that Mr. Dicksee ought to have personally inspected them. The magistrate, in giving judgment, said the work of surveying and inspecting was obviously work of a personal character, involving the exercise of professional skill, judgment, and experience; and in his opinion such work could only be performed by the district surveyor himself, an assistant surveyor, or by his deputy duly appointed under section 142. Therefore he non-suited the complainant, but would grant a case, if desired.

London Building Act Case.—London County Council v. Foulkes.—At North London Police Court, on Friday, Mr. D'Eyncourt had before him this case, which related to proceedings under the London Building Act of 1894. The defendant, Mr. C. H. Foulkes, builder, of Clevedon-road, Hornsey, has been engaged since 1893 in developing an estate of eight acres known as The Willows, Clissold Park, Stoke Newington. The estate has a crescent-shaped frontage to Park-lane, a quarter of a mile long, and has been built over with a serpentine road, the ends of which are at the western and eastern ends of the crescent. Three closely-packed lines of houses had been placed on the property, and in the serpentine thoroughfare—Carysfort-road—spaces had been left for the formation of a small inner crescent. All this was done before the Act of 1894 came into operation. In November, 1895, the defendant began to build on the smaller crescent, but the County Council refused to give its assent. The case ultimately came before this Court, when the defendant contended that, as he had commenced to lay out the land before the passing of the Act, he did not need the consent of the council to proceed with the work, as required by the Act of 1894. Mr. D'Eyncourt found in favour of the defendant; but the County Council took the case to the High Court, and the judges (Mr. Justice Wright and Mr. Justice Kennedy) there reversed the decision. The matter now came up for Mr. D'Eyncourt to impose penalties; but Mr. Salter, who appeared for defendant, wished to reopen the case on the ground that the judges had only decided one of the three points which the magistrate submitted for their decision. Mr. T. A. D. Chilvers, for the London County Council, said that the whole matter was argued in the High Court, and the judges dealt with all the points in their judgment, although in their order it was only mentioned that they found that the work was wrongfully commenced or recommended after the Act of 1894 came into operation. Mr. D'Eyncourt said his view of the order of the High Court was that it declared him to be wrong, and directed him to reverse his decision altogether. He should, therefore, impose a penalty of £3, with £2 2s. costs.

The Rhymney Railway Company, having purchased 17 acres of land at Wenddu (between Caerphilly and the tunnel on the southern side of the town) for the purpose of erecting engineering and running sheds, has commenced levelling the ground and erecting boundary-walls. The Rhymney Company intends to leave the erection of houses to private enterprise.

A Metropolitan deep-tunnel scheme to be brought forward next session as a branch of the City and South London Railway, starting from High-street, Borough, near the London and County Bank, and terminating in Brixton Hill, 88 yards from the milestone denoting four miles to the Royal Exchange. At the same time the approach to the King William-street Station is to be widened from the spot where the South-Eastern Railway Company's bridge crosses High-street, Borough.

Mr. Herbert H. Law, one of the Local Government Board inspectors, held an inquiry at the Audit House, Southampton, on Wednesday in last week, with reference to the proposal of the Southampton County Council to borrow the sum of £14,500 for the erection of a municipal lodging-house. The borough engineer, Mr. W. B. G. Bennett, explained the plans in detail. The lodging-house will accommodate 225 men, and will be heated by hot water, and lit by electricity. The house will be practically fireproof. Under the Provisional Order the corporation are bound to clear the site, and erect upon it dwellings for the accommodation of not less than 250, before they are allowed to demolish the other dwellings in the condemned area.

A stone reredos has just been erected in St. Asaph's Church, Birmingham. It is designed in the Decorated style, and consists of a large centre panel over the altar table, filled by a representation of the "Last Supper." Above this is a recessed canopy, supported by green marble columns at either end, the face of which is divided by buttresses into seven panels of pierced tracery work with carved spandrels. The centre of the canopy rises into a crocketed gable, flanked by pinnacles. At the sides of the reredos are panels of the vine and wheat. The side panels are carried above the centre portion, and terminate in light open spirelets. A carved cresting runs along the top of the canopy. The work has been executed by Messrs. Jones and Willis, of Birmingham and London.

Our Office Table.

The London Technical Education Board, in their report published this week, remark that the most significant fact in connection with the nine polytechnics which fall under the Board's sphere of operations is that, notwithstanding the opening of four new large polytechnics during the four years that the Board has been at work, no diminution has been caused in the number of students attending the older institutions; but, on the contrary, every one of the nine institutions shows an increase in the number of class entries for the present session. Thus the remarkable result has been brought about that, although these four new institutions show this session a total of over 8,000 class entries, representing a total number of nearly 5,000 individual students, yet the enrolment of these new students has not only not decreased the membership of the other older institutions, but has actually stimulated their growth. There are now in attendance at the evening classes of the nine polytechnics about 18,000 individual students, the great majority of whom are engaged in systematic courses of evening instruction under the direction of the principal of the institution where they are studying. The classes in the building trades show in almost every case an increase in the number of students. The classes in these subjects at the Borough Polytechnic have made a particularly marked advance, the number of entries in the carpentry and joinery classes being 102 as compared with 54 at the commencement of last session, while the classes in technical drawing and workshop drawing have increased by over 50 per cent. In the engineering trades there is likewise a very general increase in the attendance at the classes.

The exhibition of French art at the Guildhall Art Gallery in the coming year promises to be an unusually attractive one. It will differ materially from the loan exhibitions which have been held at the Guildhall in the past. The last exhibition was attended by 248,093 persons, the attendances on weekdays numbering 231,705, or a daily average of 2,385; while the Sunday attendance was 16,388, or an average of 1,170 each Sunday. There were sold 30,011 copies of the descriptive catalogue, which was prepared by Mr. A. G. Temple, F.S.A., the director of the Guildhall Gallery, the profit from the sale of these catalogues enabling the Library Committee to draw upon only £287 17s. 4d. of the £450 which the Court of Common Council granted for the purposes of the exhibition.

The Spring Exhibition, which is to be revived in Liverpool next year, will, in addition to many other exhibits, include a section devoted to objects illustrating the work of the various technical schools. The classes which are likely to be represented are the house-painters and decorators, bookbinders, plumbers, designs by the School of Art, and woodcarving and wrought ironwork by the architectural and applied art students. The exhibits, which should form an interesting collection, will probably occupy a special department. The exhibition promises to be an attractive and successful one.

In the Corporation Galleries, Glasgow, on Tuesday night, Mr. Paton delivered the fifth of his addresses on Italian art, his subject being "Michael Angelo." He referred to the characteristics which distinguished the truly great artist, the true test of whom was that his works deal not with things fleeting, ephemeral, local, trivial; but with what affects men in all climes, in all times, and under all conditions. Frith's crinolined woman was like a fashion plate of 1870; Raphael's "Madonna" was the eternal feminine. The two great sculptors of the world were Phidias the Pagan and Michael Angelo the Christian. The works of Phidias were serenely beautiful, bright, passionless, calm, fit types of the gods of a people where deity and humanity touched each other at so many points. The gods of the Greeks were the incarnations of specific powers, virtues, and attributes, and could be fittingly treated in the calm, dignified, and passionless fashion which belongs to sculpture. Michael Angelo had another task as the typical Christian sculptor. He had to express through his obdurate material, and with the limitations of sculpture, something of the spirit of modern man, to deal with things pertaining to the unseen and the eternal. Hence his figures are full of action, emotion, of the suppressed excitement and volcanic thoughts which possessed the man. Michael Angelo was a great solitary Titanic soul full of concentrated thought and impassioned imagination, pure in life, steadfast in faith, loathing and lamenting the conditions of life and society around him—the prophet or seer of the Renaissance.

The ninth annual Congress of Archæological Societies in union with the Society of Antiquaries was held at Burlington House on Wednesday. Viscount Dillon presided, and many delegates of societies attended. Resolutions were adopted for forming a catalogue of effigies of all dates in parish churches, and for compiling models for catalogues for museums and for indices of transactions of societies. It was announced that preparations were now made for obtaining, through the various societies, catalogues of family and historical portraits on the forms devised at the request of the congress by Mr. Lionel Cust, the director of the National Portrait Gallery. The formation of a National Photographic Association was also announced; this will, it is hoped, assist the work inaugurated by the congress some years back.

Mr. Trevail, F.R.I.B.A., of Truro, chairman of the Headland Hotel Company, met at Cardiff, on Tuesday, several shareholders who, in consequence of the disturbances at Newquay, and representations that had reached them from an interested source, had requisitioned for a general meeting. Mr. Trevail laid the whole subject before them in the most candid manner, together with plans, documents, and leases bearing upon the issue, and described what the mob did, the amount of damage done to the company's property, the prosecutions ordered by the hotel directors, and the 21 convictions which followed. Mr. Trevail also explained Mr. Treffry's position in respect to the question of his title to the land leased to the hotel company and his determination to uphold it, with the result that the shareholders present considered Mr. Trevail's statement most satisfactory, approved of the steps taken by the directors, and agreed to cancel their request for a general meeting, which, in view of the present position of the question, they quite saw would be undesirable.

In connection with its exhibition in 1898 the American National Sculpture Society proposes to form and display a comprehensive collection of photographs and other illustrations of sculpture and sculptured monuments in America. The scope of this collection will include commemorative monuments, memorials, statues, groups, reliefs, busts, original work in museums, and architectural monuments adorned with sculpture. The society earnestly solicits the active co-operation of individuals and organisations in making this collection, the first of its kind to be proposed in America, as complete and as interesting as possible. It is requested that communications be addressed to the secretary of the National Sculpture Society, Mr. Barr Ferree, 112, Wall-street, New York.

The New York Rapid Transit Commission has definitely decided in favour of underground railways for transporting passengers through the crowded parts of that city, and it is probable that work upon such roads will be begun within a few weeks. A plan has been drawn up by the commission, which must first be submitted to the Courts, and if approved by them, will be offered for public competition. A company has been formed, which will tender for the work, and, if its bid is accepted, will proceed at once to build the road, operating in several places at once, so that the different sections may be united, and the line put in use as soon as possible. The successful completion and operation of a large part of the underground railway at Boston, Mass., shows how freely subterraneous tracks can be utilised by electrical traction, and the position in New York is much simpler than it was in Boston.

A new organ, built by Messrs. Hele and Co., of Plymouth, has been placed in St. John's Church, Walworth.

At a meeting, on Friday, of the committee of the Manchester City Art Gallery, Col. Bridgford, C.B., formally presented to the city, on behalf of Mr. Gibbon Bayley Worthington, of Ossington, Newark, the fine landscape "Winter Fuel" by the late Sir J. E. Millais. Sir John E. Millais hitherto has been represented in the gallery by "Autumn Leaves," a portrait of the late Bishop of Manchester, "Victory, O Lord," and "A Flood."

MEETINGS FOR THE ENSUING WEEK.

Saturday (To-morrow).—Examination in Sanitary Building and Construction. Carpenters' Hall, London Wall, E.C. 12 noon.

Monday.—Society of Engineers. "Water Pollution and Its Correction," by Reginald E. Middleton, M.Inst.C.E. 7.30 p.m.
Surveyors' Institution. "Royal Commissioners' Suggested Amendments to the Agricultural Holdings Act, 1893," by F. Punchard, F.S.I. 8 p.m.
Society of Arts. "Guttapercha." Cantor Lecture No. 2, by Dr. Eugene F. A. Obach. 8 p.m.
Liverpool Architectural Society. "Domestic Architecture of the Early Renaissance," by J. A. Gotch, F.S.A.

Tuesday.—Institution of Civil Engineers. Discussion on "The Law of Condensation of Steam." 8 p.m.

Wednesday.—Society of Arts. "The Stockholm Exhibition of 1897," by Bennett H. Brough. 8 p.m.

Friday.—Architectural Association Lyric Club Concert at the Swallow-street Club, Piccadilly.

CHIPS.

A new organ built by Messrs. Norman and Beard, of Norwich, was dedicated in the parish church of Ufford, near Woodbridge, last week.

Under the auspices of the Sheffield Society of Architects and Surveyors, a course of ten lectures on "Some of the Classic Elements of Architecture" is being given by Mr. Hugh Stannus, F.R.I B.A., in the library of the Montgomery Hall, Surrey-street, Sheffield, on Wednesday evenings. The course began on Nov. 24, and will deal with Mouldings, the Wall, and the Order. The attendances at the first two lectures has been very good.

The London County Council, at their meeting on Tuesday, agreed, after discussion, to expend £60,000 on the construction of a new pumping station at Lot's-road, Chelsea, for dealing with the flow of the low-level and Counter's Creek sewers and relieving them in times of heavy rains. A report from the Parks Committee, recommending that no alteration be made in the present mode of dealing with small open spaces in London, was rejected in favour of an amendment instructing the committee to prepare a scheme whereby all the open spaces now maintained at the expense of the local authorities should in future be maintained by the Council.

Between thirty and forty Romano-British pewter vessels have been found at Appleshaw, near Andover, by the vicar while digging a trial trench on the supposed site of a Roman villa. The deposit consists of large circular dishes, bowls of various forms and sizes, cups, jugs, and platters.

The Light Railway Commissioners have submitted to the Board of Trade an order authorising the construction of a line from the Pewsey Station of the Great Western Railway to Salisbury, over the famous plain, and through the military camp which the War Office authorities intend forming there. The various public bodies in the district to be traversed by the projected railway have received official intimation that the Commissioners have decided in favour of the scheme, which is approved by the Great Western Railway Company.

A Congregational school-chapel erected at Keighley, at the junction of Oakworth-road and Fell-lane, was opened on Tuesday. Mr. John Haggas designed the structure, which includes under its roof an assembly-room 52ft. by 50ft., three classrooms, and a kitchen, the cost of erection having been £1,200.

Although there was a slight lull in the building boom at Blackpool a month or two ago, the Lancashire watering-place is again going ahead, and on Tuesday 80 plans were presented. The surveyor's annual report was also presented, showing the number of new houses certified for habitation as 984 for the year, an increase of 240 on last year, or at the rate of 3·15 per weekday. The list includes 216 shops, two chapels, two schools, two political clubs, and one circus.

St. George's Church, New Mills, Derbyshire, has been undergoing considerable improvement. This church was built about 66 years ago, and the interior had not, until now, been much altered. The improvements were carried out from plans by Messrs. Preston and Vaughan, of Manchester. A portion of the church has been taken for the formation of a chancel, and fitted with choir-stalls of Dantzic oak and marble pavement. The nave is reseated, and the organ has been repaired and enlarged by Messrs. Young, of Manchester. The church was reopened on Sunday by the Bishop of Southwell. About £2,000 has been spent.

As the result of a suggestion made by the mayor, the proposal to erect a memorial to the late Duchess of Teck is being seriously entertained in Richmond, Surrey. The idea of placing a statue, with a fountain at the base, in the Terrace Gardens has been received with much favour.

LIST OF COMPETITIONS OPEN.

Cardiff—Town Hall and Law Courts (A. Waterhouse, R.A., Assessor—£200,000 limit)	£500 (merged), £300, £200	J. L. Wheatley, Town Clerk, Town Hall, Cardiff	Dec.	4
City Corporation—Bronze Diamond Jubilee Medal	£20, £15, £10	Sir J. B. Monckton, Town Clerk, Guildhall, E.C.	,,	6
Hackney—Electric Lighting Scheme		Geo. Grocott, Vestry Clerk, Town Hall, Hackney	,,	14
Westminster—Block of Dwellings, Millbank Prison Site	London County Council	T. Bell, Clerk, Spring-gardens, S.W.	,,	14
Nottingham—Laying-out and Planting Basford New Cemetery.	£100, £50	Samuel G. Johnson, Town Clerk, Nottingham	,,	15
Dorking—Workhouse Infirmary (£4,000 limit)	(No first) £15, £5	Geo. Scales, Clerk to Guardians, 35, High-street, Dorking	,,	15
Nottingham—Designs for Basford Cemetery Buildings: Chapels, Crematorium, Lodges, &c.	£100, £50	Samuel G. Johnson, Town Clerk, Nottingham	,,	15
Menai Bridge—Landing Pier (£3,000 limit)	£40	Thos. Hughes, Clerk, Min-y-Den, Menai Bridge	,,	16
Festiniog—Temporary Eisteddfod Pavilion for 10,000 (£900 limit)	10 Guineas	Wm. Jones, Hon. Sec., Pavilion Committee, Blaenau, Festiniog	,,	17
Bootle—Fire Brigade and Police Stations (£14,000 and £1,500 limits)	50 Guineas, 25 Guineas	J. H. Farmer, Town Clerk, Bootle, Lancs	,,	31
Altrincham—U.D.C. Offices	£20, £10	J. Stokes, Clerk, 64, Market-street, Altrincham	,,	31
Crich—Water-Supply Scheme (3,100 population)	15 Guineas, 5 Guineas	Joseph Pym, Clerk, Belper	Jan.	8
Carlton, Victoria—Children's Hospital	£100, £50, £25	J. Nicholson, Hon. Sec., Pelham-street, Carlton, Australia	,,	30
Leicester—Motor Refuse Carts	Corporation	E. G. Mawbey, Borough Engineer, Leicester	,,	31
Port Elizabeth—Free Library (Assessors, Sir F. Blaine and R. H. Hammersley-Heenan—£20,000 limit)	100 Guineas, 50 Guineas	G. Cettle, Librarian, Port Elizabeth, S.A.	Feb.	15
New York—Sun Dial (Plaster Model)	500dol., 250dol.	Sec. National Sculpture Soc., 215, West 57th-street, New York	,,	28
Newcastle-on-Tyne—New Infirmary (local Architects)	(No first) £150, £100, £50	Secretary Building Committee, Newcastle	Mar.	1
Belper—Sewage Disposal Schemes	50 Guineas, 25 Guineas	Joseph Pym, Clerk, Belper	May	1
Wadebridge—Schoolroom, adjoining Wesleyan Church	(No first) £5	Walter O. Wellington, Sec., Building Com., Wadebridge, Cornwall.	—	
Lymington—New Forest Hall (Limited to Hampshire Architects)	25 Guineas	Clerk to Hall, Committee, Lymington	—	

LIST OF TENDERS OPEN.

BUILDINGS.

Hampton-on-Thames—Semi-Detached Villas	J. J. Draper	F. G. Hughes, Architect, Hampton-on-Thames	Dec.	4
Coupar Angus—Farmhouse, West Haugh		J. Reid, Architect, Coupar Angus, N.B.	,,	4
Barrow—Stores, Hindpool-road	Spencer and Sons	J. Butler, Architect, Cornwallis-street, Barrow-in-Furness	,,	4
Leicester—Additional Goods Warehouse	Midland Railway Company	The Company's Architect, Cavendish House, Derby	,,	4
Lossiemouth—Villa at Stotfield		R. B. Pratt, A.R.I.B.A., County Bank House, Elgin	,,	
Londonderry—Stables	Belfast & Northern Counties Ry. Co.	W. R. Gill, Secretary, York Road Station, Belfast	,,	4
Buckie—Writing Chambers, Baron-street	A. B. Hendry	Jas. Perry, Architect, 44, East Church-street, Buckie	,,	4
Frizington—Six Houses		James Gracie, 12, Rheda-terrace, Cleator Moor	,,	4
Dundee—Bathroom, &c., at West Poorhouse	Combination Parish Council	William Alexander, City Architect, Dundee	,,	4
Inchmyre—School and Teacher's Residence	Banchory-Devenick School Board	R. G. Wilson, Architect, 181A, Union-street, Aberdeen	,,	4
Aberystwith—Chancel and Vestry, Trinity Church		Rev. Prebendary Williams, Aberystwith	,,	4
Brymbo—Alterations to Bwlchgwyn School	Brymbo School Board	Davies and Moss, 11, Regent-street, Wrexham	,,	4
Monsall—Covering Roofs of Temporary Hospital Buildings	Manchester Sanitary Committee	The City Surveyor, Town Hall, Manchester	,,	4
Ballymena—Store	Belfast & Northern Counties Ry. Co.	W. R. Gill, Secretary, York-road Station, Belfast	,,	4
Newtownmore—House	Donald Macdonald	Alex. Mackenzie, Architect, Kingussie	,,	4
Reddish—Goods Warehouse and Extension of Platforms at Station	Sheffield and Midland Railway Cos.	Oliver S. Holt, Secretary, London-road Station, Manchester	,,	6
Silloth—Six Houses		J. M. Thompson, 13, Esk-street, Silloth	,,	6
Leeds—Alterations to Cricketers' Arms, Dewsbury-road	Ind, Coope, and Co.	Wm. N. Wynn, 10, Livingstone-street, Roundhay-road, Leeds	,,	6
Great Barugh—Wesleyan Chapel and School		Edward Taylor, Architect, 7, Stonegate, York	,,	6
Rowley Regis—Addition to School	School Board	J. T. Meredith, Architect, Kidderminster	,,	6
Shibden—Semi-Detached House		Jackson and Fox, Architects, 22, George-street, Halifax	,,	6
Morecambe—One House and Three Shops, Margaret-street	J. C. Miller	Jas. Marshall, Architect, Back-crescent, Morecambe	,,	6
Mithian—Taking Down Tower and Spire of St. Peter's Church.		Wm. Swift, Architect, 23, Lemon-street, Truro	,,	6
Middlesbrough—Imbecile Wards & Sanitary Blocks to Infirmary	Board of Guardians	R. Lofthouse and Sons, Architects, 62, Albert-road, Middlesbrough	,,	6
Shibden—Semi-detached House in Kell-lane		Jackson and Fox, Architects, 22, George-street, Halifax	,,	6
Llandudno—Municipal Buildings	Urban District Council	Alfred Conolly, Clerk, Council Offices, Llandudno	,,	6
Prestatyn—Royal Victoria Hotel		R. E. Hughes, Architect, Stafford Buildings, Prestatyn	,,	6
Rodborough—Board School	School Board	W. H. C. Fisher, Architect, 6, Rowcroft, Stroud	,,	6
Barnsley—Eight Cottages, St. George's-road		Owner, 9, Park-grove, Barnsley	,,	6
Bridlington—Dwelling-house, Carlton-street	John Smith	Samuel Dyer, Quay-road, Bridlington Quay	,,	7
Woking—Public Offices near Station	Urban District Council	G. J. Wooldridge, Surveyor, Bank Chambers, Woking	,,	7
Campbeltown—Temporary Hospital at Poorhouse	Corporation	James Fullarton, Master of Works, Campbeltown	,,	7
Belfast—Hospital within Prison	General Prisons Board for Ireland	S. H. Douglas, Secretary, Dublin Castle	,,	7
Newton Abbot—Additions to Workhouse	Guardians	S. Segar, F.I.A.S., Architect, Union-street, Newton Abbot	,,	7
Branksome—Bathroom at Isolation Hospital, Ringwood-road	Urban District Council	S. J. Newman, Surveyor, 3, Tennyson Buildings, Ashley-road	,,	7
Winchmore Hill, N.—Nurses' Home and Isolation Pavilion at Northern Hospital	Metropolitan Asylums Board	T. Duncombe Mann, Clerk, Norfolk-street, Strand, W.C.	,,	8
Bingham—Boardroom at Workhouse	Board of Guardians	A. R. Calvert, Architect, Nottingham	,,	8
Great Yarmouth—Additions, Isolation Hospital	Corporation	J. W. Cockrill, Borough Surveyor, Great Yarmouth	,,	8
Melincrythan—Schools at Herbert-road (for 617 children)	Llantwit Lower School Board	J. Cook Rees, Archt., St. Thomas Chambers, Church-place, Neath.	,,	8
Clayton—Eleven Terrace Houses		Saml. Spencer, Architect, 344, Great Horton-road, Bradford	,,	8
Newhaven—Workhouse Infirmary	Guardians	Clayton and Black, Architects, 152, North-street, Brighton	,,	8
Keighley—35 Houses, Fell-lane	Industrial Co-operative Society	John Haggas, Architect, North-street, Keighley	,,	9
Halifax—Police Station and Court-House	Corporation	George Buckley and Son, Architects, Tower-chambers, Halifax	,,	9
Lees—Institute		John Judson and Moore, Architects, York Chambers, Keighley	,,	9
Newquay—Villa	W. R. Northway, Tavistock	William Square, M.S.A., Tavistock	,,	9
Weston-super-Mare—Shop Front, &c.	Bryant and Sons	S. J. Wilde, Architect, Boulevard Chambers, Weston-super-Mare	,,	9
Kilkenny—Erecting 40 Houses and Repairing 24 Houses	Corporation	William K. Cleere, Executive Sanitary Officer, Kilkenny	,,	9
Davyhulme—Roofing and Ironwork to Screening Chamber at Sewage Outfall Works	Manchester Rivers Committee	The City Surveyor, Town Hall, Manchester	,,	10
Mallow—Alterations to Female School at Workhouse	Board of Guardians	Maurice Regan, Clerk, Poor Law Office, Mallow	,,	10
Pett, Sussex—Coastguard Station		Director of Works Dept., Admiralty, Northumberland-avenue	,,	10
Kendal—Ten Dwelling-Houses in Captain French-lane	Geo. E. Moser	John Stalker, M.S.A., Architect, 57, Highgate, Kendal	,,	10
Chorley—Infectious Wards, Administrative Block, &c., Heath Charnock	Joint Hospital Board	Jolly and Buckley, Architects, High-street, Chorley	,,	11
Darfield—Ten Houses		A. B. Linford, Architect, Kelvin Cottage, Wombwell	,,	11
Hatfield—Mortuary	Overseers	A. Whitby, Assistant Overseer, North-road, Hatfield	,,	11
Neyland—Baptist Chapel at Neyland		S. Wilson Edwards, Architect, Beach Mount Villa, Mumbles	,,	11
Macclesfield—Construction of Vaults and Entombments at Cemetery (for Three Years)	Cemetery Committee	W. Fred. Taylor, Town Clerk, Macclesfield	,,	11
Grangemouth—Sixteen Houses, Marshall-street	Co-operative Building Society	G. D. Page, Architect, Old Glebe Chambers, Falkirk	,,	11
St. Johnstown's Castle—Alterations and Repairs		E. A. Hackett, Architect, Clonmel	,,	13
Trimdon—Board School	Wingate School Board	Jas. Garry, Architect, 27, Church-street, West Hartlepool	,,	13
Gelli—Congregational Chapel		Griffiths and Jones, MM.S.A., Architects, Town Hall, Tonypandy	,,	13
Guildford—Extension of Produce Shed in Cattle Market	Corporation	Ferdinand Smallpeice, Town Clerk, Guildford	,,	13
Llangynidr—Additions to National Schools		F. Baldwin, Architect, 8, Lion-street, Brecon	,,	13
Nottingham—Additions to Lunatic Asylum	Corporation	G. T. Hine, Architect, 35, Parliament-street, Westminster	,,	13
Loddiswell, Devon—Cottages	Great Western Railway Co.	G. K. Mills, Paddington Station, W.	,,	14
Woodbridge, Guildford—Additions, Fever Hospital	Joint Hospital Board	E. L. Lunn, Architect, 36, High-street, Guildford	,,	14
Garra Bridge Station, Devon—Cottages	Great Western Railway Co.	G. K. Mills, Paddington Station, W.	,,	14
Blundesden—House		S. Rivett, M.S.A., Architect, 3, South Quay, Great Yarmouth	,,	15
Hartburn—Additions to Landieu, Hartburn	M. Robinson	A. Whipham, A.R.I.B.A., 59, High-street, Stockton-on-Tees	,,	15
Barrow-in-Furness—Electric Lighting Station, Buccleuch-street		Borough Engineer, Town Hall, Barrow-in-Furness	,,	15
Merthyr—Piggery at Eglosmerther Farm	James Freethy	George Gow, Tregothnan Office, Truro	,,	15
York—Extending Carriage-Building Shops	North-Eastern Railway Co.	C. N. Wilkinson, Secretary, N.E.R. Offices, York	,,	15
Chorley—Free Library		Jolly and Buckley, Architects, High-street, Chorley	,,	16
Cefn Coed—Library and Dwelling-House		R. C. Jenkins, Surveyor, Cefn Coed	,,	17
Bradford—Herring-Curing Establishment, Buck-street		Hodgson and Farrar, Old Bank Chambers, Bradford	,,	17
Buenos Ayres—Central Railway Station (cost, 4,000,000 piastres)		Legation of Argentine Republic, London	,,	26
Copenhagen—Repairing Cemented Walls of Thorvaldsen's Museum	Corporation	F. Meldahl, Copenhagen	Jan.	1
Lincolnshire—Stanhope Memorial, Horncastle		S. Goe Overton, Secretary, 2, Manor House-street, Horncastle	—	
Saltaire—Semi-Detached Villas		Peterson and Lawson, Architects, 1, Bank-street, Bradford	—	

BUILDINGS—*continued.*

Bodmin—Isolation Hospital at County Asylum	Visiting Committee	Robt. P. Edyvean, Clerk, Bodmin	—
Scarborough—Fourteen Large Houses on South Cliff		A. Moore, 23, West-bank, Scarborough	—
Redruth—Alterations to Lanner Board Schools		S. Hills, Architect, Redruth	—
Bingham—Board Room and Offices	Board of Guardians	A. R. Calvert, Architect, Nottingham	—
Belfast—Six Houses, Mersey-street, and Six in Lawnbrook-avenue		Wm. Campbell, Architect, 4, Hurst-street, Belfast	—
Bury—Two Houses and Shops, Elton-road		J. Sellars and Son, Architects, Union Chambers, Bury, Lancs	—
Keighley—Houses, Skipton-road	Robert Feather	Peterson and Lawson, Architects, 1, Bank-street, Bradford	—
Yatton—Additions to Claverham House		A. C. Rowley, Architect, 20, Nicholas-street, Bristol	—
Mallaig—Business Premises		Dun. Cameron, Architect, Inverness	—
Harrogate—Additions to George Hotel	Oliver Barber	A. A. Gibson, Architect, 8, Cambridge-crescent, Harrogate	—
Fleetwood—Shop and Dwelling-House		D. Rankin, Church-street, Fleetwood	—
Dudley—Additions to Conservative Clubhouse		A. Gammage, Architect, High-street, Dudley	—
Colmonell, Ayrshire—Free Church		Alex. Petrie, Architect, 134, Wellington-street, Colchester	—
Castleford—Victoria Hotel	W. Pickerskill	A. Hartley, Architect, Carlton Chambers, Castleford	—
Consett—Fifteen Houses		J. Bloom, 9, High West-street, Sunderland	—
Colchester—Reinstating Two Houses after Fire		C. E. Butcher, Architect, 3, Queen-street, Colchester	—
Blackpool—Four Detached Houses, Lytham-road		Goldsmith and Son, 63, Faulkner-street, Manchester	—
Whitehead—Three Terrace Houses	Whitehead Development Co.	Henry T. Fulton, Architect, 91, Donegall-street, Belfast	—
Astley—House		J. R. Withers, Architect, Shrewsbury	—
Ulverston—Re-erecting part of Furness Paper Mills (burnt down)		Settle and Farmer, Architects, Ulverston	—
Hadleigh—Two Villas		A. Morling, Hadleigh, Suffolk	—
Rugby—Citadel Buildings, Castle-street	Rugby Citadel Co.	Alexr. Gordon, M.S.A., Architect, 101, Queen Victoria-street, E.C.	—
Great Horkesley—Additions to The Cedars		C. E. Butcher, Architect, 3, Queen-street, Colchester	—
Attercliffe—Sixty Houses		W. Frobisher, Shirland-lane, Attercliffe, Sheffield	—
Feltwell Fen—Cottage at Anchor Drove		Bidwell and Sons, Surveyors, 11, Bennett-street, Cambridge	—
Fota—New Room and Other Work	Rt. Hon. A. H. Smith-Barry, M.P.	Arthur Hill, Architect, 22, George-street, Cork	—
Bradford—Offices and Storerooms, Duke-street		C. H. Hargreaves, Architect, New Corridor, Bradford	—
South London—Ten or Twenty Eight-roomed Houses		T. B., care of Street and Co., 30, Cornhill, E.C.	—
Wigan—Rebuilding Clarence Hotel		W. E. V. Crompton, Architect, Moot Hall Chambers, Wigan	—
Harrogate—Rebuilding Crown Villa, West Park	G. Goodrick	Arthur A. Gibson, Architect, 8, Cambridge-crescent, Harrogate	—
Kirkstall—Three Pairs Semi-Detached Villas, Victoria Park Estate		John Jackson, M.S.A., Barry-street, Bradford	—
Holbeck—Rebuilding of the Old Queen Anne Inn		A. D. Kaye, Architect and Surveyor, 71, Albion-street, Leeds	—
Harrogate—Semi-Detached Villas in Park Drive		J. F. Royce, 9, Station-square, Harrogate	—
Wetherby—Tall Brick Chimney	Wharfedale Brewery Co.	T. A. Battery, Architect, Queen-street, Morley	—
Middleton-St.-George—Private Asylum		John W. Dyson, Architect, 67, Grey-street, Newcastle	—
Winchester—Six Cottages		J. A. Sawyer, Surveyor, 62, High-street, Winchester	—
Morecambe—Four Dwelling-Houses, Balmoral-road		Harry Eastwood, 19, Regent-road, Morecambe	—
Great Horkesley—Addition to The Cedars	W. Page	Chas. E. Butcher, Architect, 3, Queen-street, Colchester	—
Skegness—Primitive Methodist Chapel (450 sittings) and School		Hy. Harper, Architect, Market-place, Nottingham	—

ENGINEERING.

Sheffield—300 Retort Mouthpieces	United Gaslight Company	Hanbury Thomas, Secretary, Commercial-street, Sheffield	Dec. 4
Penybont—Water Supply	Rural District Council	R. Harmar Cox, Clerk, Union Offices, Bridgend	" 4
Sheffield—Fittings for 150 Through Retorts	United Gaslight Company	Hanbury Thomas, Secretary, Commercial-street, Sheffield	" 4
Southampton—Pontoon, &c.	Harbour Board	E. Cooper Poole, A.M.I.C.E., Surveyor, 4, Portland-st., Southampton	" 6
Collooney—Watercourse and Turbine Pit at Creamery		W. F. Gilcriest, Architect, Sligo	" 6
Southam—Storage Tanks and Water-Main	Rural District Council	Wm. Wood, Clerk, Church Hill, Southam	" 6
Salford—Steel Girder Footbridge at Peel Park	Corporation	Borough Engineer, Town Hall, Salford	" 7
Kirkby Ireleth—New Bridge	County Council	The Bridge-Master, 19, Brazenose-street, Manchester	" 7
Craiova—Waterworks	Town Council	The Mayor, Craiova, Roumania	" 7
Hertford—Water-Mains	Corporation	John H. Jevons, Borough Surveyor, Hertford	" 8
Davyhulme—Screening Chamber at Sewage Outfall Works	Rivers Committee	The City Surveyor, Town Hall, Manchester	" 10
Northallerton—Iron Bridge across Wiske	Rural District Council	Wm. Fowler, Clerk, Northallerton	" 11
Bathgate—Embankment at Sunnyside Dam	Police Commissioners	J. and A. Leslie and Reid, C.E.'s, 72A, George-street, Edinburgh	" 11
Loch Katrine—Waterworks	Glasgow Corporation	J. D. Marwick, Town Clerk, City Chambers, Glasgow	" 11
Castlebar—Water Supply Works	Governors Castlebar Lunatic Asylum	Mr. Thomas Griffiths, Clerk of Asylum, Castlebar	" 13
Barking—Engineering Works at Baths	Urban District Council	C. J. Dawson, F.R.I.B.A., Public Offices, East-street, Barking	" 14
Portsmouth—Repairing Wharf and Quay Wall	Corporation	A. Hellard, Town Clerk, Portsmouth	" 14
Ostend—Harbour Works (estimated cost, £497,792)	Official	Provincial Government, Bruges	" 14
Edinburgh—Extension Railways, Bonnington-road	Caledonian Railway Co	J. Blackburn, Secretary, 302, Buchanan-street, Glasgow	" 14
Corpach—Water Supply	Lochaber District Council	N. B. Mackenzie, Clerk, Fort William	" 15
Barrow-in-Furness—Boilers and Electric Plant	Corporation	C. F. Preston, Town Clerk, Barrow-in-Furness	" 15
Newport—Electric Lighting Plant at Wentwood Waterworks	Corporation	Albert A. Newman, Town Clerk, Town Hall, Newport, Mon.	" 15
Kirkcaldy—Heating of Memorial Halls		Dunn and Findlay, Architects, 35, Frederick-street, Edinburgh	" 18
Canterbury—Electric Lighting Plant	Corporation	H. Fielding, Town Clerk, 15, Burgate-street, Canterbury	" 20
Carrickfergus—Rebuilding Retort Bench	Gas Company	David Gillespie, Secretary, Carrickfergus	" 27
Braila—Bridge and Road (about £7,507)		The Prefect, Braila, Roumania	" 27
London—Arc Lighting Extension	Vestry of St. Pancras	C. H. F. Barrett, Vestry Clerk, Pancras-road, London, N.W.	" 28
Catauzaro—Electric Tramway from Town to Station		The Municipal Authority, Catauzaro, Italy	" 30
St. Gilles-lez-Bruxelles—Gasworks	Council	The Secretary, 504, Chaussée de Mons, Anderlecht, Brussels	" 31
Brazil—Railway from Novo Hamburgo to Caxies	Government	Central Directorate, Public Works, Porte Alegre	" 31
Denbigh—Laying 13,200 yards of Cast-Iron Water-Mains	Visitors of N. Wales Counties Asylm.	Wm. Barker, Clerk to the Visiting Committee, Denbigh	" 31
Athens—Docks Extensions (about £110,000)		Chancelleno, Monarchie Attique, Athens	Jan. 9
Pernambuco—Port Works	Government	Brazilian Ministry of Public Works, Rio de Janeiro	Feb. 28
Madras—Utilisation of Water of Periyar Lake		Chief Engineer for Irrigation, Madras	July 1
Tralee—Three-ton Steam Crane		Harbour Commissioners, Tralee	—
Altham—Septic Tank	Burnley Rural District Council	S. Edmondson, Surveyor, 18, Nicholas-street, Burnley	—
Ymuiden, Holland—Metal Sluice Gates (estimated cost, £19,600)		Provincial Authorities, Harlem	—

FENCING AND WALLS.

Grimesthorpe—Concrete Retaining Wall	Sheffield United Gas Light Co.	Hanbury Thomas, Secretary, Commercial-street, Sheffield	Dec. 4
Shoreditch—Unclimbable Iron Railings (5,050ft.)	Vestry	H. Mansfield Robinson, Clerk, Town Hall, Old-street, E.C	" 7
Kinson—Iron Fencing to Schools	School Board	H. W. Dibben, Clerk, Upper Parkstone, Dorset	" 13
Hunslet—Wall in Pepper-road		W. Broughton, Builder, Jesmond-terrace, Pudsey	—
Lazonby—Wall near Post-Office		E. James, Silloth	—

FURNITURE AND FITTINGS.

Queensbury—Fox Hill Schools	School Board	Drake and Son, Architects, Queensbury	Dec. 4
Leeds—Free Library, Municipal Buildings	Corporation	The Town Clerk, Town Hall, Leeds	" 8
Liverpool—Extension of Nurses' Home at Workhouse	Select Vestry	H. J. Haggar, Vestry Clerk, Parish Offices, Brownlow Hill, Liverpool	—

PAINTING.

Belfast—Goods Stores	Great Northern (Ireland) Ry. Co.	T. Morrison, Secretary, Amiens-street Terminus, Dublin	Dec. 6
Nottingham—Eight Board Schools	School Board	W. J. Abel, Clerk, Victoria-street, Nottingham	—

PLUMBING AND GLAZING.

Penzance—Washhouse Repairs, &c.	Board of Guardians	Hy. Maddern, Architect, Penzance	Dec. 7

ROADS AND STREETS.

Dewsbury—Paving and Flagging of Wheelwright-street, Halliley-street, and Hemingway-street	Corporation	Trevelyan Lee, Town Clerk, Town Hall, Dewsbury	Dec. 4
Birstall—Sewering and Kerbing of School-street, Union-street, and John-street	Urban District Council	William Middlebrook, Clerk, Council Offices, Gasworks, Birstall	" 6
Leith—Paving Wardie-road and Ashley-place	Council	T. B. Laing, Town Clerk, Town Clerk's Office, Leith	" 6
Abbotsholme, Rochester—Roadmaking at Head School	H. Cecil Reddie	Sugden and Son, Architects, Leek	" 6
Brockley, S.E.—Kerbing, Tar-paving, and Metalling Merritt-rd.	Lewisham Board of Works	The Offices, Lewisham Town Hall, Catford, S.E.	" 7
London, E.C.—Paving with Asphalte Norwich-ct., Fetter-lane.	Commissioners of Sewers	The Commissioners, Guildhall	" 7
Windsor—Roads and Sewers	Alma Park Estate Company	T. V. Davison, Elmdale Chambers, Frances-road, Windsor	" 11
Swindon—Sewering and Metalling Back Roads	New Town Urban District Council	Henry Kinneir, Clerk, Regent Circus, New Swindon	" 13
West Ham—Making-up and Paving Various Streets	Corporation	Fred. E. Hilleary, Town Clerk, Town Hall, West Ham	" 14
Blackpool—Street Works	Corporation	J. Wolstenholme, Borough Engineer, Market-street, Blackpool	" 16
Preston—Paving, &c., St. George's-road and Trower-street	Corporation	The Borough Engineer, Town Hall, Preston	" 17
London, E.C.—Paving with Jarrah Wood Chiswell-street	St. Luke Vestry	G. W. Preston, Clerk, Vestry Hall, City-road, E.C.	" 18
Reading—Paving and Kerbing Thames-avenue	Sanitary Authority	John Bowen, A.M.I.C.E., Borough Engineer, Town Hall, Reading	" 21
Mill Hill, N.W.—Laying-out and Completing Two New Streets		Arthur G. Spencer, M.S.A., Surveyor, 17, Coleman-street, E.C.	—
Sandiacre—Sewering and Metalling Stevens-rd. and Brook-st.		A. R. Calvert, Surveyor, Nottingham	—
Knaresborough—Roads and Sewers, Rennison's Gardens Estate		Arthur A. Gibson, Surveyor, 8, Cambridge-crescent, Harrogate	—

THE BUILDING NEWS
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FLOOD AND FIRE.

LAST month the Metropolis was aroused by a fire of appalling magnitude and rapidity, which spread through masses of brick-built warehouses of comparatively modern construction. Last week a hurricane of great fury, accompanied by a flood-tide, caused immense destruction along our south and east coasts, and overwhelmed inhabitants in the low-lying parts of the Thames course. The scene at Woolwich Arsenal has been described as one of desolation and despair. The flood had inundated all the basements, boiler-houses, and sheds; the river walls and other substructures have been damaged or washed away; while higher up the river, at Staines and Richmond, extensive damage has been reported. At Sheerness the inroads of the sea swept away a large portion of the pier, and sea-walls at Queenborough and other places have been damaged. Other damage to sea-walls and other structures has occurred on the north-east coast and the Norfolk and Suffolk seaboards. The towns of Skegness, Mablethorpe, and Sutton-on-Sea have been flooded.

A great deal of this desolation and loss of life and property might have been averted if ordinary precautions had been taken by the local authorities in levels and construction. Much of our sea-coast and riverside building is practically below the level of the high tides. For the sake of economy, business, and other considerations, warehouses and stores have been built close to the water's edge, and in numerous seaside towns may be seen houses and villas so near the cliffs and even below them, that any extraordinary tide, raised by the force of hurricane would speedily render them unfit for habitation. Take, for example, a good deal of the property along the harbour end of Folkestone, which is exposed to heavy seas. At Eastbourne and also at Sandgate hotels and residences may be seen whose basements are swept by the waves at certain periods of the year, or so close to the sea that they are in danger of being swept away at any moment. The mistake is in forming roads and letting land for building that are below a flood-tide level. Roads at Sandwich, Ramsgate, and land at Herne Bay and Whitstable, near the sea fronts, were rendered impassable, the doors and windows of dwellings were below the level of tide, and houses were rendered tenantless through the inpour of sea-water and the dashing force of the waves, which hurled tons of shingle into the basements. Water is said to have flowed through some streets of the latter town to a height of nearly 4ft., and at a great velocity. The same tale of submersion comes from other places along the Lincolnshire coast. In all of them the effect of a tidal wave has been neglected by local building authorities. Take Purfleet as an example. Here the insurgent waters have broken through the stone and earth sea-wall, which hitherto shut out high tides, and flooded and rendered homeless hundreds of labouring families. The repair to the river wall is estimated at several thousands.

Around the many factories at or near Purfleet rows of red-brick cottages or tenements have been erected for the workmen on marsh land reclaimed from the river, and much lower than its high-tide level. In some cases the water of the flood rose above the ground floor of the cottages, and the hapless tenants were rendered homeless. The river-wall could not withstand the fury of wind and tide; but those who built this protection probably never thought that buildings would be erected on the level of the marsh. The London Building Act (section 122) enacts that it is not lawful for any person to erect any building for a dwelling upon "land of which the surface is below the level of Trinity high-water mark," and which cannot be drained by gravitation into a sewer, except with permission of the Council, and they have power to prescribe the level of the lowest floor. They have also power to make by-laws as to the levels, surface, &c., of sites for new buildings. Yet, in spite of these rules, dwellings still continue to be erected on ground below high-tide level even in places subject to the rule of the Council. These waste and marsh lands are cheap: hence the temptation to build on them near large factories. Embankments and river walls are often constructed, also in a temporary manner, and without any reference to tidal action. The materials of many of the walls that have yielded are stone and earth. Canvey Island, near the mouth of the Thames, has greatly suffered. It is a marshy flat, and was once covered at every tide, till a sturdy Dutchman built a sea-wall and drained the land. It was dyked and cut with drains; the stone wall on the south side appears to have resisted encroachments; but it is the earthen wall on the north side that has given way, and let through the sea, and many farms have been submerged and cattle lost.

The problem of bank protection has scarcely received the attention which might have been expected from an insular country like England. In Holland and in America the subject has been dealt with by many leading engineers. The bank revetment on the Lower Mississippi, for example, is a theme that has engaged much attention from the engineers of the United States. Banks of brushwood, willow, cane, and straw have been used for river protection from time immemorial, and the woven fascine revetment has been found a valuable barrier. In our seacoast towns, local chalk, rock, and other materials have been largely used for sea-walls and groynes; but the mode of construction has been left too much to chance. Sloped embankments, and upright walls slightly battered or curved, have been indifferently used. Each has its merits and defects. Brighton has paid dearly by periodical incursions of the sea; the groynes of concrete that are now replacing the old timber ones show at what cost these protecting works have been undertaken. That they have answered their purpose in resisting denudation and wave-action cannot be denied. Why have not other sea-coast towns constructed similar defences to prevent erosion and caving? The flat meadowland about Whitstable which has been submerged, driving out of their cottages many tenants, might have been made safe if groynes and a sea-wall had been constructed, though, of course, the authorities are to blame by allowing jerry-builders to build houses on such wastes as they have done at Harwich and Felixstowe. Our eastern and southern coasts have been visited by these tidal incursions for centuries, and many rocks and buildings bear witness to the gradual wasting of the coast. It has been estimated that the Norfolk coast, which has suffered so much, has been wasting away at the rate of two yards a year in some parts near Cromer. At Eccles, the tower of the old church remained on the shore as a record of sea incursions; the ruined church of the Reculvers on the Kentish shore is another instance, the rocky stacks known as the "Parson and Clerk," near Dawlish, till finally swept away in a storm three years ago, the marine deundation going on Folkestone and elsewhere attest the same action. No doubt the cost of constructing permanent barriers is greater than small towns like Whitstable can undertake without Government help. One point also in the disastrous submersion of the last week ought to be noticed—the absolute necessity of guarding all small creeks and tributaries, and even dykes into which the sea-water can find an entrance. Unless these can be closed by dams or gates, a sound and well-constructed sea-wall along the sea-front is useless. This weakness has been shown at Canvey Island, where the sea-wall was intact; but the water found its way over the land by a backwater, and at Harwich where the tide forced it way up cracks, water-courses, and fissures.

Then not a few sea-walls are barely high enough to prevent a tidal wave, backed up by wind, from making a clear breach over. At Sheerness, for instance, the troops and seamen have been engaged in heightening the sea-wall. When we hear of land being submerged to a depth of 8ft. in some places, it is a proof that the defences are too low for any extraordinary tide. In other cases it has been found that the sea-walls withstood the immense pressure, but the water found its way through weak places in the embankments, caused by the dry weather. In this way the water honeycombed the embankments, and finally swept away long lengths of the bank thus weakened. Through narrow breaches the sea forced its way, in the first instance, widening them till a stream of torrent-like force was formed. Does not this incoherence show the want of a more tenacious material to resist the tide? If concrete is not used, other means must be employed; but the interrupted revetment is a failure: the water attacks the bank or wall in the unprotected intervals. The woven continuous mattress we have before described has been found to be a great protection in the States. Various kinds of mat construction have been used for this purpose; but those found most efficient are woven sufficiently close and compact to prevent the erosive action of the water through the openings between. Why cannot our weaker banks be similarly strengthened?

Fire has been another fell destroyer—the arch-fiend of city life; but how very little all our appliances and organisations have done to render the spread of fire impossible! The family who lives on an upper floor of a house in our crowded cities, or has rooms in a block of flats, is nightly at the mercy of some irresponsible or drunken lodger. Occupants of houses which adjoin theatres or stored warehouses cannot be sure that a fire will not some day overtake them, and destroy all they possess. The modes we adopt for illumination, guarded as they are, are still sources of danger. Every restaurant and tavern or shop, with its flaring lights of gas or electricity, are perils in our midst. Have we ever estimated the amount of heat that is wasted at the top of a room or a bar, which is daily converting the floors into desiccated material ready to ignite on the least accident, or the amount of inflammable material in the shape of match-boarding in ceilings and partitions and shelving, to say nothing of dried combustible goods and wares? All these are perils. Even the electric wiring of our buildings may, by bad fixing or insulation, cause a fire; but the naked, flaming, unprotected gas-burner is the worst enemy. Many lessons have been taught by the late City fire. As one of our correspondents pointed out last week, the newspapers have been grumbling unnecessarily at our fire-brigade appliances and their shortcomings, forgetting that if we insist on using combustible materials, like match-boarding to walls and ceilings, cheap wooden roofing, partitions and floors, and lead gaspipes, we cannot expect any abatement of this terror. We have now several fire-resisting

materials and modes of construction, that can be employed to protect girders, floors and columns, and other structures. Great resistance, for instance, is afforded by many of our fireproof floor systems, fireproofing materials like "Asbestic," the metal lath, and other applications well known to this journal. Those who have tried them can bear testimony, and it seems little short of blind fatuity that we should go on using inflammable materials without due precaution. If the precautionary rules suggested by another correspondent were generally adopted, we should have fewer destructive fires as that of last week, and it is for the Building Act to prevent the use of inflammable materials in buildings, and at least to encourage better methods of construction. We believe the majority of our great fires are attributable to flimsy and inflammable buildings, which become veritable tinder-boxes, and to imperfectly protected, so-called "fire-proof," structures, in which the most ordinary precautions have been neglected.

The City Commissioners of Sewers will no doubt turn their attention to the area of ruins in Cripplegate, and out of the present chaos will organise a new scheme of rebuilding. It is said that new buildings of the worst type of jerry-building had been allowed to occupy the exact sites of the old ones, that no facilities for increased traffic had been made, nor the slightest security provided against fire. There will be no excuse now in postponing the improvements demanded in this crowded area of the City. Nor can there be any further excuse for delaying the strengthening of our sea-defences, which have been destroyed by the recent flood, and so preventing a recurrence of a calamity that has fallen so heavily upon the poorer inhabitants of our sea-coast towns, and has carried desolation and misery to so many homes.

PRACTICAL QUESTIONS.

SIGNS are not wanting that the profession begin to see that the practical and the technical factors of architecture cannot be any longer subordinated to what has been called, for want of a better term, "artistic." True art has ever been associated with honesty of intention and good craftsmanship, and it is only the later tradition of an era of archæological study and dilettanteism that has conjured up a new meaning to that elastic word. But professional custom or usage dies hard. The addresses of presidents of architectural societies have often been filled with a kind of mingled wrath for those who disturb the calmer atmosphere of professional society by even hinting that there is anything wrong in our existing arrangements, or by suggesting that a basis of architecture must be found more in accord with the older building traditions, and at one with the practical requirements of the day. The same note of disturbance or distress comes from the addresses of the presidents of the Institute and Association, the remarks by the president of the Birmingham Architectural Association, and those of the Society of Architects we reported in our last issue. And yet all are obliged to admit greater importance should be attached to practical subjects — construction and the design in materials. In every one of these annual utterances, a share of attention is given to workmanship. We remember the addresses of men like Barry and Scott and Donaldson and the older school. We heard very little of practical questions; building materials and workshops were almost considered *infra dig.* in an inaugural address, and were considered impertinent intrusions on the part of any speaker who brought them up. But it is very different now. Professor Aitchison speaks of making students design, not only in old-world materials like wood, brick, and stone, and marble, but in new materials like cast iron. Still more pregnant in meaning were the remarks made the other day by Mr. Charles E. Bateman before the Birmingham Architectural Association. Thoroughly practical was its "note." Mr. Bateman struck a good vein of thought when he said that the commercial spirit of the age and its business needs—its trade, ought to be turned to account in the design of the architect, as the old traders of Bruges and other Belgian cities turned the commerce of their time to glorious account, which have become models of all that is poetical and picturesque in building. Again, he showed how careful planning ought to be utilised in our crowded cities, how supports may be minimised by the use of iron, and even trade competition be made a gain instead of a disgrace, as it is now. Buildings, too, should find their proper expression. The factory is a building that should not be neglected, as it often is, but be grasped and made a source of effect. Then there is mechanical contrivance, which we cannot escape from in these days, but to which the architect should try to lend the graces of his art to make agreeable. Many similar instances may be found in this practical paper on design, as discarding patterns, caution in copying Continental work so as to preserve the effect of scale. The author thinks it worth while to remind the student that the workshop and craftsmanship influence exercise a welcome restraint in bringing us to face the limitations of materials and difficulties of execution. No doubt it is a "hobby that can be ridden to death." There is a true and false way of presenting it to the student. Well may the young architect who has succeeded in passing his "preliminary" or "intermediate" revolt against the idea of being required to learn half a dozen, or only one, handicraft as well as any skilled craftsman;—such a scheme is only doomed to failure. At the same time no one can dispute that our leading architects and designers are men who have made themselves especially familiar with materials and the difficulties of execution; the mere office or draughtsmanship ideals, they have appraised at their true value.

Practical was Mr. Walter Emden's address the other day before the Society of Architects. We do not touch here on his sensible remarks on registration of architects—the only way by which the capabilities of an architect can be known or guaranteed to the client who employs an architect because he likes his work or his taste. Some useful suggestions on building law, public health, and sanitation are made. Every practical architect knows how many difficulties he has to encounter in the exercise of his profession. One of his greatest is the overlapping jurisdiction of local authorities. He may be well up in his professional duties, but be subjected to innumerable insults or delays, if he does not know the machinery of legislation and administrative control. The overlapping of the powers of various authorities, as Mr. Emden says, is "a crying evil in London, where the central authority deals with frontage lines, projection, construction, and all such like matters, and puts in action its own surveyors; though there is in each district the surveyor of the local body also dealing, more or less, with the same subjects." Few in the profession have not been subjected to this vexatious kind of interference or obstructive officialism. Plans for new buildings and alterations are frequently delayed by local interference. The surveyor of the local body has required certain alterations to be made, under by-laws as to projections and sanitary matters, after have passed central authorities. In some cases the delay is a serious hindrance to building, and local by-laws are enforced which ought to have been settled by other authorities. It is a practical suggestion that the central authority should lay down rules and regulations under such Acts as deal with these questions, after consultation with the local authorities, and that the latter should administer them. No doubt by this arrangement much trouble would be saved, both to building owners and to the public, who would, by preventing the duplication of officials and friction, save delay and expense in building. The passing of plans for buildings is often a complicated process, as many architects find to their cost. It is further suggested that one surveyor in each district should be employed, and the central authority delegate the administration to the local board under certain rules framed by them. In this way overlapping would be avoided. These and other suggestions are worth the consideration of those who are charged with the administration of our building laws.

ELECTRIC LIGHTING NOTES FOR ARCHITECTS.—XI.

By an Assoc. Inst. Elect. Engs.

Conductors in Practice.

DISTRIBUTION — (*continued*).

CARRYING CAPACITY OF WIRES.—Respecting the sectional area of conductors, the Institution of Electrical Engineers' rules state that "their sectional area should be proportioned to the heating effect of the current required for the maximum number of lamps or other current, using apparatus that can be used simultaneously on the circuit; but in no case should the sectional area of any conductor be less than that of a No. 18 S.W.G. wire. All conductors having a sectional area larger than that of a No. 14 S.W.G. wire should be stranded." For convenience of reference, a table of copper conductors has been drawn up, and is included in these articles. In this table the diameters, areas of conductors, resistances, weights, current, number of feet per ohm, and particulars corresponding to those given in table accompanying the new rules of the Institution of Electrical Engineers are given for all the important sizes of wires used, so that it will be an easy matter to pick out the particular wire required for any purpose. By referring to this table it will be noticed that for each size of wire there are four different values of current given, the latter two, in columns marked 2 and 4, have been calculated from the formulæ—

$$C = 2\,A^{0.715}, \text{ or } \log. C = 0.775 \log. A + 0.301$$
$$\text{and } C = 2.6\,A^{0.82}, \text{ or } \log. C = 0.82 \log. A + 0.415,$$

to which we have already referred, whilst in the former two columns the values of the current are (1), from the Fire Office rules, to the basis of 1,000 ampères to the square inch, and (2) according to Kennelly's rule. By comparing the values given it will be observed that they vary considerably, and it will be necessary to explain why so many values have been included in this table. In the majority of cases internal wiring has to satisfy the rules issued by the fire insurance company with which the building may be insured, and as a current density of 1,000 ampères per square inch of cross-sectional area satisfies most companies, values to this basis are given. It must, however, be borne in mind that these values only serve as a guide for determining the proper size of wire to use for short lengths of wire, such as the internal wiring of houses, &c. As an example of the various rules issued by the fire insurance companies bearing on this point, the following, taken from the Phœnix Fire Office rules, will be interesting:—

"For currents up to 100 ampères, a current density of 1,000 ampères per square inch may be employed. For larger currents, a less current density must be used. In any case, the conducters must be absolutely safe with regard to heating, even if the current should become doubled."

In no case must the Fire Office Rules, however, be followed for determining the proper gauge of wire to employ for wires imbedded in conduits, &c., as the permissible drop of potential forms the basis for the gauge of such conductors. From the insurance point of view, the fire insurance company rule is all-important; but when we remember that the heating effect is proportional to the square of the current, and that the current—according to this rule—is proportional to the area of cross-section, which increases as the square of the diameter, whilst the heat radiated is proportional to the surface of the

TABLE OF COPPER CONDUCTORS.

S.W.G.	Diameter. Each wire. Inch.	Diameter. Each wire. Mm.	Diameter. Cable or Strand. Inch.	Diameter. Cable or Strand. Mm.	Area of conductor. Square inch.	Area of conductor. Square mm.	Resistance at 60° F. Per 1,000 yards.	Resistance at 60° F. Per mile.	Weight. Per 1,000 yards.	Weight. Per mile.	Current. 1,000 amps. per sq. in.	Current. Kennelly's Rule.	Constant K = feet per ohm.	Institution of Electrical Engineers' Table. Maximum current for high external temp.	Total length in yards of lead and return for 1-volt drop.	Maximum current allowable.	Total length in yards of lead and return for 1-volt drop.	Minimum thickness of dielectrics in mils.	Minimum Insulation resistance in meg-ohms for 1 mile.	Minimum Insulation resistance in meg-ohms for 1 mile.
							ohms.	ohms.	lb.	lb.				amps.		amps.			Class A.	Class B.
20	·036	·914	...	...	·00102	·658	24·0354	42·3	11·7	20·7	1·02	3·83	122	2·0	20	2·64	15	34	1200	300
19	·040	1·014	...	...	·00126	·813	19·469	34·267	14·5	25·5	1·26	4·49	151	2·4	21	3·2	15	34	,,	,,
18																				
62/38	·048	1·219	...	...	·00181	1·168	13·52	23·795	21	36·8	1·81	5·90	217	3·1	23	4·2	18	35	,,	,,
37/40																				
3/22	·028	·711	·059	1·425	·00186	1·193	13·243	23·308	22	38	1·86	6·06	223	3·3	23	4·4	17	36	,,	,,
7/25	·020	·508	·060	1·524	·00217	1·418	11·124	19·578	25·5	45	2·17	6·2	260	3·7	24	4·9	18	36	,,	,,
17	·056	1·422	...	...	·00246	1·587	9·933	17·483	28	58	2·46	7·41	295	4·0	25	5·4	19	36	,,	,,
7/24	·022	·509	·066	1·677	·00266	1·716	9·1952	16·183	31·5	55	2·66	7·47	319	4·3	25	5·8	19	37	,,	,,
3/20	·036	·914	·077	1·830	·00311	2·	7·7256	13·597	37	65	3·15	9·90	378	4·8	26	6·66	19	37	,,	,,
7/23	·024	·610	·072	1·830	·00315	2·043	7·6049	13·385	37	65	3·22	9·96	374	4·87	26	6·8	19	37	,,	,,
16	·064	1·626	...	...	·00322	2·077	8·0118	14·1	36	63	3·11	8·84	386	4·9	27	6·6	19	38	,,	,,
15	·072	1·828	...	...	·00407	2·625	6·0089	10·576	47	83	4·07	10·8	488	5·9	28	8·2	20	37	800	,,
7/22	·028	·711	·084	2·133	·00434	2·781	5·676	9·989	51	89	4·34	11·45	521	6·2	28	8·7	20	38	,,	,,
7/21½	·030	·762	·090	2·28	·0050	3·242	4·945	8·702	58	102	5·00	12·72	600	7·0	29	9·8	21	38	,,	,,
14	·080	2·028	...	...	·00503	3·245	4·867	8·566	58	102	5·03	12·9	604	7·0	29	9·8	21	38	,,	,,
7/21	·032	·813	·096	2·439	·00560	3·631	4·346	7·648	66	116	5·60	14·00	672	7·6	29	10·7	21	40	,,	,,
7/20½	·033	·838	·099	2·51	·0061	3·923	4·086	7·164	75	132	6·10	15·0	732	8·2	30	11·5	21	40	,,	,,
13	·092	2·336	...	...	·00665	4·289	3·680	6·475	76	135	6·65	15·8	798	8·7	30	12·3	21	40	,,	,,
7/20	·036	·914	·108	2·742	·00714	4·606	3·434	6·043	84	147	7·14	16·71	857	9·3	31	13·0	22	41	600	,,
12	·104	2·641	...	...	·00849	5·476	2·880	5·068	98	173	8·49	18·7	1019	10·5	32	15·1	22	40	,,	,,
7/19	·040	1·014	·120	3·042	·00882	5·691	2·781	4·895	104	183	8·82	19·56	1058	10·8	32	15·5	22	42	,,	,,
11	·116	2·946	...	...	·0106	6·837	2·315	4·075	122	215	10·6	22·2	1272	12·5	34	18·	23	42	,,	,,
7/18	·048	1·219	·144	3·657	·0127	8·176	1·931	3·399	149	263	12·7	25·72	1524	14·0	37	21·0	25	44	,,	,,
10	·128	3·251	...	...	·0129	8·322	1·901	3·346	148	261	12·9	26·3	1548	14·5	37	21·2	25	43	,,	,,
9	·144	3·658	...	...	·0163	10·52	1·502	2·644	188	331	16·3	30·4	1956	17·4	37	25·6	25	45	,,	,,
7/17	·056	1·422	·168	4·266	·0172	11·10	1·419	2·497	203	357	17·2	32·41	2064	18	38	27	26	45	,,	,,
19/20	·036	·914	·180	4·570	·0194	12·50	1·265	2·226	228	401	19·4	35·38	2328	20·0	39	30·0	26	48	,,	,,
S	·160	4·063	...	...	·0201	12·96	1·217	2·142	232	409	20·1	36·4	2412	20·4	39	30·5	27	46	,,	,,
7/16	·064	1·626	·192	4·878	·0225	14·54	1·086	1·912	266	468	22·5	39·63	2700	23·0	40	34·0	27	49	,,	,,
19/19	·040	1·014	·200	5·070	·0239	15·45	1·025	1·803	282	496	23·9	41·44	2868	23·4	40	35·0	27	50	,,	,,
7	·176	4·47	...	...	·0243	15·68	1·005	1·769	281	495	24·3	42·10	2916	23·8	40	35·6	27	48	,,	,,
7/15	·072	1·828	·216	5·484	·0285	18·38	·858	1·510	336	591	28·5	47·26	3420	24·7	40	41·	28	52	,,	,,
6	·192	4·876	...	...	·0290	18·71	·845	1·487	334	589	29·0	48·5	3480	27·0	43	42·	28	50	,,	,,
19/18	·048	1·219	·240	6·095	·0344	22·19	·7115	1·252	406	714	34·4	54·38	4128	31·0	45	48	29	54	,,	,,
7/14	·080	2·028	·240	6·084	·0352	22·72	·6953	1·224	415	730	35·2	55·34	4224	32·0	45	49	29	54	400	,,
19/17	·056	1·422	·280	7·110	·0467	30·15	·5228	·9201	553	973	46·7	68·65	5604	36	51	61	31	58	,,	,,
19/16	·064	1·626	·320	8·130	·0612	39·46	·4002	·7043	722	1270	61·2	84·07	7344	49·0	51	77	32	62	,,	,,
19/15	·072	1·828	·360	9·140	·0773	49·88	·3162	·5565	914	1608	77·3	100·08	9276	58	53	92	33	66	,,	,,
19/14	·080	2·028	·400	10·14	·0956	61·66	·2561	·4507	1128	1985	95·6	117·21	11472	70	56	110	35	70	,,	,,
37/16	·064	1·626	·448	11·38	·119	76·85	·2055	·3616	1410	2481	119	138·56	14280	83	59	130	37	75	,,	,,
19/13	·092	2·336	·460	11·68	·126	81·49	·1937	·3409	1491	2624	126	144·55	15120	85	61	137	37	76	,,	,,
37/15	·072	1·828	·504	12·80	·151	97·13	·1624	·2858	1785	3141	151	165·34	18120	97·5	62	160	38	80	300	,,
19/12	·104	2·641	·520	13·21	·161	104·0	·1515	·2666	1906	3354	161	173·73	19320	100	66	170	39	82	,,	,,
37/14	·080	2·028	·560	14·20	·186	120·1	·1315	·2314	2203	3877	186	193·65	22320	120	64	190	40	86	,,	,,
37/13	·092	2·336	·644	16·35	·246	158·7	·09947	·17506	2914	5128	246	238·82	29520	143	70	237	41	95	,,	,,
37/12	·104	2·641	·728	18·49	·314	202·6	·07783	·13698	3723	6552	314	287·03	37680	180	73	300	44	103	,,	,,
61/12	·104	2·642	·936	23·778	·5316	342·8	·04721	·08308	6145	10815	531·6	417·9	63546	260	82	450	47	124	,,	,,
91/12	·104	2·642	1·144	29·062	·7942	512·2	·03164	·0556	9181	16158	794·2	564·75	94820	350	90	620	51	144	,,	,,
91/11	·116	2·946	1·276	32·406	·9881	637·3	·02543	·0447	11422	20102	988·1	665·26	117970	420	94	740	53	158	,,	,,

conductor, and this is directly proportional to the diameter. Consequently, as the wires increase in diameter, the temperature increases at a too rapid rate, and it is clear that small wires will carry more than this rule allows, whilst large conductors should have a less current density than the fire offices allow. This is very apparent when we compare the current density according to 1,000 ampères per square inch with that given by Kennelly's rule. From an engineering point of view, the values given under the Institution of Electrical Engineers' section are more specific, and are recommended in all cases.

Calculations for Cross-Section of Conductors.—Although the accompanying table is invaluable, and may be used for many problems occurring in practice, still, there are many points of detail which demand special consideration. In many cases, for instance, the permissible drop in volts for a given length of cable has to be taken into account as well as the current density, and many engineers have drawn up wiring rules to assist them in making their calculations. A very simple and useful rule, known as Sayer's wiring equations, will now be described. It was published in the *Electrician*, Jan. 31, 1890 (Vol. XXIV), and, as will be observed, it is simply an extension of Ohm's law. Thus, if—

l = length in feet of wire (lead and return),
C = average current strength to be carried,
e = drop in volts for l feet of the wire,
K = feet per ohm resistance of cable.

Now, by Ohm's law—

$$C = \frac{e}{R}, \text{ and } e = CR; \text{ but } R = \frac{l}{K}.$$

$$\therefore e = C \times \frac{l}{K}, \text{ and } K = \frac{Cl}{e}.$$

Now, K is of the nature of a constant for each gauge of wire, the various values being given in the accompanying table. The following examples illustrate the method of using these equations :—

(1) A corridor is 100ft. long. Determine the size of cable to carry an average current of 15 ampères with a loss of 0·5 volt.

$$\text{Since } K = \frac{Cl}{e}. \quad \therefore K = \frac{15 \times (2 \times 100)}{0{\cdot}5} = 6{,}000.$$

and the cable with a valne of K nearest to 6,000 (see table) is 19/17. Consequently, a 19/17 cable would be used.

(2) A cable 200 yards long (lead and return) of 19/18 carries an average current of 7 ampères. Find the drop in volts.

Since— $$e = \frac{c \times l}{K}$$

And— $c = 7$ ampères, $l = 200 \times 3 = 600$ft.

And— K for 19/18 cable = 4,128

$$\therefore e = \frac{7 \times 600}{4{,}128} = \frac{4{,}200}{4{,}128} = 1 \text{ volt.}$$

(3) What current can a 7/16 cable carry for a distance of 80 yards with a loss in pressure of 5 volts?

Since— $$c = \frac{Ke}{l}$$

And— K for 7/16 cable from table = 2,700

$e = 5$ volts, and 80yds = 240ft. = l

$$\therefore c = \frac{2{,}700 \times 5}{240} = 56{\cdot}25 \text{ ampères.}$$

(*To be continued.*)

CONSTRUCTION OF ARCHES IN CONCRETE.—XIV.

WE have now investigated and recorded all those details respecting the actual experiments undertaken with arches built of stone, brick, concrete, and concrete in combination with iron and steel, which we judged worthy and possessing both interest and valuable information for our readers. After having ascertained the manner in which arches constructed of the materials already mentioned behaved when submitted to tests of so severe and crucial a character as to be carried to the point of fracture, it was resolved to add one more example to the list. It was considered, and very properly too, that the trials would not be complete until an arch of similar dimensions and proportions to those previously experimented upon, but composed solely of wrought iron, was tested likewise *à outrance*. Cast iron always was, and although of recent years greatly superseded by its wrought iron and steel rivals, is to some extent still a favourite material for bridges of that particular type. Old Southwark Bridge with its unsurpassed central span of 240ft., still holds its own bravely, though the weight now thrown upon the old structure was never contemplated by its designer, Rennie. No doubt the load brought upon an ordinary road or street-traffic bridge is considerably lighter than that to which a railway bridge is subjected. At the same time, cast-iron arches of a span of 200ft. are still doing good suit and service upon our own lines of railway.

Mild wrought iron was accordingly the material selected for the experimental arch which now claims our attention. Its principal dimensions were as follows: The span was 76ft., and the intradosal rise 15ft. 2in. There is one peculiarity in this arch which was not shared in by the other competitors, and is deserving of notice. Instead of the axis, and consequently the contours of the soffit and extrados, being of the usual curvilinear or segmental form, they were made polygonal, as will be subsequently seen from the drawings we shall give of the whole general design. One reason for adopting this particular form, was

that it facilitated the putting together and the building up of the structure. Another was probably due to the fact that the parabola is the correct curve for the line of pressure of an arched rib when under a uniformly-distributed dead load. When a live load is substituted for a dead load, the ellipse takes the place of the parabola, or should do so, if practical requirements and exigencies did not demand that the dictates and assumptions of theory must frequently be modified, to a greater or lesser extent, in actual construction. As a matter of fact, the curve usually adopted is the segment of a circle. When a given proportion of depth to span is not exceeded, it adequately fulfils sufficiently approximately the conditions governing strength and stability. Besides, it is a much simpler and more economical method of carrying out ironwork in the "sheps," to use a constant or radial templet, than a dozen or so due to the number of ordinates needed for the accurate delineation of the other conic sections. As examples of the three forms with which we are all acquainted, it may be stated (adhering as much as possible for the present to metallic iron arches only, and selecting those over

FIG. 1.

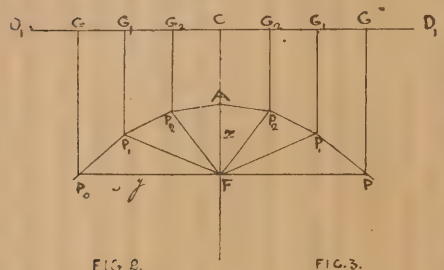


FIG. 2.

FIG. 3.

FIG. 4.

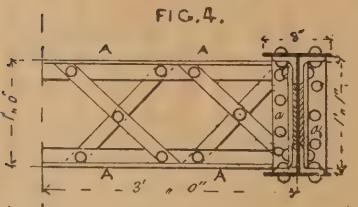
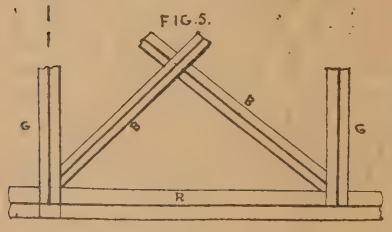


FIG. 5.



our Metropolitan river), that the ancient moribund structure at Vauxhall is segmental, and so also, which is more apropos to the question, is Blackfriar's Bridge. Westminster Bridge, unquestionably the handsomest anywhere and everywhere over the Thames, belongs to the parabolic type, although it is not exactly a pattern to follow. For the elliptical and segmental forms, reference must be made to Waterloo Bridge, which is, similarly to that at Vauxhall, on its last legs, and to London Bridge.

The axis of the arched rib under consideration is itself a polygon, each joint or apex of which is situated upon a parabola, having a certain parameter, which can be readily calculated from the data which are supplied. It will be as well, perhaps, to explain this identity a little more fully for the benefit of our younger readers, the more especially as the parabola, the ellipse, and hyperbola, which certainly do belong to the domain of co-ordinate geometry, are frequently looked upon as quite incomprehensible without the aid of the higher mathematics. Generally, let $D_1 D_1$ in Fig. 1 be any given straight line, and F any point situated anywhere except on the straight line $D_1 D_1$ itself, and of which the position is known. From any points G, G_1, G_2, equidistant or not in the line $D_1 D_1$, plot off perpendiculars to it in the directions of $G P, G_1 P_1, G_2 P_2$. From the point F draw lines $F P, F P_1, F P_2$, intersecting the lines drawn from the points $G, G_1 G_2$ in the line $D_1 D_1$, and perpendicular to it, in such a manner that $F P = P C$, $F P_1 = P_1 G_1$, $F P_2 = P_2 G_2$, and so also for the other side of the vertex of the parabola at C. If the point P be supposed to move so that it occupies successively the positions shown at $P_1, P_2, A, P_2, P_1, P_0$, it will describe the parabola P A P_0. It is scarcely necessary to point out that F A = A C and that the points $P_1, P_2 \ldots P_0$ must all be in the same plane with the line $D_1 D_1$, and the point F. A few other particulars are required before we can obtain the value of the parameter of the metallic arched rib. The line $D_1 D_1$ is termed the directrix, and the point F the focus of the parabola. The line F A C represents in direction the axis or principal diameter of the parabola. It is a property of the parabola that if y denote any ordinate to a diameter, and x represents the corresponding abscissa, and P = the parameter of the diameter, then we have the general equation—

$$y^2 = P \times x \quad \ldots\ldots\ldots\ldots\ldots \quad (1)$$

which is also known as the "equation to the parabola." It may be observed that in geometry the parameter signifies a constant right line, which is common to the ellipse and hyperbola, as well as to the parabola. It is also called the *latus rectum*. From the above equation, by transposing, we obtain—

$$P = \frac{y^2}{x} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

In Fig. 1 $y = P_0 F$, and $x = F A$, so that—

$$P = \frac{P_0 F^2}{F A} \ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

but from the dimensions of the iron arched rib, $P_0 F$ = 38ft., and F A = 15·2ft. Inserting these values in equation (3) it becomes—

$$P = \frac{38^2}{15{\cdot}2}$$

from which the value of the parameter becomes equal to—

$$P = \frac{19 \times 19}{3{\cdot}8} = 95\text{ft.}$$

The general arrangements for testing the wrought-iron arched rib were the same as those adopted for the similarly proportioned examples constructed of the other materials, so that it will be unnecessary to further illustrate or describe them. Though the depth of the rib was maintained constant throughout the whole span, with the exception of about 18in. in length at the springings, where it was increased in order to obtain a good bearing upon the articulated pivots, which were of cast iron, the sectional area was not uniform.

There was a general minimum cross section employed, varied, however, at those points where increased stresses were brought upon the structure. These two different sections are shown in Figs. 2 and 3. The former represents the minimum section, which is built up of two flanges, consisting each of a single plate, 8in. by $\frac{3}{8}$in., a pair of angle irons, $3\frac{1}{4}$in. by $3\frac{1}{4}$in. by $\frac{3}{8}$in., and a plate web, 1ft. 1in. in depth, and $\frac{3}{8}$in. in thickness. The rivets uniting the web and flanges were $\frac{3}{8}$in. in diameter. In Fig. 3 is shown the maximum section, which is strengthened by the riveting up of two additional plates, each 8in. by $\frac{3}{8}$in. This reinforcement of the arched rib at certain points will remind those who have perused our former articles on this subject, of the similar increase of material over and above the amount employed in the minimum or normal cross-section, which was given to arches built of brick and concrete. It is evident, therefore, that dangerous points, as they were termed, exist in metallic arched ribs, as well as in those constructed of other materials, and whether belonging to the simple or compound system. For the purpose of the experiment upon the iron arch, two ribs were constructed, and erected parallel to one another, at a distance of 6ft. apart, measured from centre to centre of the web of each rib. It was necessary in order to give the *tout ensemble* sufficient lateral rigidity, to interbrace the ribs at intervals measured horizontally, of every 6ft. Notwithstanding the comparatively small depth of the arched ribs, some system of bracing them together to resist the pressure of the wind and other disturbances which are practically unavoidable and invariably present when experimental trials of this character are in progress, was imperative. Wind, or sway-bracing as the American engineers call it, may be introduced between the girders composing bridges, roofs, or other trussed or solid frames in three different planes—the horizontal, the vertical, and the diagonal. It may be mentioned that many descriptions of bracing may be of solid or of open work.

Both vertical and horizontal sway-bracing were employed to impart stiffness to the ribs forming the metallic arch. The former is shown in Fig. 4, which is a half-cross section through one of the main ribs. In this instance the vertical bracing consists of small lattice girders, A A, securely riveted to the ribs by the angle irons *a*. The outside angle iron *a* is placed to act as a stiffener, and to transmit the stress uniformly throughout the whole rib instead of allowing it to bear upon one-half only of it. Considering the small depth of the ribs, it might be urged that a lattice girder is somewhat in excess of the actual requirements of the case, and that every purpose might have been adequately fulfilled by the adoption of simple sway-rods. Perhaps so; but those carrying out the tests are, after all, the best judges of what were the real necessities of the trial, and no blame can possibly be attached to them for taking every precaution that skill and experience might suggest.

In Fig. 5 is given a plan of the horizontal diagonal bracing between the main ribs. That is, the bracing bars B B are situated in a horizontal plane, but not in a direction parallel to either the main ribs R or the cross-girders G. It must not be supposed that both the systems of bracing just described and illustrated can be employed indiscriminately to all structures regardless of their form and mode of construction. It is obvious, for instance, that in an ordinary "through" bridge—that is, a bridge in which the traffic, whether road or rail, passes through between the side girders—the vertical type of sway-bracing shown in Fig. 4 could not be employed. Neither, for the same reasons, could the horizontal or lateral bracing, of which a skeleton plan is given in Fig. 5, be used in the same kind of structure for the upper booms or flanges, although it could be, and is, used always to stiffen the platform and the lower booms. It will be pointed out presently that both these descriptions of bracing can be employed to stiffen a through bridge under certain conditions which are rarely complied with. But both these types of bracing are adopted in a "deck" bridge with great facility, and that is the reason why they can be so utilised. An arched-rib bridge, to all intents and purposes, is a "deck" bridge, since the loading is all above the main ribs. Within the depth of the ribs the latter can be interbraced to any extent and in any plane.

Another case of bracing here presents itself, and may be investigated in a very simple manner. Suppose that the plane in which Fig. 5 is imagined to be turned round through an angle of 90°, and so become a vertical instead of a horizontal plane, and let C C represent the side girders of an ordinary "through" bridge. Then R may be considered to occupy the position of the cross girders. The introduction of what would now become the vertical diagonal bracing B B would clearly be impracticable. As an example for illustration, we may take the tubular bridge carrying the London and North-Western Railway over the Straits of Menai. No such bracing as that represented in Fig. 5 could be employed in the interior of the tubes. It would, nevertheless, be an error to come to the conclusion that the tubes are altogether without sway-bracing. The cells comprising the flanges or booms, which run transversely across the whole breadth of the tubes, unquestionably act as vertical sway-bracing. It must, however, be admitted that their depth is very disproportionate to the duty they have to discharge, but at the time this unexampled specimen of a bridge was constructed, very little, if any, attention was bestowed upon wind-pressure. Indeed, but little or nothing was known about that important subject, and practically, even at the present time, our knowledge is still very deficient. The case which was previously alluded to—viz., that in which both vertical and horizontal bracing could be used, may be now adverted to. If the side girders are abnormally high, so as to allow of vertical and horizontal bracing being introduced above the maximum permissible height of all traffic underneath, the problem is solved. But this, although quite possible in railway bridges, is nearly impossible in ordinary road bridges,

because in those over public roads, streets, and main thoroughfares, a minimum height of a clear 16ft. must be left between the level of the road and the lowest part of any standing work above. In other words, neither vertical bracing nor horizontal nor lateral bracing can be employed in "pony truss" bridges. There is one other form of bracing which is rarely used in bridge and roof designs, but very much adopted in other descriptions of building construction. It is frequently necessary to brace a large and high aperture, or walls or columns which are in positions which do not permit of cross or diagonal bracing, or of vertical bracing in the ordinary sense of the term. The description of bracing employed for examples of this character is known as "portal bracing." It is very seldom used in this country, but is common where "sky-scrapers" abound. It may be either of the solid or open type, but the preference appears to be given to the latter. T. C.

ARCHITECTURAL ASSOCIATION.

THE fortnightly meeting of the Architectural Association was held at 9, Conduit-street, W., on Friday evening, the president, Mr. Hampden W. Pratt, F.R.I.B.A., in the chair. Messrs. C. J. Butcher, A. St. John Diament, A. G. Ross, J. Henry and W. H. Williams were elected as members, and Mr. A. G. Angel was reinstated in membership. Mr. E. Howley Sim, the secretary, proposed a vote of thanks to Mr. G. B. Carvill, F. D. Clapham, and Leonard Butler for their services in connection with the very successful entertainment and musical play given on the previous Friday, and also to Messrs. R. Phené Spiers, A. H. Hart, W. H. Atkin Berry, W. G. B. Lewis, C. C. Dukie, and the members of the Water-Colour Class for the loan of drawings and photographs exhibited on that occasion. The name of Mr. A. Cox, who designed the cover of the programme, having been added, the motion was carried with hearty applause. The President announced that the next concert of the A.A. Lyric Club would be held on Friday, the 10th inst. (to-night) at the Club-rooms, Swallow-street, Piccadilly, and that a General History Class would be commenced on Thursday, the 23rd inst. A number of donations to the library were announced by Mr. Howley Sim, and acknowledged with thanks.

A paper on the subject of

HIGH SCHOOLS FOR GIRLS

was read by Mr. J. Osborne Smith, F.R.I.B.A., and was illustrated by numerous plans and elevations, and by very clear lantern slides. During the past twenty-five years, the author remarked, a goodly number of these schools have been established, and for a lesser number special buildings have been erected. The requirements have naturally grown, and experience has taught many valuable lessons to all concerned. High schools are superior day schools for girls of all classes above those provided for by the Elementary Education Act. There were no high schools twenty-five years ago: the word "high" was not used as applied to schools until the incorporation of the Girls' Public Day School Company, Limited, in June, 1872. The starting of this company to establish and maintain in London and the provinces superior day schools forms an epoch in the education of the larger half of the inhabitants of England. It was an attempt to meet and correct the defects pointed out in the report of the Schools' Inquiry Commission:—"Want of thoroughness and foundation; want of system; slovenliness and showy superficiality; inattention to rudiments; undue time given to accomplishments—and these not taught intelligently or in any scientific manner; want of organisation." The first school was opened in January, 1873, at Chelsea, in an old house adapted for the purpose. There are now thirty-four schools belonging to this company, and various others have been established by limited liability companies, which were formed usually to establish individual schools. Existing premises, more or less adapted for the purpose, formed the first homes of many flourishing schools now housed in buildings the planning of which is based upon the knowledge thus gained. Work carried on in buildings originally erected as private residences, or for other purposes, revealed almost hourly weak places where time was lost, where adequate supervision was impossible, and where it was hopeless to combat the evils attendant upon temporary and ineffective means of ventilation, low and small rooms, narrow staircases, weak floors, falling ceilings, small and dark cloak-rooms, small fireplaces, insufficient light, and other defects. These drawbacks to effective teaching were well remembered, discussed, and digested whenever a new home was in view, and the new schoolhouse, planned and erected for a definite purpose, became at once an added pleasure to the daily lives of both mistresses and pupils, and an effective aid to education. One of the most

PROMINENT CHARACTERISTICS OF A HIGH SCHOOL

should be cheerfulness produced by ample lighting, plenty of sky visible, possibility of the sun himself being able to peep into every room, pleasing wall surfaces, good pictures, &c.; all these, except, perhaps, the last, form a part of the design, and if the architect will make tempting provision for hanging pictures in suitable positions, the pictures will soon follow. Gloom and semi-darkness should find no place where children are being taught. Spaciousness, too, is an important quality to secure; ample floor-space is here meant—not loftiness. Class-rooms need not be lofty to be healthy; an excessive cubic space above the pupils' heads makes ventilation and warming more difficult, and is simply inclosed space in the wrong place. It is obvious, also, that inasmuch as it is found desirable to limit the number of children in a class to thirty or forty, the floor-space must be limited to dimensions which will enable the mistress to keep the pupils well under control, to speak to them all effectively without strain, and have access to each desk without disturbing the pupils at adjoining desks. These considerations, as well as those of access to the room, space for and around the mistress's desk for teaching apparatus, &c., must be regarded as determining the extent of floor-space, even when it is not urgently necessary to keep always in mind the cost of every cubic foot of space to be inclosed. When the room is warmed by the usual open fireplace, the best position for that cheerful, if wasteful, contrivance must not be overlooked, because it also demands a portion of the available floor-space. The relative positions of the door and fireplace in relation to the windows deserve more consideration than is usually given. Waste of space necessarily arises where both door and fireplace are not situated at the end of the classroom occupied by the teacher. It is not convenient for the fireplace to be in the centre of the end wall; sometimes it may be well placed near the door. The corner of the room on the right hand of the teacher is a position with many advantages. The fireplace should contain some form of ventilating or warm-air producing grate, with fresh air brought to it from outside well above the ground, all inlets being short and accessible for cleaning; the air-chamber for warming the incoming air ought also, for cleanliness' sake, to be readily accessible. In large rooms, or where there are two or more external walls, it is sometimes found desirable to supplement the fire by hot-water pipes under the windows or along the wall opposite to the mistress. Open fireplaces should not be omitted from schools of this kind without very full and serious consideration of the means to be employed to warm and ventilate the buildings, and especially the classrooms. A form of classroom for thirty pupils, which, from its frequent use, may be accepted as convenient both in shape and size, shows an allowance of floor-space per pupil of 13ft. 6in. super. (or 13·6ft., to be quite accurate), and the cubic space of 163·8c.ft. per child. Space should be provided between the walls and desks for access for supervision, and to enable the children and mistress to write or draw upon the slates or blackboards upon the walls. Movable blackboards are inconvenient appliances; but as they are less costly than continuous slates, the inconvenience still prevails in too many instances. It is possible still to find classrooms with windows, blackboards, and desks so arranged that it is impossible for all the scholars to read what has been written or drawn for their instruction. The ceilings should be as much as possible unobstructed by beams or other timbers which prevent the ready flow of air or check or divert the air currents. A point which affects the health and comfort of teachers is the provision of windows at the back of the children. If these windows happen to be in a south wall, the evil becomes very trying. A teacher stated a few months ago that one of his eyes was seriously injured from having to face a south window; moreover, under such conditions some of the pupils' features are in shade, and it is not possible to distinguish the effect of the teacher's remarks upon the children. Except in cases of special difficulty, it is possible to effectively light any class-room, large or small, from windows *in one wall only*. An additional window may be useful for obtaining direct sunlight in an otherwise sunless room, or for securing cross-ventilation not otherwise obtainable; but it will be found desirable to make that window smaller than the rest, or to place it in a corner of the room, or to arrange means of regulating the light from it when required. The chief use of the assembly-room or

CENTRAL HALL

is to accommodate all the pupils at one time daily, and its size is fixed accordingly. If the school is thought likely soon to expand beyond a normal standard, this room may be built to accommodate a maximum number of possible pupils. This hall may serve for access to the classrooms upon two floors, a consideration by which its height is often determined. The supplementary purposes for which the hall is used also affect the floor-space, shape, and dimensions. This important room should be near the principal entrance, and have ample means for access; it was a common defect in the earlier schools that only one entrance was arranged. This should be regarded as inadmissible, except in very small schools. The position of this room in relation to the classrooms is probably the most important factor in determining the general plan of a school. Side-lighting for this hall is preferable, for the sake of ventilation. Where top-lighting is used, great care and judgment are required to avoid too much glass, which, moreover, should be placed as near the sides as possible, in order to prevent deep shadows being cast upon the floor from the balconies. Centre top-lights are rarely successful for schoolrooms of any kind. Good acoustic conditions ought to be secured for this room.

PLANNING.

For convenience of consideration, plans may be divided into three types—viz., (1) those which have the principal classrooms and the assembly-room separated by corridors, as in this slide; (2) those where the classrooms are grouped round a central hall; (3) those which have classrooms on one, two, or three sides of the assembly-room, leaving the fourth side an external wall. The difficulties of a contracted or otherwise comparatively unsuitable site often lead to varieties of treatment not included in either of these types. These may be regarded, however, as exceptional plans adapted to special situations rather than typical examples. Sometimes a feeder is fostered in the form of a kindergarten room, which should be exceptionally cheerful, on the sunny side of the ground floor, near to the pupils' entrance, and to separate lavatories. A spacious room for drawing purposes should face north or east, with as much floor-space as can be afforded, and wide doorway, fitted with cupboards, rails and shelves for models, racks for boards, drawers for paper, drawings, and materials, a sink, dark blinds, &c., well lighted from one side or end. Usually the best situation for this room is upon the top floor. Laboratories for teaching chemistry and physics (separate rooms for each if possible), with impervious floors, ample side or top lighting, and special means for ventilation, fitted with working tables, with water, gas, and electricity laid on. Also a small room for balances, cupboards for stores, apparatus, &c. The size of the laboratory must depend upon the extent to which science is taught in the school. It should be lofty, well lighted, with the windows just above table height and extending to the ceiling; ventilation must be specially studied, particularly the means of readily producing cross currents of air at the levels of the worktables and ceiling. It is convenient sometimes to plan a separate building for science teaching, a covered playground fitted as a gymnasium, a luncheon-room for mistresses and pupils, with the kitchen, and offices, and housekeeper's rooms adjoining. These domestic rooms should be planned with a separate entrance, and be cut off from the schoolrooms, with prompt access from the kitchen to all the school entrances, and from the school to the dining-room. On no account should any of the noise or odours from the domestic rooms be allowed to enter the school proper. Well-lighted and ventilated cloakrooms, not less than 9ft. high, and large enough to afford floor-space for fittings, should also be provided. The best position for cloakrooms is, of course,

near the pupils' entrance. Stands for cloaks should be about 6ft. apart from centre to centre, and about 1ft. lineal of stand space should be allowed for each pupil, with means for drying wet clothes. A sitting-room for assistant mistresses should overlook the playground and its entrances, and be reasonably near to the head mistress's room. A small cloakroom and lavatory are convenient and desirable adjuncts. It should not be less in size than an average classroom. The glass line of the windows should be nearer the floor than in the classrooms; in this, as in other respects, the room should be regarded as a workroom and sitting-room combined. The head mistress's room, with secretary's room and a small waiting-room, must be near the chief entrance, and the platform end of the assembly-room. Neither of them need to be so large as a classroom; but from the windows of the head mistress's room it should be possible to see the main entrances to the building. This room is a workroom and also a reception-room; it should be well lighted, cheerful, and convenient, with a lavatory near at hand. Stairs should be of reasonably fire-resisting materials which will not become slippery, have easy gradients, wide treads, and shallow risers, suitable for the younger children, thoroughly well lighted, and at least 4ft. wide, to enable two files of pupils to pass each other. Those to cloakrooms, or where there is an exceptional amount of traffic, should have handrails on both sides to prevent accidents, and be, say, 5ft. wide. The position, form, and size of the staircases are most important—no greater inconvenience in a school can be conceived than a carelessly designed staircase in the wrong place. A building designed to accommodate more than, say, 150 children, should have two distinct staircases, as far apart as possible, but both near the assembly-room. Windows and circular or elliptical staircases are inconvenient, and ought never to be planned for these schools, wherever it is possible to avoid doing so. The rise of each step should not exceed 6½in.—6in. is better when obtainable; 11in. should be the minimum width of the tread (from nosing to nosing). Staircases need not be lofty, if sufficient head-room and ample lighting be secured. Lavatories with washbasins to accommodate, say, 5 per cent. of the pupils at one time, and closets for, say, 3 per cent., can be in most cases arranged on two or more floors in a separate wing or other suitable position, disconnected from the main building by a staircase or well-ventilated corridors. A bicycle store or shed has now become an essential requirement, as girls now ride to school in great numbers. Last, but not least, a spacious levelled playground for tennis and other games, small border gardens for the pupils' botany specimens, cricket and hockey meadow, &c. Seven feet is a desirable width for main corridors, which should not be of less height than the rooms adjoining. Windows at each end are essential, and there should be ample lighting throughout, especially at points where they deviate from a straight line. Having thus brifly noted the requirements, let us now consider the

THREE TYPES OF PLANS

before mentioned. It will be seen that in the first or corridor type the assembly-room is treated as a separate room, and does not afford access through it to other rooms. It can therefore be used for special purposes without causing inconvenience or hindrance to work going on in the class-rooms, and also without the work going on in the assembly-room being interrupted by children passing through from the classrooms. That is an obvious advantage provided at the cost of constructing the corridor. The corridor constitutes the chief variation between this type and another. In an executed design of this first type the most important story is the first floor, which is approached by covered stone steps. The head-mistress's room has been placed on the right of the vestibule, and a waiting-lobby on the left; two classrooms and a corridor are entered from this lobby: other classrooms are on the right, and two at the left in a line with the assembly-room. Two well-lighted staircases, one at each end of the corridor, lead from the ground-floor to the second floor, and there are large borrowed lights between the assembly-room and corridor, and over each classroom door. On the second floor are classrooms over those below, a small laboratory over the head-mistress's room and vestibule; one of these classrooms is fitted as a science lecture-room, and a large studio at end of assembly-room. On the ground floor are the pupils' entrance, with cloakrooms on the right and dining-room on the left, a gymnasium under part of the assembly-room, mistress's room, lavatories, tradesmen's entrance, kitchen, and offices, two rooms for special work, furnace chamber, fuel store, serving room, &c. There is access to the playground at three points. Most of the classrooms are lighted from the south-east, the assembly-room faces north-west, and the studio north-east. This school accommodates 320 pupils, and is found, after being in use for twelve years, to be convenient and suitable for the purpose. Where the rooms are grouped round a central hall, the second type of plan, some of them will be less cheerful than others, owing to the diminution of direct sunlight. The noise of drilling and singing will interfere more or less with the work going on in the adjoining classrooms, and the passing of children from the classrooms to other parts of the building will tend to disturb the work going on in the assembly-room. To set against these drawbacks, which are possibly more apparent than real, there are many advantages—viz., compactness of plan, economy of space, increased facilities for effective supervision, &c. The assembly-room gives access to two stories of classrooms, the upper ones being entered from a gallery arranged on all four sides. This form of hall is easier to light than would appear at first sight. In fact, one has to be very careful to avoid having too much lighting surface, which is also chilling surface in cold weather, and heating surface in summer-time. It is a common and fatal error to underestimate the value of a square foot of top-light—fatal to comfort, convenience, and health. The assembly-room is occasionally used also for prize distributions, lectures, concerts, private theatricals, and similar functions, and by this plan the adjoining rooms and galleries can be used to increase the accommodation for visitors and parents. Plans of the third type are a variation upon the central hall type, inasmuch as there are no classrooms upon one side, from which the hall is lighted through windows in the only external wall. In this form of plan the classrooms are grouped along the quietest or most cheerful side of the building, the assembly-room, studio, laboratory, cloakrooms, and other rooms occupying positions which are less important in this respect. Galleries are required only on one or two sides, and the drawbacks of the central hall type of plan are somewhat less in this type. The conditions of the site usually settle which type of plan shall be used. There are, of course, some sites where all sorts of variations and adaptations will be found necessary. Some peculiar and exceptional opportunities for skilful and picturesque planning arise when one has an existing building to utilise and fit in. The width of doors to classrooms should be limited to dimensions which will permit the passage of the usual movable furniture; 3ft. by 3ft. 3in. is usually sufficient. Those to studios, corridors, cloakrooms, dining-rooms, entrances, &c., should be wider, with pairs of doors hung folding or to swing, as may be found desirable. Glazed upper panels in doors, and also a second door leading from one classroom to another are very useful in assisting supervision and maintaining discipline. Glass panels are sometimes objected to for apparently good reasons; but they are usually found to be very convenient.

NOTEWORTHY POINTS AS TO WINDOWS.

The essential points to be borne in mind regarding windows are:—The chief lighting for *all* rooms, except those for science teaching, should be in one wall only—that on the left-hand side of the pupils—with an extra window conveniently arranged where possible for cross ventilation or extra sunlight. The glass line should be as near the ceiling as possible, and not nearer the floor than 3ft. 6in. or 4ft. in classrooms, and the glass should be clear, except in lavatories and a few other positions. The window-frames should be as near the outer surface of the wall as appearance, Building Acts, and other circumstances will permit, to afford means for obtaining admission of air without interfering with blinds, &c., and also to allow the maximum of floor-space to be used without the desks being placed too close to the glass. All windows should be made so as to be opened easily by children, and to the fullest extent possible, and should be constructed to permit portions of them to remain open, if desired, while work is going on, without the possibility of downward currents of air being felt by the pupils. The most suitable kinds of windows are those which can be opened most readily, and which when open will not admit rain or expose the occupants of the room to strong currents of air. French casements and centre-hung sashes, although very useful in some positions, are not as a rule deirable for classrooms. Double-hung sashes, with hopper casements over them hung to the transom are a common and useful form of window. Hopper casements hung to sill and to transom, with centre or side-hung sashes between them, are found convenient, and comply with the conditions above referred to. In the wall opposite to the windows, openings near the ceiling, fitted with hopper casements, are extremely useful in obtaining cross ventilation of the rooms during the intervals for recreation and when the school is closed. Fireplaces are conveniently arranged in the wall facing the children, not in the centre, if it is possible to place it either near the door or in the corner near the windows, especially when warm-air grates or stoves are used, as then the cold air inlets are short and accessible; it is very important that all stoves or grates used for warming the air should be capable of being taken to pieces to allow the air channels to be kept clean.

CLOAKROOM FITTINGS.

Stands from 5ft. to 6ft. from centre to centre; seats and boot-racks, with hot-water pipes below them, are usually provided. Where this is not possible, other means for occasional drying of damp clothes are desirable. Cement, asphalte, tiles, wood blocks, or similar materials capable of being readily cleaned are most suitable for the floors; cement or varnished wood for dadoes.

LAVATORY FITTINGS.

The water should be laid on to the basins and waterclosets direct from the high-pressure mains, or from cisterns placed at a considerable height above the lavatories. The diameter of the pipes will depend upon the size of the lavatory ranges or the number of closets to be served, as well as their position below the main cistern. A very important point to bear in mind is that the closets and lavatory basins are often all in use during the same time; therefore, all service-pipes must be exceptionally large. There are so many disadvantages connected with the small flushing cisterns which water companies insist upon, that other methods of flushing the closets are arranged when water is supplied through a meter, such as lead-lined trough and spindle-valves over waterclosets or continuous cistern. The stoneware trough and automatic flushing-tank arrangement for waterclosets partially avoids these difficulties; but a separate watercloset apparatus and flushing arrangement has many advantages over the trough method. Ranges of waterclosets in or adjoining a building should be invariably separated from the corridor or stairs which gives access to them by a well-ventilated lobby or passage, in which may be placed the lavatory basins. These lavatories should be roomy enough to allow pupils to pass freely to and from the waterclosets while others are using the basins. The height of the lavatories and waterclosets need not exceed 8ft. 6in. or 9ft.; a separate window for each watercloset, inlet ventilators near the floor of the lobbies or lavatories, and outlet flues from the ceiling level up to above the roof are desirable.

WALLS.

Walls must, of course, be built of sufficient substance to resist heat, cold, and moisture. Hollow walls in very exposed situations are useful, in spite of their disadvantages; but solid walls of good materials are better for ordinary positions. All openings in walls, flues, chases, &c., should be made accessible for cleaning. The greatest care should be taken, and thoroughly effective means should be adopted to prevent moisture penetrating the walls from above downwards, or from the ground upwards. Solid damp-proof courses, formed of asphalte, slate, cement, &c., ought alone to be used, being much more effective than the various glazed perforated substitutes.

ROOFS.

Roofs, if of the usual wood rafters, and slate, tile, or lead coverings, should be close-boarded, and have some non-conducting material under the outer coverings.

FLOORS.

Floors of classrooms should, if possible, be impermeable, and covered with wood. Where wood

joists are used special care should be taken to insure rigidity, and provide effective means of checking the passage of sound and air through the floors. Floors of all lavatories and science-rooms should be solid, with hard, non-absorbent coverings. The use of porous breeze concrete for such floors is not to be commended. Wood floor coverings should be polished, and have skirting fillets of sufficient width to keep the desks from injuring the wall surfaces.

VENTILATION AND WARMING.

The cost of forming and maintaining a system of mechanical ventilation, and the desire for an open fire for the sake of cheerfulness and prompt control, account for the fact that in most of the schools of the kind under consideration the open fireplace has been utilised. If a school building be designed to allow currents of air to sweep entirely across it during the pupils' absence, and each classroom be provided with two 9in. by 9in. or 14in. by 9in. shafts or flues from the floor to above the roof, with inlets to each at floor and ceiling levels, in addition to a large warm-air grate and suitable windows, it is found in practice that reasonably adequate means for warming and ventilating are thus economically obtained. Their effective use depends greatly, of course, upon the mistresses in charge of the rooms; but it is an exception to find a head-mistress who is not keenly alive to the value of the means afforded and familiar with the use of them. Vertical inlet tubes, deep sill fillets to windows, and the various valve ventilators, are all useful as aids, *when kept clean;* but unless air is warmed before it enters a school, the inlets will remain closed during six months of the year when fires are in use. This fact accounts for the popularity of the various ventilating grates, most of which can be taken to pieces periodically for cleaning, and work best when doors, windows, and ventilators are closed. The assembly-room, corridors, cloakrooms, lavatories, laboratory, entrance lobbies, and stair cases can be more conveniently warmed by hot-water pipes. It should be possible to raise the temperature in the corridors, cloak-rooms, lavatories, &c., to about 50° or 55° during cold weather, for the purpose of preserving a fairly equable temperature inside the building, and protecting the sanitary arrangements and water services from disorganisation by frost. The small pipe medium-pressure apparatus is found very useful for warming schools, on account of the small quantity of liquid used, enabling heat to be produced in less time than with larger pipes. These small pipes, moreover, can be used under skylights and in other positions where the larger pipes could not conveniently be placed. The practice of arranging hot-water pipes in channels below the floor of the spaces to be warmed, with open gratings above them, is unnecessary, wasteful, and dangerous, because of the difficulty of keeping the pipes and channels free from foul matter from boots and floors. Inclosing hot-water coils in ornamental casings is objectionable for the same reason. The last word upon warming and ventilating crowded rooms has not yet been said; the present methods are not perfect. The air in streets is polluted in a manner which it is to be hoped will be regarded with amazement in the near future, when thick clouds of unconsumed fuel, foul exhalations from so-called sewer ventilators at the level of the roadway, and the fibrous filth from wood pavements, are no longer allowed to adulterate the precious air, which ought to enter our houses unsullied by such dangerous and unpleasant companions. At present the windows and doors are often closed, and the air refused admittance, because it cannot enter alone. Air in buildings will always require warming in winter, but it need not require washing and filtering as it does now. The problems met with in endowed schools for girls are very similar to those in high schools, and are solved in much the same way.

A vote of thanks to the lecturer was proposed by Mr. Banister F. Fletcher, seconded by Mr. W. H. Seth-Smith, and having being supported by Messrs. E. Howley Sim, Louis Jacob, R. Langton Cole, G. Trolley, and the President, was carried by acclamation, and was acknowledged by Mr. Osborne Smith.

Mr. George W. Willcocks, M.I.C.E., held an inquiry at Hove on behalf of the Local Government Board last week, into an application on the part of the urban district council for sanction to borrow £3,500 for works of street improvement.

ART METAL EXHIBITION AT THE ROYAL AQUARIUM, MAY—JUNE, 1898.

THE preparations for this exhibition, which bids fair to be a very attractive one, are progressing favourably. The following gentlemen have already joined the Council:—

Professor Banister Fletcher, F.R.I.B.A., J.P., D.L., &c. (Chairman of the Council).
Maurice B. Adams, Esq., F.R.I.B.A., &c.
W. A. S. Benson, Esq.
G. Purdon Clarke, Esq., C.I.E., F.S.A.
Lewis F. Day, Esq.
George Frampton, Esq., A.R.A.
George C. Haité, Esq.
J. Starkie Gardner, Esq.
E. J. Kibblewhite, Esq., A.S.A.
Seymour Lucas, Esq., A.R.A.
Percy Macquoid, Esq.
Ellis Marsland, Esq., Hon. Sec. Society of Architects.
Sir Wm. Cuthbert Quilter, Bart., M.P.
F. W. Ruck, Esq.
Josiah Ritchie, Esq.
A. W. Smith, Esq., F.R.I.B.A.
Gilbert Wood, Esq., F.R.G.S.
Herbert Winstanley, Esq.
J. W. Wilkinson, Esq.
Edgar S. Shrubsole
(Organiser of the Exhibition, to whom all communications must be addressed).

A strong sub-committee is arranging a most interesting loan collection, to which it is hoped many of the City Companies and other owners of old metal-work, armour, coins, &c., will contribute liberally. The applications for space in the Trade section are numerous, and a very good show of the leading art metal-workers is certain.

Very useful features of the exhibition will be the Competitions in Design and Handicraft. The designs invited must reach the organiser of the exhibition, Mr. Edgar S. Shrubsole, at the Royal Aquarium, Westminster, by Tuesday, May 3, 1898.

CONDITIONS FOR CONDUCTING THE COMPETITIONS IN DESIGN AND IN HANDICRAFT.

1. Competitors may enter in any one or in all the subjects in Design and in Handicraft: they must pay a nominal entrance fee of One Shilling for each subject, which fee will be returned to them providing they actually compete.
2. All competitors in the Handicraft Competition will have to provide their own tools; and, subject to consent of London County Council and Fire Insurance Offices, forges, coals, and materials will be supplied.
3. No medals will be awarded in any class unless the judges are satisfied as to the merit of the work.
4. The competitors may attend each day to work at the Handicraft Competitions, from 3 to 5 and 7 to 9.30 p.m. from the 1st day of June until the 15th day of June. A record will be kept of the time occupied, and in case of equality of merit, the advantage will be given to the competitor who has done the same quantity of work in the least time.
5. Competitors in the Handicraft Competitions may bring any drawings they themselves may make, and any moulds or templates for use by them in such competitions.
6. All designs must be sent in on or before Tuesday, May 3, 1898. The envelope must bear a distinguishing mark or motto, be accompanied by a sealed envelope having outside the same distinguishing mark or motto, and inside the name and address of the competitor. This envelope will not be opened by the judges until they have made their awards.
7. In all cases the decision of the judges shall be final and absolutely binding upon all parties.
8. The competitors must during the competitions obey the directions of the judges, and of the moderators, and conform to all regulations which may be made by the judges.
9. If, in the opinion of the judges, the time allotted is not sufficient for the work to be completed, they may adjudicate upon the work in its unfinished condition.
10. All handicraft work, after the time allotted for executing the work, and all designs will be exhibited during all the time the exhibition is open.
11. All work and designs which obtain medals or certificates shall remain for future reference and exhibition for a period not exceeding twelve months, with the name and address of the competitor attached.
12. All work done in gold and silver to be absolutely the property of the Royal Aquarium and Summer and Winter Garden Society, Ltd.

SUBJECTS FOR WHICH DESIGNS ARE INVITED.

1. A street lamp-post for electric light; scale 3in. to the foot.
2. A wrought iron open panel, 2ft. 6in. by 1ft. 6in.; scale full size.
3. A weathercock, 7ft. high, on 6in. square lead-covered post; scale 3in. to the foot.
4. Repoussé coal scuttle in copper; scale full size.
5. Pair of wrought iron carriage gates and piers, opening to be 10ft. wide; scale 1½in. to the foot, with necessary details full size.
6. Wrought iron grille, 12in. high by 8in. wide, in solid oak door, with hinges, lock-plate, and knocker; door 4ft. wide and 8ft. high; scale 3in. to the foot. Details full size.
7. Wrought iron ornamental open screen with door in centre, dividing a hall in a residence; the hall 18ft. wide and 12ft. 6in. high; scale 1in. to the foot, with necessary details full size.
8. Wrought-iron or brass casket with enamel panels; its object is to contain the freedom of a City to be given to a General who has served Her Majesty successfully in India; scale full size.
9. Metal end of a coach-pole for a Mayor's State Carriage; the City is a seaport; scale full size.
10. A brass repoussé book-cover; the book is the "Pilgrim's Progress," its size, large quarto; scale full size.
11. A grille, to fill a semicircular arch 10ft. wide; the design is to be executed in wrought iron, and is to contain a central feature; it is suggested that electric light might be incorporated in this feature, but it is not compulsory; scale 3in. to the foot.
12. A lectern in brass or iron, suitable for a parish church; scale 3in. to the foot.
13. Wrought-iron balconette, 4ft. wide, projecting 3ft., and supported by cantilevers; scale 3in. to the foot.
14. Ornamental guard to prevent flower-pots falling into the street from the window-sill; drawing need only show two-thirds in width of the design; scale full size.
15. Cast-iron stove and mantelpiece with overmantel: fire, 14in.; mantel-shelf, 4ft. 6in. long; total height not to exceed 7ft. 6in., including overmantel. Give plan, front elevation, and end elevation; scale 1in. to the foot. Give details, full size of mouldings and enrichments sufficient to illustrate design.
16. A ewer and basin, soap dish and sponge basin; full size.

Note.—The method of execution of the drawings is left to the competitor; but the drawings must be practical and workmanlike, such as a craftsman would require. They must be mounted on stout cardboard, or on linen on wooden-framed strainers, with not more than 2in. margin all round. Two or more small drawings may be mounted on one board or strainer.

PRIZES TO BE AWARDED.

There will be one Silver Medal, one Bronze Medal, and a Certificate of Merit for each of the subjects in the Designs Competitions.

There will also be one Silver Medal, one Bronze Medal, and a Certificate of Merit for each of the subjects in the Handicraft Competitions.

SPECIAL MEDALS.

Two Gold Medals will be offered, one in the Designs Competitions, and one in the Handicraft Competitions, irrespective of subject. These medals will only be awarded in the case of special merit, and will be given in lieu of a silver medal.

SUBJECTS FOR WHICH HANDICRAFT COMPETITIONS ARE INVITED.

1. A 1in. square upright standard diagonally placed through bar, with ornamental head.
2. A stanchion head and saddle-bar, bilged.
3. A clean welding of scrolls, not split; the sketch shows it one-eighth full size.
4. Spray, exhibiting husks and covered junctions on each side of the stem.
5. Spray of natural foliage.
6. A panel, 18in. square, of interlaced bars and centre-piece scroll.
7. A pilaster filling, alternating scrolls and husks.
8. A hinge with rose and thistle terminations.
9. Ornamental projecting trade sign, with name panel in pierced lettering; wording of name in panel is left to the competitor.
10. Repoussé copper or brass plate, diameter about 12in.
11. Portion of a memorial brass.
12. Repoussé copper or brass finger-plate.
13. A wrought-iron knocker: design left to craftsman.
14. Lead ornamented bossed head for 4in. rainwater pipe, to be made from a sheet of lead: design left to craftsman. The size of the sheet of lead is 5ft. by 4ft.; 8lb. lead.
15. Two lead ears of different design, to secure 4in. by 3in. lead pipe: design left to craftsman. The size of the piece of lead 1ft. square for each ear; 6lb. lead.
16. A panel for a lady's card-case, either pierced, chased, or embossed: design left to craftsman.
17. A pewter ecuelle (as per sketch). The bowl to be 6in. in diameter. A copy of the original drawing will be lent to competitors.
18. A key-bow in gold, silver, or iron, for a dressing-case: design left to craftsman.

We give illustrations on p. 834 of the designs in the Handicraft Competition, for which the Council is indebted to the kind assistance of Mr. Lewis F. Day, Mr. Maurice B. Adams, and Mr. J. Starkie Gardner. The work done by the handicraft competitors will be performed each day at the exhibition itself from June 1 till June 15, from 3 till 5, and 7 till 9.30 p.m., and will undoubtedly attract many interested spectators.

THE SURVEYORS' INSTITUTION.

AT the ordinary general meeting of this Society, held on Monday evening last, a paper was read by Mr. F. Punchard (Fellow), of Kirkby Lonsdale, on "The Suggested Amendments to the Agricultural Holdings Act, 1883." As is usually the case at the first December meeting, when many country members are brought to London by their interest in the cattle show, the subject selected was, as the title indicates, a purely bucolic one; but Mr. Punchard's paper contained much which could not fail to interest anyone who is concerned, ever so remotely, with the great industry of agriculture. The Royal Commissioners, who have been reporting on the subject, expressed, Mr. Punchard said, a decided opinion that the policy of the three F's in its entirety would be a grave and serious injury to the agricultural community, and that rents had, as a rule, been adjusted to meet existing prices. They suggested that the landlord's consent be no longer necessary to certain improvements to roads, watercourses, to the making of gardens, the planting of orchards or fruit bushes on a

small scale, and some other similar "improvements." It would be an interesting, and perhaps instructive, return if we could have a statement of the cases in which the present provision as to drainage has been put into force, and whether where the statutary notice was given, the work was done by the landlord or the tenant, and (if by the landlord) how long he had received the stipulated interest on his outlay. The vagueness of the word "improving" as applied to roads and watercourses needed qualifying by a provision that the improvements must be of a durable nature—something beyond the mere putting into working order which was implied in the covenants of the lease. The majority of the Commissioners fortunately held that the landlord should still have the controlling hand over the permanent outlay on the estate, for which he would be ultimately responsible, and that he must not be converted into "a mere rent charger, or that medium of security for tenant's outlay," which Mr. Channing vaguely talked of. He was surprised that the Commissioners had not put the laying down of permanent pasture among the improvements as to which the tenant was to have a free hand. A good piece of newly-laid pasture was perhaps the best proof of continuous good farming, while the "accumulative fertility" cou'd not be easily extracted from it without the effects being apparent. He would advocate giving the tenant a free hand in laying it down; but after it had been down for, say, eight or ten years, he would not allow it to be ploughed without the landlord's consent. He believed that the proviso in the Act as to the "inherent capabilities of the soil" had been inoperative; but its retention showed that the landlord had still some rights or property in the natural and varying capabilities of his land. The author next went into the question of compensation for manurial value left at the end of a tenancy, and pointed out that a dishonest tenant could, by the use of chemical stimulants practically exhaust the land as fast as he put artificial fertility into it by the use of purchased feeding stuffs, and this he could do without detection, while at the same time claiming compensation for unexhausted manurial value. He thought home-grown corn fed to cattle should be treated as if it were purchased. The procedure under the Act was subject to several suggested variations. The arbitrators or referees were to be called valuers, and the umpire must be chosen from a list approved by the Board of Agriculture. The simultaneous delivery by landlord and tenant of notices of claim must tell against the tenant, as the landlord would, and in the case of a trusteeship must, put in every possible claim before he knew what the tenant's items of claim were.

A short discussion followed, in which part was taken by Mr. W. Willis Bund, who did not seem to have a very high opinion of some of the persons who set up for agricultural valuers; by Mr. J. W. Kensley, who thought that the less freedom of contract, as between landlord and tenant, was interfered with the better; by Mr. F. J. Smith, Mr. J. Shaw, Mr. D. Watney, and Mr. H. Donne. On the motion of Mr. Albert Buck, the discussion was adjourned.

CARPENTERS' COMPANY'S EXAMINATIONS.

THE annual examination in Building and Sanitary Construction, held by the Carpenters' Company, took place at their hall on December 2nd and 4th. Among the examiners present were Professors Banister Fletcher, F.R.I.B.A.; T. Roger Smith, F.R.I.B.A.; Henry Robinson, M.I.C.E.; and A. Wynter Blyth, Mr. Hampden W. Pratt (President of the Architectural Association), and Mr. W. Shepherd (President of the Institute of Builders).

The number of candidates who sat for the examination was larger than in the previous year. The entries proved that these examinations are valued in the provinces as well as in London.

The names of the successful candidates, arranged in order of merit, are as follows:—

Silver Medals.—Messrs. S. A. Switzer and H. F. Bridel.

Bronze Medals.—Messrs. H. C. Grubb, F. Hartnoll, Mr. Jno. Sanderson, and Jno. Parham.

Certificates.—Messrs. H. S. Higlett, E. J. Simmons, A. Thomas, H. Herbert, H. T. Hunt, F. Dawkins, Geo. Ellis*, J. Landen*, E. W. Turner*, W. W. Winn*, Jas. Nighy, H. Body, R. H. Ellis, and A. S. Henley. (* Equal.)

Mr. Alfred Carter obtained marks entitling him to a Silver Medal, which, as he already holds it, cannot be awarded to him again.

NOTES ON SURVEYING AND LEVELLING.—VIII.

By Walter Tester.

AS soon as the straights are pitched and ready for concreting, the surveyor will have to put in a series of sections as close as necessary, with pegs on the foot line, and at the outer edge set with the level, their tops being at the finished surface of the cycle track. As the section of the track is a straight line, the concretor can work between the two pegs with a straight-edge. The junction curves must now be accurately set out, and section lines put in for finishing these portions, and the surveyor is supplied with details, one for the curve leaving the straight, and the other for the curve entering the straight. The curves are to be set out with arcs of circles of diminishing radii, and taking the one leaving the straight, Fig. 6.

		ft.	in.	Proportions.
The radius of first arc on the 1ft. line	=	1,913	2	 1
The radius of second arc on the 1ft. line	=	478	$3\frac{1}{2}$	.... $\frac{1}{4}$
The radius of third arc on the 1ft. line	=	239	$1\frac{3}{4}$	.... $\frac{1}{8}$
The radius of fourth arc on the 1ft. line	=	159	5	.... $\frac{1}{12}$

This method of setting out the junction curves is the one adopted by M. Forestier, the French engineer, and is really an approximation to an ellipse by means of circular arcs, the advantages over the ellipse being that the lengths of the curves required for the total length of the track can easily be calculated, and also the radial lines serve for the sections for finishing the surface of the track. It should be mentioned that the formula for the length of an ellipse is an exceedingly long one (see Molesworth Pocket-book), and even then is only approximate. On the detail supplied the surveyor has given to him the dimensions along the line of straight produced, and offsets at right angles to the latter to the curve at the points where the radial lines cut, and also the tangential angles at the same points. The particulars all refer to the measurement line 1ft. from the bottom edge on the track, and the lengths of all these curves have been calculated, so that the total length on the 1ft. line will be exactly 1,760ft., or three laps to the mile. The surveyor is required to set out these curves in the best way he can, and he finds at the outset that it is impracticable to produce the line of straight, and measure out the offsets and set out the angles given on the detail, as he will have to work on the track, and the lines run up the bank out of level, and also the men are at work at these points, and will soon disturb his pegs. He, therefore, decides upon a different method—viz., to mark out the radial lines on the football field, as it is now all sunk down on to the level, and his pegs will not be disturbed.

With this object in view, he makes some fresh calculations, adopting a line, A B, on the football field parallel to the line of straight produced, and continuing the offsets given to cut the line A B. Taking the junction curve, leaving the straight, Fig. 6, he obtains three right-angled triangles, each with an angle the same as the tangential angle given at the corresponding points. Lettering these triangles as shown on the plan, Fig. 6, we have—

Triangle C D E.		Triangle F G H.		Triangle J K L.	
Angle C	0° 54′	Angle F	3° 36′	Angle J	8° 6′
,, D	90 0	,, G	90 0	,, K	90 0
,, E	89 6	,, H	86 24	,, L	81 54
	180° 0′		180° 0′		180° 0′

Angles outside the triangles at—

E.	H.	L.
180° 0′	180° 0′	180° 0′
89 6	86 24	81 54
90° 54′	93° 36′	98° 6′

Length of sides:—

C D	F G	J K
50′ 0″ less $\frac{3}{4}$″	50′ 0″ less $7\frac{1}{2}$″	50′ 0″ less 2′ $1\frac{5}{8}$″
50·0000	50·000	50·00000
·0625	·625	2·13541
C D = 49·9375	F G = 49·375	J K = 47·86459

Now taking C D E and using the formula for right-angled triangles:—

D E = C D × Tan. 0° 54′
E C = C D × Sec. 0° 50′.

Using the tables for Tan. and Sec.:—

D E = 49·9375 × ·0157093 = $9\frac{3}{8}$in.
E C = 49·9375 × 1·0001234 = 49ft. $11\frac{1}{4}$in.

In the triangle F G H:—

G H = F G × Tan. 3° 36′
H F = F G × Sec. 3° 36′.

G H = 49·375 × ·0629147 = 3ft. $1\frac{1}{4}$in.
H F = 49·375 × 1·0019772 = 49ft. $5\frac{3}{4}$in.

In the triangle J K L:—

K L = J K × Tan. 8° 6′
L J = J K × Sec. 8° 6′.

K L = 47·86459 × ·1423211 = 6ft. $9\frac{3}{8}$in.
L J = 47·86459 × 1·0100769 = 48ft. $4\frac{1}{4}$in.

The surveyor has now obtained his distances E C, H F, and L J along the radial lines from the points where they cut A B to the curve on the foot-line; he also has the angles which the radial lines make with A B, and he requires the lengths along A B to the points where the radial lines cut, which can be found by deducting D E, G H, and K L from A D, A G, and A K, using the figures.

ft.	in.	ft.	in.	ft.	in.
15	$0\frac{3}{8}$	30	$0\frac{3}{8}$	44	$11\frac{3}{4}$
	$9\frac{3}{8}$	3	$1\frac{1}{4}$	6	$9\frac{3}{4}$
A E = 14	3	A H = 26	$11\frac{3}{8}$	A L = 38	2

The only other calculation required is for intermediate points on the curves between those where the radial lines cut, and they can be worked out by the formulæ in Molesworth's Pocket-Book for the segment of a circle.

For example, taking the portion F J, Fig. 6. The length of the straight line between these two points must first be worked out as the hypothenuse of a right-angle triangle having sides.

	ft.	in.		ft.		ft.	in.		ft.
	2	$1\frac{3}{8}$	=	2·13541		44	$11\frac{3}{4}$	=	44·97916
less		$7\frac{1}{2}$	=	·62500	less	30	$0\frac{3}{8}$	=	30·05208
				1·51041					14·92708

$$\sqrt{1{\cdot}51041^2 + 14{\cdot}92708^2} = 15{\cdot}0033.$$

Calling this 15ft., then the offset to the curve at point M

$$= \text{Radius of curve} - \sqrt{\text{Radius}^2 - \text{M F}^2}$$
$$= 239\text{ft. } 1\tfrac{3}{4}\text{in.} - \sqrt{239\text{ft. } 1\tfrac{3}{4}\text{in.}^2 - 7^1{\cdot}6^2}$$
$$= 239{\cdot}14583 - \sqrt{239\ 14583^2 - 7{\cdot}5^2}$$
$$= {\cdot}11766 = 1\tfrac{3}{8}\text{in.}$$

The offset to the curve at any other points, as for instance N and O, can be calculated by the formula:—

$$\text{Offset} = \sqrt{\text{radius}^2 - \text{M N}^2} = (\text{radius} - \text{offset at M})$$
$$= \sqrt{239{\cdot}14583^2 - 3{\cdot}75^2} - (239{\cdot}14583 - {\cdot}11766)$$
$$= 239{\cdot}116474 - 239\ 02817 = {\cdot}03830 = 1\tfrac{1}{8}\text{in.}$$

The plan, Fig. 7, gives the detail of the junction curve entering the straight, and the surveyor is supplied with particulars, and makes calculations similar to those already explained. The results are given on Fig. 7.

The surveyor now has all the data he requires, and can proceed to put the lines in on the ground. He commences by measuring out the position of point A along the line already marked out, and then with his theodolite sets out A B at right angles. Along A B he measures the requisite lengths to the points E H and L, and in succession places his theodolite at each of these points, and sets out the angles which the radial lines make with A B, retaining each line by a peg with a nail in it, or an iron bar if on the rock, 100ft. towards the centre of the football field, all points being exactly fixed on the lines with the theodolite. The radial lines can be produced towards the track when required, and the lengths E C, H F, and L J measured out accurately; also the intermediate points on the curve can be put in, and as the radial lines serve for the sections of the track, as soon as the pitching is done they must be produced, and the requisite lengths measured out and pegs put in for finishing the cementing, the tops of the pegs being accurately set with the level at the surface of the track. Each of the sections for the junction curves will have to be put in fully; but for the central portions of the ends, where the banking attains the full height, the surveyor will only require to measure out distances from the centre point and put level pegs at the bottom and top edges of the track, as he can have a wooden template made to the section of the track, and it can be fixed in position and level on the pegs at the edges. The track will require to be finished exactly to the levels, screeds being put in the requisite distance apart, and the portions between the screeds being worked with a straight-edge, no sharp angles being allowed, and great care has to be taken to prevent the surface cracking

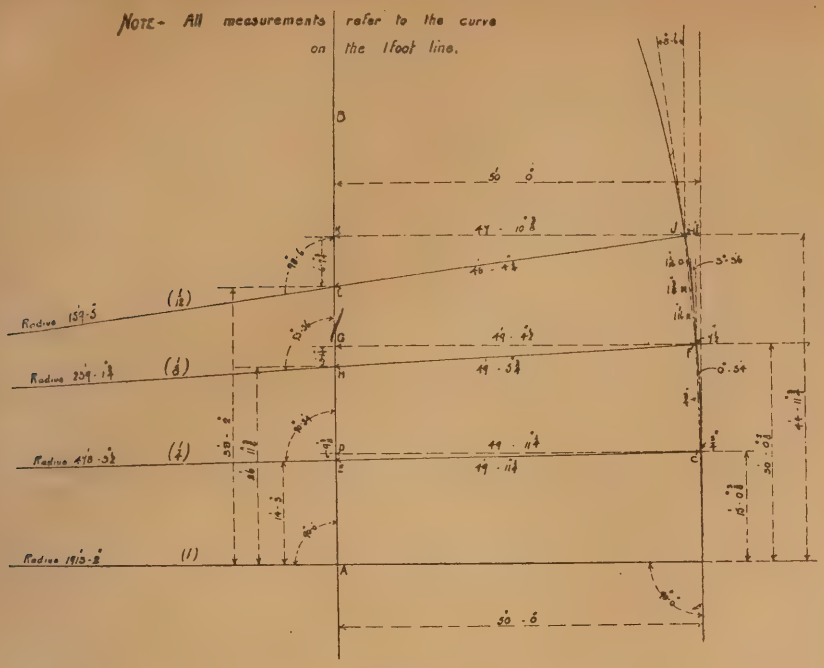


Fig. 6.

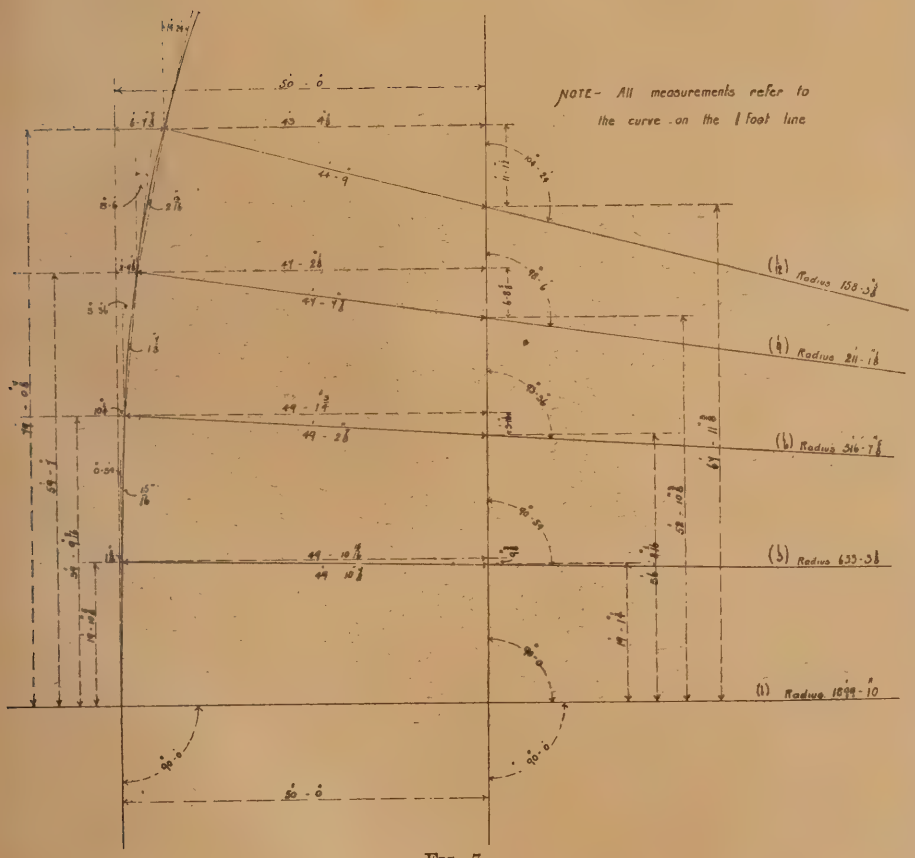


Fig. 7.

whilst it is drying. There will be little difficulty in setting out the running-track, as the ends are true semicircles; but the surveyor should, after he has adjusted the distance apart of the centres on the formation level, set out a line at each point square off the central axis and each side of it, and measure out the lengths to each edge of the track on the line where it begins to curve. The excavations can easily be squared up from the sections, the latter being plotted down with both the original ground and rock surfaces shown; also the working levels being put on, the areas of excavation can be taken out as explained in the article on the Tower Buildings.

In the next article, something further will be said about the menagerie end of the track, and the setting out of the front wall parallel to the concrete retaining wall.

The technical school at Dewsbury is about to be enlarged at a cost of £3,500.

McEWAN HALL, EDINBURGH UNIVERSITY.

[WITH LITHOGRAPHIC ILLUSTRATIONS.]

THE plan of this fine Hall, which was opened by the Right Hon. A. J. Balfour, M.P., LL.D., Chancellor, on Friday last, is based on the form of the ancient Greek theatre; this form was chosen as best suited for an auditorium, and one likely to insure good acoustic results. The architectural treatment is the same as the rest of the new University buildings—viz., Early Italian Renaissance. The flat side of the semicircle abuts on the medical school on the west, while the principal elevation is directly opposite on the east. Here is situated the main entrance, 30ft. in height and 16ft. in width, flanked on each side by double pilasters, and crowned by a semicircular pediment containing a carved representation of the ceremony of conferring academic degrees; besides this, there are other six entrances to the hall from the outside. The external wall is divided vertically by projecting buttresses containing niches for statuary. It is divided horizontally into three sections. The lower section is panelled, and is pierced by the circular windows which light the interior corridor; the intermediate section is blank, with the exception of one panel, which contains the inscription recording Mr. McEwan's gift to the University in these terms:

Hanc Aulam Academicam
Gulielmus McEwan
Universitati Edinbrugensi
Libens Animo Donavit
[MDCCCXCIV.

This section is divided from the upper by a band of Italian ornament, with panels at intervals, containing the coats-of-arms of James VI., the City of Edinburgh, the University of Edinburgh, the donor of the hall, the late Sir Alexander Grant, a former principal of the University; the Right Hon. A. J. Balfour, Chancellor; the late Mr. J. Christison, W.S.; Sir William Muir, principal; and Sir William Turner, trustees of the hall. The upper of the three horizontal sections is arcaded in red stone, and is surmounted by an architrave, frieze, and cornice and an open balustrade. The height of the outer wall from the base to the top of the balustrade is 64ft. An interior wall, concentric with the outer, incloses the hall proper, and, rising above the outer wall, to which it is joined by flying buttresses, supports at its summit the dome-shaped steel roof, which is surmounted by an ornamental lantern 30ft. high; the total height from the street level to the top of the lantern is 130ft. The outer and inner walls of the hall are 12ft. apart; the space between them is, on the ground floor, utilised as a corridor; this corridor is divided into compartments by pilasters and is vaulted, the panels of walls and vaults being filled in with fine red brick. The flooring is of marble mosaic. The corridor runs round the entire auditorium, and gives communication between the various staircases, entrances, and exits.

The entrance to the principal staircase, which is placed in the south angle, is from the quadrangle of the University building; this staircase is oblong in form, and is carried on pillars and arches, which are vaulted; its broad, shallow steps are guarded by a balustrade of stone. The groined ceiling is decorated in colour, the main features being a series of coats-of-arms, including those of the rector, Lord Balfour of Burleigh, and the late rector, the Right Hon. J. P. B. Robertson, besides those of the already-mentioned dignitaries of the University which find place on the outside wall. On the mosaic flooring of the landing are panels containing the arms of the donor, the city, and the University. From the first landing of this principal stair access is gained to the reception-rooms set apart for the assembling of the Senatus Academicus, distinguished guests, &c. The staircases leading to the galleries are placed in the round projections at the south and north-east angles of the building. Two staircases are placed in each projection, one leading to the first gallery the other to the second, so that the two currents of people going to, and coming from, these parts of the house are kept entirely separate from one another. This plan of double staircases gives much greater facility of entry and exit. From the corridor on the ground floor entry to the hall is gained by five separate doors. The dimensions of the hall are spacious, the internal diameter being 106ft., while the height to the dome light is 90ft.; this gives an ample floor space, and provides abundant room for the placing of two galleries. The area floor is laid with blocks of oak in patterns, and, in order to allow of its being used for other than formal academic functions, the seats on it are of a movable character, only round the circumference are four tiers of fixed fauteuils also in oak. The wall is panelled in oak up to the height of the first gallery. The galleries are placed over the corridor on the ground floor in the space between the outer and inner walls of the hall, the inner wall being opened up to the interior of the hall by means of an arcading of 13 bays, each 13ft. in width, and rising from the floor to the top of the arch, a distance of 48ft., upon columns of red Corsehill stone, supported as far as the balustrade of the first gallery by square-moulded freestone bases, and surmounted by gilded Corinthian capitals. The pews in the galleries are of oak placed on a sloping platform, and the galleries are guarded by an open balustrade of the same material. These balustrades have central panels

those of the lower gallery being filled with appropriate designs carved and gilded. At the wall-head is a carved stone frieze and cornice, above is a coved clerestory with circular windows 7ft. in diameter, while the whole hall is covered with a dome constructed of steel and panelled with wood. The figure decorations, which form so handsome a feature in the McEwan Hall, were illustrated in the Building News for Dec. 11th, 1896, and Jan. 22, 1897. They were the work of Mr. W. M. Palin. In the centre of the dome is a circular light, 22ft. in diameter, which, with the clerestory windows, lights the hall in the daytime. The flat side of the hall, that abutting on the new University buildings, is reserved for the platform, and the arrangements of it are especially designed for University ceremonies, as the hall is primarily for academic purposes. At the back of the platform is a series of stalls constructed of solid oak for the members of the Senatus Academicus, University Court, &c., with special seats in front for chancellor, rector, and principal; as, however, if restricted to its original purpose, the hall would only be used two or three times a year, Mr. McEwan expressed a desire that its uses should be extended, and that it should, as much as possible, be made available for civic functions and for concerts of a high class. Following up this idea a magnificent organ, probably the finest in Scotland, has been placed in the hall. Considerable difficulty was experienced in arranging for the placing of the organ in a hall which was never intended for one. The construction of the organ was committed to the Hope-Jones Electric Organ Co., and, as the nature of their mechanism admits of the organ being broken up into sections, a position was ultimately contrived for it. The organ gallery, carried on carved oak pillars, projects over the back row of stalls, and the great organ is placed immediately above. Two other sections of the organ are placed high up on each side of the platform recess; all these are inclosed in handsome carved oak cases, gilt and coloured, corresponding to the rest of the woodwork of the hall. A movable orchestra has been constructed, capable of accommodating 300 people. The framework is of light steel, the floor and seats being of wood; it is made so as to fit over the stalls on the platform, and can be taken to pieces easily; and as easily put together again. The hall is lit by electricity. Before arriving at the present arrangement a long series of experiments were made by the architect and the electric engineers, Messrs. King and Co., as to the best method of lighting the hall; the result is considered by all who have seen it to be most satisfactory. A large pendant hangs from the dome, above the cornice; but concealed, is a series of lights round the whole circumference of the hall; these throw a light on the decorations of the dome. The galleries are lighted by placing lamps concealed behind the pillars and the lower beams of the gallery fronts. The result of this concealed disposition of lamps is that the hall is lighted without the eye being distracted by numerous small brilliant points of light from the lamps. The complete design for the hall included a great tower at the north-west angle, rising to a height of 230ft.; the lower part of it only has, as yet, been executed; it has been carried up to the height of the roof of the hall.

The great object of the architect, Dr. Rowand Anderson, in designing the hall, was not to give it the appearance of a hall designed to hold the maximum number of people in a given space, but to give it as much of a monumental character as possible consistent with the requirements of a good auditorium.

NOTES FROM PARIS.

Amongst the various committees elected to look after and direct the arrangements and installations of the many sections of exhibits at the Exposition of 1900, the one formed to follow the interests of Class 65, that of the decoration of dwellings, is particularly interesting from the manner in which the well-known artists and men of taste have been joined as members by the side of manufacturers and art-workers, in order to avoid, as much as possible, the exclusive features of harshness and dryness so often apparent when exhibitions of this kind are decorated by leaders of industry alone. Messrs. Puvis de Chavannes, Rochegrosse, Roll, Philippe Gille, and L. Gandara, all well-known painters, are members of this committee, and, in the classes of jewelry and gold and silver work, Roger Miles, Froment Meurice, Benedite, and Boucheron will maintain the standard of artistic and intellectual qualities, aided by such members of Parisian circles of art and intellect as Messrs. Waldeck Bousseau, Raymond Joincaré, Laybeyrie, Brice, Barrias, Bonnat, Garnier, Claretie, Sarcey, Sardou, and Mdme. Adam in the other sections.

The two rival art societies, the Société Nationale des Beaux Arts and the Société des Artistes Français, now that they are unable to hold their annual salons at the Champ de Mars and the Champs Elysées respectively, owing to the pulling down of the buildings for the Exposition of 1900, are sorely put to for places to hold their future salons. It was proposed to hold the salons side by side in the immense hall of the Galerie des Machines in the Champ de Mars, but the rivalry between the two societies is such that an arrangement which would make them such near neighbours could not be accepted. The Société Nationale des Beaux Arts at length proposed to take over the celebrated Pavillon Chinois in the Bois de Boulogne, and so enlarge and arrange the building as to afford an excellent home for the salon of next year. They have, however, met with certain difficulties with the Municipal Council of Paris, to whom the building belongs, and the military authorities, in whose zone of defence it stands, and again a number of members have resigned, M. de Baudot, the well-known rationalist, taking the lead, because the plans for the new building had been intrusted to M. Formigé without duly consulting the members beforehand. In the face of these difficulties and others which would certainly arise, the Sociéteé Nationale has abandoned the scheme, and the two rival societies have at length consented to instal their salons in the Galerie des Machines on the condition that the two exhibitions be strictly divided off, each one to have its special entrance. It is hoped that such close neighbourship will bring about a reconciliation between the two societies, but their envy and hate of each other is so great that there is little chance of future friendship. The sum of £12,000 has been voted on the funds of the Exposition to defray the expenses of alterations to the Machine Gallery and the installation of the salons. M. de Baudot, who appears to have entirely separated himself from the Société Nationale, makes known his intention of organising a special salon for architecture, quite apart from painting and sculpture, and undertaken in a spirit of rationalism, in which the pompous Classic styles will be excluded to the profit of originality and schemes of architecture based on a rational and logical study of the necessities of the present day, and the new materials now at the disposal of the architect for building purposes. This scheme, if put into execution, will certainly produce very interesting results.

The picturesque ruins of the old Cour des Comptes, on the Quai d'Orsay, are at last destined to disappear. The final agreement has been passed between the Minister of Finance and the Orleans Railway Company, handing over the ground now occupied by the Palais de la Cour des Comptes to the latter company, for the construction of a railway-station and an hotel, forming the terminus of the Orleans railway. A committee has been formed whose duty it will be to examine the plans and elevations submitted by the company. It will go to the heart of many a Parisian to witness the disappearance of these most picturesque ruins, despite the cruel souvenirs of 1870 which they recall.

A decree has been passed authorising the reconstruction of the Cour des Comptes on the ground owned by the State in the Rue Cambon. The estimated cost of the building is £180,000. Another decree, granting the Pavillon de Maran, at the Louvre, to the Union Centrale des Arts Decoratifs, for the installation of its interesting museum, was legalised at the same time. It will be remembered that this society had to abandon the Palais de l'Industrie, where its museum was installed, owing to the pulling down of that building.

At the recent annual public meeting of the Academie des Beaux Arts, the following awards were made to the students of the Ecole des Beaux Arts, winners of the Prix de Rome in architecture; Grand Prix de Rome to M. Eugene Duquesne (also winner of Leprince and Leclère scholarships), second and third Grand Prix to M. Tony Garnier, and M. Arfvidson, respectively.

An interesting report has been presented by the secretary to the Academie des Beaux Arts on the works sent in by the students of the Ecole des Beaux Arts now residing at Rome as winners of the Grand Prix. The report gives special praise to the work of M. Bertone, who has sent in during the past two years some most interesting work. M. Bertone explored during three months the ruins of Palmyre, in the desert of Syria, at five days' distance from Damascus, supporting the excessive fatigue and dangers of such an exploration. This young architect has already sent to Paris a number of large drawings reproducing the most interesting details of the work, and is now working at the complete plans and façades in their actual state and restored; the whole will form a most valuable set of documents. This year the work sent in consisted of the views and details of the temple of Baal Sehamin, which, according to the inscription engraved on one of the columns of the façade, was constructed during the time of Hadrian or at the commencement of the second century of our era. The Academie gives every possible encouragement to the young architect, and expresses the desire that he will complete the useful information which he is giving on these ruins, almost unknown to all.

The plans and designs for the building of the Military Exhibition, to be constructed on the banks of the Seine for the Exposition of 1900, have now been sent in by the architects who have taken part in this competition. The jury, whose duty it will be to decide on the design to be accepted, is composed of the General de la Noë and four military officers, together with three representatives of the navy. The artistic military element is represented by M. Edouard Detaille, the well-known painter of battle scenes, and the element of military industry by General Sebert, director of the Chantiers de la Mediteranée, complemented by three members of the institute—MM. Baulin, Vaudremer, and Guadet, architects.

M. Guadet, professor at the Ecole des Beaux Arts, is preparing the programme of the competition for the University Palace of St. Francisco. The competition, although prepared by a French architect, is to be an international one; the building is to accommodate 5,000 students and cover a surface of 1,250 acres; the architect is to take no account of cost, either of the building or the materials; the style of the palace is left entirely to the competitors, and may be Classic or original. The committee has already got together the sum of 9,000,000dols., but it is hoped to more than double this sum. The programme will shortly be published.

By reason of the large amount of building work now being undertaken at Paris, and the constant discoveries of archæological interest which are being made during the pulling down of old buildings and the necessary excavations for the new constructions, the Municipal Council has appointed a committee whose special duty will be to supervise all work which may lead to interesting discoveries, and take every possible precaution and care in unearthing and preserving all relics of past times.

The church of the Madeleine, that magnificent work commenced by Vignon and terminated by Havé, under Charles X., is found to be urgently in need of repairs; the immense and greatly-admired columns of the façades are rapidly going to pieces, and the scheme of complete restoration of the affected portions is now before the Municipal Council.

The sinking and filling-in with concrete of the immense caisson on the right bank of the Seine, destined to support one of the abutments of the new bridge, Alexandre III., has now been successfully terminated. The work has occupied nearly two months and a half; the scaffolding is now being taken down for fitting over the caisson on the left bank, in order to commence the work of sinking. The foundations of the larger palace of the Champs Elysées are nearly terminated; a portion of the ground-floor of the building is already some feet above the surface. The basement is constructed of the celebrated hard stone of Souppes, and the portion of the walls up to the level of the first floor is being built of Eurville stone, two excellent building stones which would be greatly appreciated in England. The cost of the masonry work alone will be £200,000, divided between three contractors.

It is proposed to form an interesting addition to the Exposition of 1900 by a reconstitution of the attractions of Versailles under the reign of the Roi Soleil, Louis XIV. The grand canal, the avenues, water basins, and "bosquets" will be restored as much as possible to their original glory, but the sentiment of progress will provide an additional charm—but this is doubtful—to the beauties of the old royal gardens. Electricity

will play an important part in the installations, and the canal, basins, and cascades will be brightly illuminated with electric lamps and coloured luminous fountains, whilst fêtes will be organised on the canal, and the historical "cabarets" or drinking houses will be reconstructed and add to the pleasure of the visitors. All this, however, will seem to many to be a profanement of the calm and majestic beauties and souvenirs of this marvellous dwelling of old-time royalty.

CHIPS.

The city council of Birmingham accepted, on Tuesday, the gift from Mr. Harding of an oil-painting entitled "Charity," by M. Bouguereau, as an addition to the collection in the Corporation Art Gallery.

The Royal Hotel, Prince of Wales'-road and Bank-street, Norwich, has just been rebuilt from designs by Messrs. Edward Boardman and Son, of that city. It is faced with red bricks and Cossey brick dressings. The dining-room, on the ground floor, is 60ft. by 40ft., the hall 40ft. by 30ft., the winter garden 30ft. by 20ft., and the kitchen 40ft. by 26ft. On the first floor are suites of rooms and the the drawing-room. The contractor was Mr. J. Youngs, of Norwich.

A meeting was held at Hadleigh last week with reference to the proposed railway, to be constructed under the Light Railways Act, between Hadleigh and Long Melford. Sir W. C. Quilter, M.P., presided. After considerable discussion, a committee was appointed to draw up a memorandum to be forwarded to the Great Eastern Railway Company, and to arrange for a deputation to wait upon the chairman and directors of the company.

At the last meeting of the Colchester Town Council, the report of the Roads and Drainage Committee referring to the widening of the Maldon-road was adopted, and certain alterations in the accepted plans to the proposed new town-hall were agreed.

The arbitration between Messrs. Watson and Wilson, contractors, and the Manchester Corporation, as to extras in their construction of a portion of the Thirlmere Aqueduct, is approaching the end. On Monday the proceedings before Mr. Harrison Hayter, the arbitrator, were resumed, and Sir John Harwood and Mr. Talbot (the town clerk) were present. The evidence of Mr. F. B. Winser was continued. It is expected that the evidence will be closed in a few days.

At Eastbourne Police-court, on Monday, C. Peerless Dennis and Co., builders, Terminus-road, were ordered to pay a nominal penalty of 10s. for having commenced the erection of cottages on the Cavendish-place Estate without having given notice to the borough surveyor.

New board schools at Stapleford, designed by Mr. W. H. Higginbotham, of Nottingham, were opened last week. They have cost £3,000, and include a central hall, 61ft. by 25ft., and six classrooms.

The corporation of Derby have decided to appoint Messrs. Bramwell and Harris as engineers for carrying out the sewage scheme. It is proposed to acquire from 70 to 100 acres of land close to Spondon Station, and to discharge the effluent, after precipitation has taken place, into the River Derwent just below Borrowash. The system will cost £100,000 for land and works at Spondon, and £20,000 for alterations to drains and sewers, &c.

New post-office buildings are about to be built at Worthing from plans by Mr. R. Singer Hyde, M.S.A., of that town.

Mr. Joseph Richard Cobb, F.S.A., a leading Mid-Wales antiquary, died at Brecon yesterday, at the age of 75. The deceased took great interest in the restoration of old churches and castles in the Principality.

The Dean and Chapter of Truro have agreed to the proposal that the memorial to the late Archbishop Benson by those who were ordained by him should take the form of a brass in the cathedral. The sub-committee state that a memorandum was found among among the Archbishop's papers containing suggestions as to the form which a monument or a brass should take if such were decided upon after his death. It gives directions as to the attire of the figure and the inscriptions to be placed round it. These will be strictly carried out.

At Eton College, on Monday, a portrait of the Rev. Dr. Hornby, the Provost, and formerly head-master, painted by the Hon. John Collier, was formally presented to the college by the subscribers.

The Haddingtonshire County Council received on Tuesday a report from Messrs. Carfrae and Belfrage, C.E., Edinburgh, dealing with the proposal to convey the sewage of Gullane direct to the Firth of Forth, at a point west of Jova's Neuk. The engineers reported favourably on the scheme, the estimated cost of which is £1,000. A sub-committee was appointed to consider the scheme.

OBITUARY.

We regret to announce the death of Mr. Octavius Hansard, F.R.I.B.A., of Maida-vale Mansions, and 8, Argyll-place, W., aged 71 years. Mr. Hansard, who was somewhat lame, while at Portland-road Station on Friday dropped his walking-stick upon the line, and rashly clambered down on the metals to recover it. Just then a train came in, and before help could be rendered he was crushed beyond recognition. For many years Mr. Hansard had been a prominent member of the Institute, which he joined as an Associate in 1848, becoming a Fellow in 1860; many years since he served on the council, and at one period was one of the most frequent speakers in discussions. He enjoyed a large West-end practice. Amongst his works may be mentioned the buildings erected for Messrs. Marshall and Snellgrove.

The death is also notified of Mr. William Stevens Cross, F.S.I., F.R.I.B.A., which took place at his chambers, 2, Craven-street, Strand, on the 1st inst. Mr. Cross, who was in his 75th year, had long practised at the Outer Temple. He had been a Fellow of the Royal Institute of British Architects since 1872, and of the Surveyor's Institution since April, 1872.

Mr. John Inman, builder and contractor, Fishpool, died at his residence, 24, Devon-street, Bury, Lancs., on Tuesday evening, aged 61 years. Mr. Inman had the contract for the joiners' work at the Bury sewage works, and while superintending some operations there in September of last year, to avoid an accident caused by the breaking of a plank, he jumped a depth of about 8ft., alighting rather heavily on his heels. The concussion injured his spinal cord, and from this he had since suffered. The deceased was born at Stockport, but while very young removed to Haslingden, where he served his apprenticeship with Mr. Holden, builder and contractor. From Haslingden he removed to Heywood, and subsequently was employed at Scarborough as foreman joiner for Mr. Archibald Nield, of Bradford, who was carrying out some large contracts at that seaside town. On going to Bury, 25 years ago, Mr. Inman was for six or seven years foreman for Mr. Charles Brierley, contractor, and about eighteen years ago he commenced business on his own account. He erected considerable cottage property, nearly the whole of Fishpool being built by him, and he also built the Parkhills U.M.F.C. School-chapel and Unsworth Primitive Methodist Chapel. Altogether he built some 200 houses in Bury, and at the time of his death was engaged in the erection of property off Manchester-road, near Geggle's garden. He was a Freemason, and was also a member of the Master Builders' Federation.

A Victoria Hall, seated for 300 persons, has just been built at Errol, N.B., from plans by Mr. Alexander Johnstone, of Dundee. The builder was Mr. Robert Goodall, of Errol.

The Birmingham Corporation decided on Tuesday to raise the salary of Mr. Peter Addie, the manager of the improvement scheme for the past two years, from £300 to £350 per annum. At the same meeting important lettings of land in the improvement area, amounting to £2,000 a year, were announced, these including sites for a proposed arcade and a theatre.

The London County Council discussed on Tuesday a report of its Taxation Committee, recommending that a new source of revenue should be created in the form of a direct charge upon the owners of site values, to be termed the "Owner's Tax," and that this new impost commence at the rate of 6d. in the £. An amendment to refer the subject to the consideration of a Royal Commission was supported by Lord Onslow. The discussion was eventually closured and a division taken, when there voted for the amendment, 50: and against it, 53. The first part of the committee's recommendation, affirming the principle, was carried by 55 to 47 votes, and the further consideration of the report was adjourned.

In the Consistorial Court of London on Tuesday, Chancellor Tristram gave judgment in two consolidated suits, "The People's Warden and Others against the Rev. C. J. Fuller," and the Rev. C. J. Fuller and his churchwarden's application for a confirmatory faculty in the case of St. Mark's, Marylebone-road, in which Mr. Fuller had placed a new altar and reredos, a side chapel, four crucifixes, and covered the Lord's Prayer and Ten Commandments with a curtain. The Chancellor, in a long judgment, granted a confirmatory faculty for the new altar, provided the dais was extended to the north end, and for a side chapel, but he ordered the other things complained of to be removed.

Engineering Notes.

Central London Railway.—Good progress is being made with this undertaking, and so far no unexpected engineering difficulties have occurred. Besides two-thirds of the tunnel work for the lines being already completed, a large portion of the tunnels for the stations, which are to be 21ft. internal diameter, has also been constructed. The excavation has been entirely in the London clay, and there has not been met with any of the wet sand which caused so much annoyance and delay in the Stockwell portion of the South London line. The tunnels going eastward from Chancery-lane have now approached within a short distance of the Holborn Viaduct, and for the absolute safety of that structure the contractors have completed the necessary arrangements to carry the tunnel under the Viaduct and for some distance on either side by means of compressed air; and for that purpose some of the plant used in the construction of the Blackwall Tunnel has been utilised. The shafts at all the stations, with the exception of those at Davies-street (which will be commenced next week, and in connection with which the street is to be widened at its Oxford-street outlet), have been sunk to their full depth, and they will be ready for the erection of the lifts and staircases at a very early date. Electric instead of hydraulic power will be used to work the lifts. The Electric Traction Company are constructing the line. The depot where the engines—which are to be 8,000H.P.—and the dynamos are to be placed is to be situated about half a mile west of Shepherd's Bush Station. Here electricity will be generated for traction purposes, for lifts, and for lighting the stations and carriages. The contract for the electric equipment has been given to the British Thomson-Houston Company, an offshoot of the General Electric Company of America. The sinking the shafts and the tunnelling of the railway hav been divided into three contracts: that from Shepherd's Bush to the Marble Arch is being executed by Mr. John Price; that from the Marble Arch to Newgate-street by Messrs. Walter Scott and Co.; and that from Newgate-street to the Bank by Mr. George Talbot. The electric lifts are being constructed by the Sprague Elevator Company, of New York. Sir Benjamin Baker is the engineer-in-chief, and the engineer of the Electric Traction Company is Mr. Ferdinand Hudleston.

Civil and Mechanical Engineers' Society.—Mr. Herbert Coward delivered his presidential address before this society at the inaugural meeting of the session at the Hotel Victoria, Northumberland-avenue, on Friday evening. He observed that the two principal events of interest to engineers during the past year were the passing of the Workmen's Compensation Bill and the engineers' strike. The former was simply the outcome of the desire of a Government wishing to go one better than the Opposition, and thus obtain the good feeling of a certain class of the community. With regard to the strike, the original question of the eight hours' day had little to do with the point at issue between the contending parties. Present-day employers were suffering from the mistakes of their forefathers, who, in their exalted notions of the claims of capital, caused labour to combine, thus bringing trade-unionism into existence; but most employers, having learned the lesson long since, not only knew that it was the working man's right to receive proper consideration, but had also found that it paid to treat him justly. In conclusion, the president suggested that engineers' draughtsmen should improve their position by combining in an intelligent and moderate manner to form a union or society for themselves—a society that should define the positions or grades of draughtsmen, and fix a minimum rate of wage for each grade. A discussion followed.

Plymouth.—Sir J. Wolfe Barry and Mr. Cuthbert A. Brereton have reported upon the improvement of Plymouth Harbour. Their recommendations comprise: The deepening and widening of the main low-water channel; the construction of deep-water quays; the formation of deep-water wharves in the upper portion of the harbour; the extension of the breakwater at Mount Batten; the construction of a graving dock; a railway extending along the whole length of the proposed wharves; and the deepening of the channel to a depth of 30ft. at

low tides up to a point where the Cattewater narrows. For the remainder of the distance up to Laira Bridge the depth would be 26ft. Between the entrance to Sutton Pool and Cattedonen Point 2,200ft. of wharf accommodation is to be provided. In the upper portion of the Cattewater there would be 1,850ft. more of wharf frontage, with a depth of 26ft. at low water. The cost of the whole works contemplated is approximately put by the engineers at £484,000, of which £227,500 is for dredging.

CHIPS.

A wing for the textile classes is being added to the technical school at Batley, at a cost of about £1,600, which will be defrayed by Messrs. Stubley.

At Christ Church, Catshill, near Bromsgrove, on Sunday afternoon, the east window, which has been filled with stained glass, was dedicated. The window comprises three lights, and the design represents "The Resurrection." Mr. J. A. Chatwin, of Birmingham, was the architect of the work, which has been carried out by Messrs. Hardman and Co., Birmingham.

The construction of a road around the Island-settlement of Hongkong will mark the fulfilment of a scheme which has long been desired in the colony. The scheme consists of constructing 10⅓ miles of new road, practically reconstructing 4½ miles and effecting minor improvements in other portions of existing roads, the whole, 23½ miles in length, forming a nearly complete circuit of the island, with the omission of some of its peninsular promontories.

In consequence of the pressure of the letter and newspaper work in the old General Post Office building on the east side of St. Martin's-le-Grand, it has become necessary to take into the Sorting Office the space at present occupied by the public counter. Accommodation has, therefore, been provided for the Public Office on the ground-floor of the Post Office building opposite—i.e., on the west side of St. Martin's-le-Grand. The change was made on Monday, and the sale of stamps, registration of letters, money order, postal order, parcel post, telegraph, and other business is now carried on in the General Post Office, West.

The Lancashire County Council is promoting a Bill to deal with the 22 offices and salaries of the late Mr. William Radford, the roads and bridges surveyor of the county. The total salaries of Mr. Radford reached £1,192, and he enjoyed private practice. It is proposed to include in the Bill power to purchase and maintain other than county bridges, and to contribute to the building of any bridge belonging to any railway, canal, or other company.

Ex-Provost Hugh Ker died at his residence, St. John's-place, Annan, N.B., on Friday, after a brief illness, from pleurisy. Deceased was one of the best-known public men in the county of Dumfries. For about forty years he carried on a large building and contracting business. The deceased entered the town council in 1855. In the following year he was elected a junior magistrate, in which capacity he acted for a few years. He was then elected senior bailie, and in 1886 Mr. Ker was unanimously elected to the provost's chair. Deceased was in his 74th year, and leaves a widow, three sons, and four daughters.

The Tyne Improvement Commissioners are about to carry out certain repairs to the North Pier at Newcastle, involving an outlay of some £300,000. They have decided that this work shall be done by contract, and not departmentally as hitherto. Similar work has previously been done by the commissioners' own men, under the direction of their chief engineer.

At the parish church of St. Day, Cornwall, a new oak pulpit, the work of Messrs. Harry Hems and Sons, of Exter, was dedicated last week.

One hundred thousand Jarrah sleepers are being shipped at Perth, Western Australia, for the railways of the Orange Free State, under the supervision of the Forestry Department.

At Friday's meeting of the Solihull Board of Guardians a long discussion ensued upon the report of the Workhouse Visiting Committee. In June last the Local Government Board decided that the present workhouse was inadequate for the requirements of the district, and a sub-committee of the Visiting Committee was appointed to consider the matter. They reported that they had consulted Mr. Ward, architect, Birmingham, who had prepared sketch plans for a new workhouse to be erected at an estimated cost of £36,000 or £38,000. The committee recommended that the sketches be forwarded to the Local Government Board, and that a deputation be appointed to meet the Local Government Board and confer with them upon the question. By a majority, however, the board of guardians decided to refer the plans back to the committee for further consideration.

Building Intelligence.

Birmingham.—A committee of the Birmingham Corporation have found that the stabling accommodation at Edwardes-street yard, which was taken over from the late Balsall Heath Local Board on the annexation of their district to the city in 1891, is altogether inadequate, and the buildings themselves are in such a dilapidated condition as to necessitate their being shored up. The city surveyor, Mr. John Price, has prepared plans, which have been approved by the two departments. These plans provide for stabling for 20 horses, a cottage for the horsekeeper, horsebox, shoeing-shed, harness-room, weighing-machine office, messroom, proper sanitary accommodation, the paving of the yard, and an office for health inspector. The committee have accepted for the work the tender of Mr. Thomas Johnson, of Great Brook-street, at the sum of £3,838.

Brixton.—The new Gresham Baptist Chapel, facing Gresham and Barrington-roads, Brixton, has recently been opened. The elevations are in the Italian style of architecture, and are of yellow malm bricks with Portland stone dressings. The building consists of a basement for heating purposes, chapel on the ground floor with entrances from both roads, deacons' and minister's vestries; the seating accommodation is for 475, two entrances and separate staircases to gallery, and also two entrances and staircases to schoolroom, which is placed above the chapel, on either side of which are arranged classrooms for boys, girls, and infants; kitchen, w.c., lavatories, &c. Messrs. Whitehead and Co., of Clapham-road, are the contractors for the general works; Stuart's Granolithic Co. for the fire-resisting floor, and Messrs. Ward and Co. for the staircases. The total cost has been about £5,000. The architect is Mr. J. William Stevens, A.R.I.B.A., of No. 21, New Bridge-street, E.C.

Mansfield.—The new church of St. Mark was consecrated last week. Mr. Temple Moore, of Westminster, is the architect, and the contract was let to a local firm of builders, Messrs. Fisher Bros., at £4,720. The external walling is of Mansfield Woodhouse stone, and the roofs are covered with stone slabs and red tiles. The interior consists of a nave and sanctuary under one unbroken roof, with narrow side aisles divided from the body of the church by an arcade of five bays, carried on square piers. The ambulatory is carried round the east end of the sanctuary with the vestries to the east of it. At the west end the nave and side aisles open into a wide western aisle, which runs across the whole width of the building, and into which, at its north and south ends, the outer doorways open. On the north side of the church, outside the ambulatory, is placed a wide aisle, two bays in length, the western part of which is occupied by the morning-chapel, and in the eastern end the organ will be placed. The sanctuary is raised four steps above the level of nave. Behind the altar is the retable and a carved reredos of oak, above which is placed a representation of the Crucifixion with figures of the Saviour on the Cross, and of St. Mary and St. John. The reredos is Perpendicular in character, with an ornamented setting of Tudor flowers. The pulpit is of oak, with tracery panels, the sounding-board having richly-carved cornice and cresting; the style adopted by the carver is Flamboyant. The floor of the nave is paved with wood blocks, and that of the aisles and sanctuary with Mansfield stone. The details of the interior, which are of a very simple character, follow in manner the 14th-century style.

Peterborough.—At the annual meeting of the Cathedral Restoration Committee it was reported by the committee that during the year they had empowered the architect, Mr. J. L. Pearson, R.A., to proceed with such underpinning as he might think necessary, and with the restoration of the north-west gable of the west front of the cathedral. These works had been carried out in the most satisfactory manner, in accordance with Mr. Pearson's specification. Those portions of the great arch, and of the gable above it, which were taken down and rebuilt, contained in all 2,006 facing stones. Of these 170 only were found so decayed that they had to be replaced by new ones; the remaining 1836 stones have been put back again into their original positions. It was considered desirable before the scaffolding was removed to carry out the necessary repairs to the pinnacles of the north flanking tower, including the rebuilding of the south-east pinnacle, blown over by the gale in March, 1895, to repair the old roof behind the north-west gable, and also to do the works required to render secure the upper part of the gable on the north side of the west front and its two flanking turrets. All these works have been completed, and the scaffolding at the north-west gable has been taken down. The sum of £2,816 8s. 2d. had been expended in repairs and renovation, irrespective of architects' commission, &c. The committee now appealed for £7,500 still required to enable them to complete the works advised by the architect at the south-west and central gables of the west front, and also the necessary repairs to the north transept and eastern chapel. It was unanimously resolved to proceed with the erection of centre supports to the south-west arch.

Stretton, Burton-on-Trent.—The Bishop of Lichfield consecrated last week a new church which has just been erected at Stretton, Burton-on-Trent, by Mr. Gretton, at a cost of over £30,000. The present edifice occupies a fresh site, and replaces a small, unpretentious parish church. It is cruciform, and has a central tower rising immediately over the choir. Stanton stone is used externally, but the interior walls are of Runcorn stone. The woodwork and the appointments are mainly in oak, and the flooring consists of stone quarries and wooden blocks. A high screen separates the chancel and the south chapel from the nave. Is is surmounted by a cross of exceptional size, and, together with the choir stalls, organ-case, and pulpit, has been carried out by Mr. J. E. Knox, of Kennington. The chancel is laid with black and white marble. The roof is embellished with representations of angels playing upon instruments, and singing "Gloria in excelsis." Mr. Charles Powell, of London, was the decorator. The only stained-glass window at present in the church is at the east end, and is the work of Sir William Richmond, having been executed at a cost of £1,000. The subject symbolises our Lord in His Majesty. There is no reredos proper, but a low enrichment of marble and alabaster is situated behind the altar. The stone-carving throughout is by Mr. Bridgman, of Lichfield. The font is raised on three circular steps of Frostley marble, and has a canopy of carved oak, containing, in recesses, eight effigies. The church will accommodate, with pews and chairs, 400 people. The building, which contains an organ by Messrs. Hill and Son, London, has been erected by Mr. Halliday, of Stamford, from the designs of Mr. J. T. Micklethwaite, F.S.A. (Somers Clarke and Micklethwaite), Westminster.

During the past twelve months 2,062 plans were passed by the Leicester Corporation, or nearly 500 more than in the previous year, and this large number does not include alterations and additions.

At a meeting of Berwick-on-Tweed Town Council held on Tuesday, it was agreed, by 11 votes to 9, to invite competition for plans for the new police station and lock-up which are to be built in Church-street at a cost estimated at £3,000 or £4,000. Two prizes of £50 and £25 are to be offered as the first and second prizes for the best plans.

The designs for the new buildings of the college of the City of New York will be selected in limited competition. Messrs. George B. Post; McKim, Mead, and White; R. H. Robertson; Cady, Berg, and See; C. C. Haight; J. R. Thomas; W. B. Tuthill, and George Martin Huss have been invited to compete. The buildings will be situated on 138th-street, not very far from the spot where Alexander Hamilton lived, in which was then an extensive country estate, overlooking the Hudson River, far removed from the noise and bustle of the city.

The trustees of the estate of Mrs. Evans, the owner of Lofty Down-rise, above Ventnor, one spot of which is the highest point of land in the Isle of Wight, have intimated that it is Mrs. Evans's intention to make the town a present of the Downs for the use and recreation of the public for ever. The Downs comprise several hundred acres, and the summit commands a wide range of view over the whole Island and parts of Hampshire and Sussex.

Sir John Blaker, the Mayor of Brighton, presented to the town on Wednesday a marble statue of her Majesty, as a memorial of the Jubilee year. It has been executed by Signor Carlo Niccolo, and is the third statue in replica of her Majesty which has been produced by the same sculptor, one having been already erected at Kurrachee and another at Melbourne. The statue is executed in Ravaccione (Carrara) marble, and stands upon a pedestal of Carrara marble of a darker colour, which has been presented by the Corporation.

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Our Illustrations.

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See descriptive article on page 829.

SECOND PREMIATED DESIGN FOR THE BURY ART GALLERY AND FREE LIBRARY.

The authors of this design were Mr. H. A. Cheers, Twickenham, and Mr. Smith, Blackburn. The authors are of opinion that the style of architecture adopted is the most appropriate for this class of building. They consider the art gallery to be of first importance, and have consequently placed the entrance in the centre of the Moss-street front, in accordance with the true spirit of the instructions issued to architects. The authors believe that the entrance thus located gives a more architectural appearance than if placed in any other position. To approach the art gallery, it is necessary to pass through a spacious vestibule, and from thence into a grand staircase and sculpture-hall, from which a massive staircase gives access to the gallery floor. The galleries are arranged *en suite*, and well lighted from the top, and in no case is the wall-line broken by projecting bays, which, in the opinion of the authors, is a most objectionable feature in many galleries. Ladies' and gentlemen's cloak-rooms and conveniences are well placed and retired, at the rear of the grand staircase and sculpture-hall. A curator's room is provided in a mezzanine immediately over the cloakroom and opening on to the grand staircase, from which the curator commands complete supervision. The large picture-lift is conveniently placed at the corner of Back-street, and communicates with basement and gallery floor. The library is approached from Silver-street, the various rooms being well placed and lighted, with ample provision in the basement for the storage of books and pictures. Cost, £16,000.

WELLS CATHEDRAL.*

This view, from the Palace grounds, shows the Cathedral at Wells from its best aspect, and exhibits the central tower to the utmost advantage. The etching belongs to a series now in course of publication by Messrs. Frost and Reed, of Bristol, under the title of "The Church Towers of Somersetshire," drawn by Mr. E. Piper, M.R.S.P.E., with a description upon each subject, written by Mr. J. J. Warden Page, whose well-known book on Exmoor and the hill country of West Somerset stamps him as no mean authority. Among the churches chosen are Axbridge, Bishops Lydeard, Bruton, Chard, Cheddar, Crewkerne, Dunster, Glastonbury (St. John's), Ilminster, Martock, Mells, Norton Fitzwarren, Taunton, St. Cuthbert's Wells, Wrington, &c. There are some 50 plates in all, making a very attractive and valuable series.

ST. MARY'S CHURCH, BOLSOVER, DERBYSHIRE.

This church, it may be remembered, was almost entirely destroyed by fire about ten months ago. The only remaining portions of the old building are the early 13th-century tower and spire, portions of the outside walls of the 14th-century chancel, the Cavendish chapel, erected A.D. 1618, and the north porch and parts of the outside walls of the north aisle and transept (used as a vestry), which were built about twenty years ago. The former church provided seats for about 500 adults, and it was desired to increase the accommodation as much as possible, whilst retaining the portions of the old building which were not destroyed by fire, and without adding to the length of the church, and the width only by a lateral extension of the south aisle, by which about 70 more seats are provided, and by the conversion of the north transept into a morning chapel containing 35 seats, and building a new vestry to the east of this. The only other feasible means of providing more accommodation being in a vertical direction, it was proposed to carry the roof in one span over the nave and aisles, and to form triforium galleries above the aisles, approached by staircases at the west end, and giving space for 100 more seats. The accompanying drawing shows this design for the new interior, which was approved by the building committee and the parishioners, the bishop, and other authorities. These triforium galleries have, however, been abandoned in the carrying out of the work, owing partly to considerations of cost and partly to the objections of the Derbyshire Church Extension Society, and a triple roof arrangement over the nave and aisles has been adopted, the nave arcades being carried on octagonal pillars with capitals, as before. With these exceptions the church is being rebuilt as shown. It may be added that the nave has been made 3ft. 6in. wider than the one destroyed, thus being on the central axis between the western tower and the chancel, as the original 13th-century nave evidently was. The interior of the church, as shown in the drawing, was intended to be built of red Mansfield stone, including the lining of the walls, with alternate bands of yellowish-white Mansfield stone in the upper parts above the arcades and in the chancel. Ancaster stone has, however, been substituted on account of cost for the whole of the interior work. The external walls are of Bolsover Moor stone, with Weldon stone for the window tracery, &c. The woodwork for the roof is chiefly pitch-pine, and the doors and seats are to be oak, the whole of the woodwork being stained palm-leaf green. The roofs will be covered with Buttermere green slates. The floors under the seats are to be wood blocks, the passages tiled, and the chancel floor marble paving or mosaic. The builders are Messrs. Bowman and Sons, Stamford, whose contract amounts to £7,776. The total cost of the rebuilding and restoration, including fittings and furniture, will be between £9,000 and £10,000. Mr. Louis Ambler, A.R.I.B A., 7, Arundel-street, Stand, London, is the architect, and Mr. J. C. Walker, the clerk of works.

"DRISHANE," KENILWORTH.

This residence, belonging to Mr. J. F. Scully, is built upon a charming triangular site in the Forest-road, Kenilworth, and commands extensive views across the golf links on one side and of the Castle and Abbey ruins on the other side. The site is well timbered, and on the south side of the house are the Badminton and tennis lawns, with sloping terraces around. Whilst excavating for the building, portions of the old wall that once surrounded Kenilworth were exposed to view. The builder was Mr. R. Bowen, of Leamington and the architect Mr. De Lacy Aherne, of 55, Colmore-row, Birmingham.

* The following illustrations of Wells Cathedral have appeared in the Building News during recent years. Plan, with details and views, July 20, 1888; plan of Cathedral and of precincts, Aug. 10, 1894; two interior views, by C. E. Mallows, Aug. 17, 1894; west front and N.W. tower, June 12, 1891; interior south transept and entrance to Vicar's Close, by C. E. Mallows, Aug. 10, 1894; Chapter-house entrance, April 10, 1891; bird's-eye view of Vicar's Close from the Cathedral-roof, July 19, 1889; and the Deanery bay windows, Jan. 30, 1885.

At a meeting of the Rivers Committee of the Manchester Corporation on Tuesday, a sub-committee was appointed to consider and report upon plans for the treatment of the sewage of the city. It is intended to take the advice of experts, and to report at as early a date as possible.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Edinburgh Architectural Society.—A meeting of this society was held on Wednesday in last week, Mr. J. A. Williamson, A.R.I.B.A., president, in the chair. Professor Baldwin Brown delivered a lecture entitled, "Notes on Some Edinburgh Buildings and Monuments." He began by explaining that his intention was to touch upon Edinburgh buildings, not from the historical point of view, but only as illustrating matters of general interest to those embracing the profession of architecture. The foremost question of the hour on the artistic side of architecture was that of the meaning and value of architectural styles in modern practice. Many of the younger members of the profession were repudiating the idea of being bound down in their work by the traditions of the past, and were claiming for the designer freedom to work out the solution of modern problems in a modern spirit. The past history of the art, however, showed that the "styles" had not fettered freedom, and that some of the best architects—as, for example, Wren and Playfair—cared comparatively little what forms they used so long as they obtained those effects of grouping at which they aimed. The truth was that architectural effect depended not so much on the forms themselves, but on the designer's sense of proportion in their combination. There was a distinct advantage in the use of well-understood established forms, because the eye was able to judge better of their relations without the attention being drawn off to the forms themselves. The present age had really its own architectural style, and a very good style, brought down from the Tuscan Renaissance and established here by Adam and Playfair. The fact that we had this tradition of style was, however, obscured by the numerous revivals of which the 19th century had been the scene. The lecturer discussed some of these revivals, "Gothic," "Classic," and "Scottish Baronial," in their effect on Edinburgh architecture, and urged architects, if they wished to found a new style, to take the new materials which they used now, iron and steel, and to try and evolve from these materials suitable forms for their treatment.

Northern Architectural Association.—A meeting of this association was held, in the Art Gallery, Newcastle, on Wednesday evening in last week, Mr. Frank Rich, president, in the chair. Mr. John Lane, of York, addressed the assembly on "English Cathedrals," considering their general, but more particularly their picturesque features, as compared with the cathedrals of more Southern climes. Having introduced his subject, the lecturer proceeded to illustrate the details by many lantern pictures.

CHIPS.

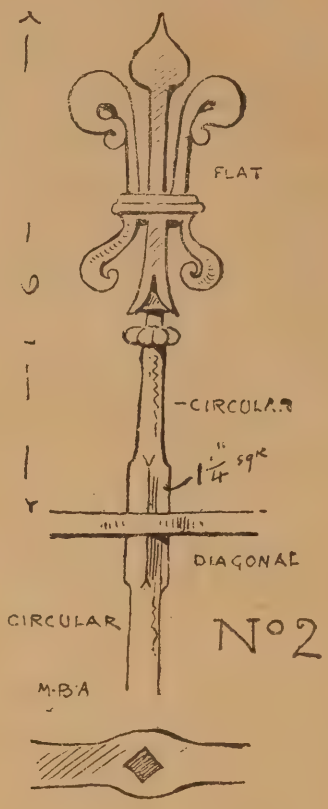
A memorial has been placed in Addington Churchyard, Winslow, to the memory of the late Lady Addington. It consists of an ornamented cross in grey granite; there is a marble panel let into the centre of the cross, in the form of a vesica, containing a figure of the Virgin in high relief. The work was executed by Messrs. J. Forsyth, of Finchley-road, Hampstead.

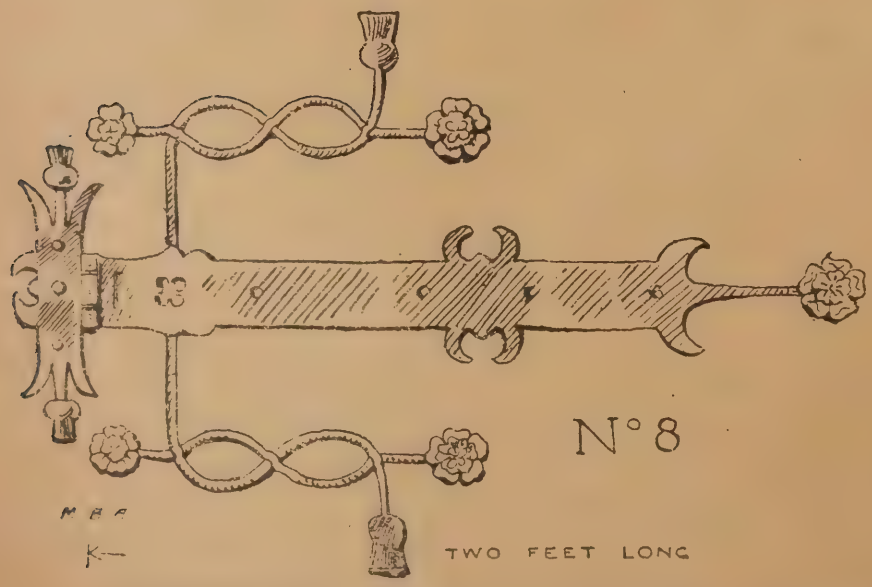
The County-court House, Galway, is being warmed and ventilated by means of Shorland's patent Manchester stoves, with ornamental tiled sides, and with descending smoke-flues, and Shorland's patent Manchester grates, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

Mr. A. Bowes, A.M.Inst.C.E., M.San.I., of the the borough engineer's office, Salford, has been appointed surveyor to the urban district of Newton-in-Makerfield, out of a large number of applicants.

On Friday last, the Duchess of Albany opened the new school buildings at Uppingham, and unveiled a bust of the Queen. The buildings were designed by Mr. J. G. Jackson, R.A., and erected by Mr. S. J. Halliday, of Stamford. The Duchess at the same time inspected the new workshops, isolation wards, and additions to sanatorium. These buildings have been erected by Messrs. Dorman and Scott and Mr. W. Dean, of Uppingham, under the supervision of Mr. J. B. Corby, F.S.I., architect, Stamford and Uppingham.

The foundation-stone of Richmond Road Congregational Church was laid at Roath, Cardiff, last week. The building will be Late Gothic in style, and will have a tower and spire rising to a total height of 120ft. Messrs. Habershon and Fawckner, of Cardiff, are the architects, and Mr. D. Davies, of the same town, is the contractor. The cost will be about £5,500.





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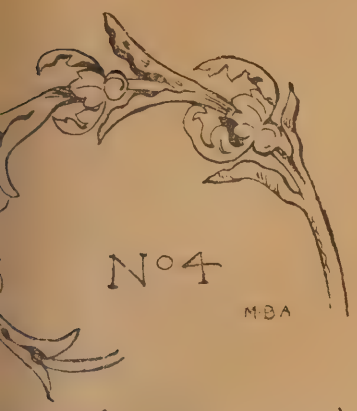

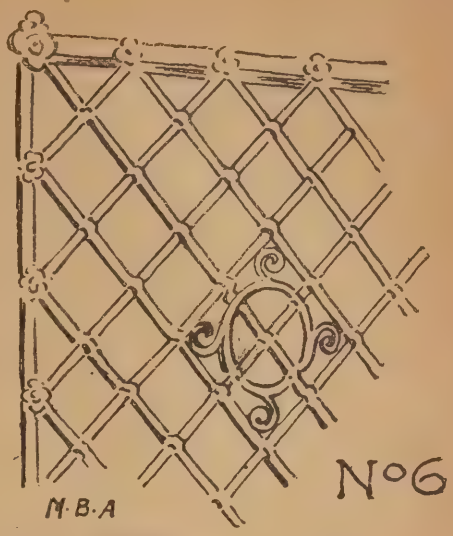

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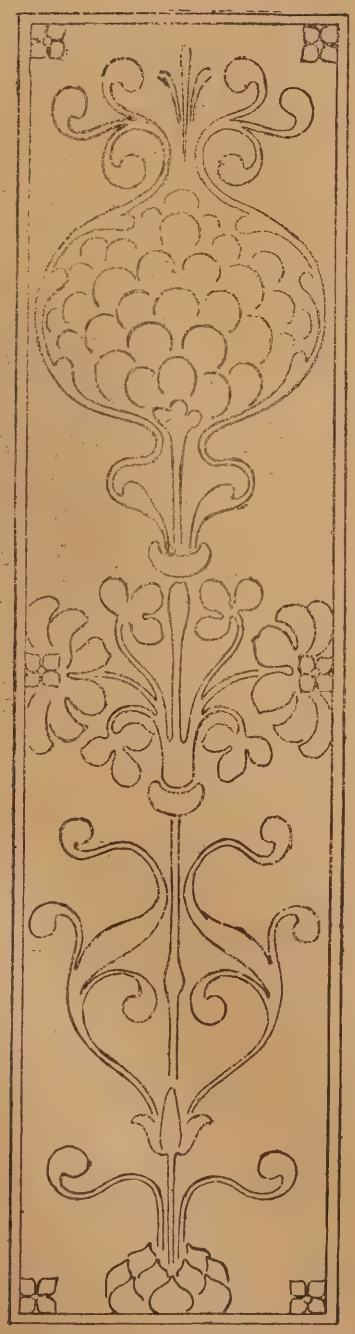

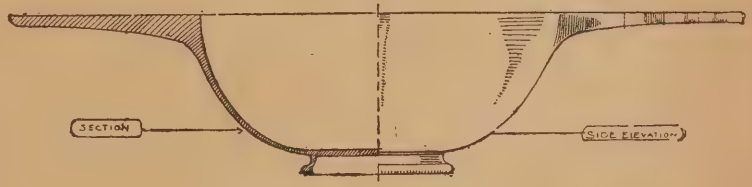

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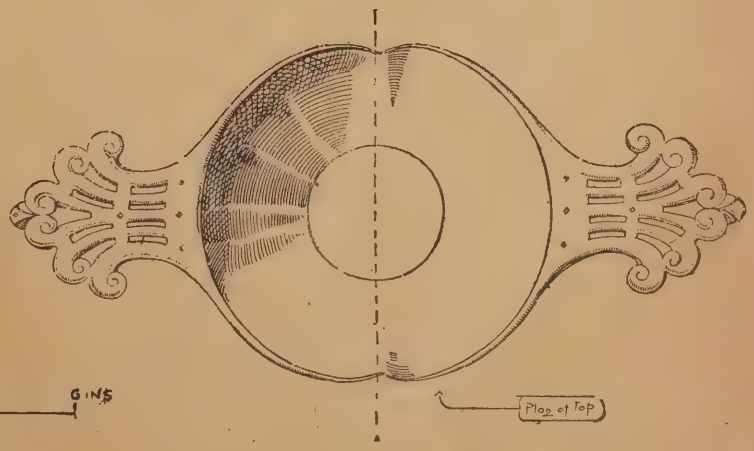


MING ART METAL EXHIBITION AT THE ROYAL AQUARIUM, MAY—JUNE, 1898.

Correspondence.

WALTHAMSTOW BATHS COMPETITION.

To the Editor of the Building News.

Sir,—I venture to say that the opinion you expressed on this matter was founded on the whole story, and not upon "half a story," as suggested by Messrs. Spalding and Cross. These gentlemen should clear their minds of cant and stick to facts.

The question at issue from a professional point of view is simply this: Are Messrs. Spalding and Cross justified in accepting the appointment as architects to the above, after their plans have been placed second in fair competition (on the award of Mr. Rowland Plumbe), and, further, after the plans placed first have been accepted by the Council—who instituted the competition—and the architect appointed under seal? Is a slight change in the *personnel* of the Council sufficient justification? Messrs. Spalding and Cross say: "That after the award was received from Mr. Plumbe the Council determined to place the work in their hands, but owing to a change made in the *personnel* of the Council, the new Board, which contained a majority of Mr. Dunford's supporters, determined to have his plans adopted." This statement is untrue. The *personnel* of the Council that instituted the competition (August, 1896) and instructed Mr. Plumbe to report (October, 1896), was exactly the same as appointed me their architect (February, 1897). Messrs. S. and C. add: "When we heard that Mr. Dunford was to be intrusted with the work, we did not move in the matter, either directly or indirectly."

Judging by the tone of the attacks made upon me in a local newspaper, to which Mr. Spalding sent a telegram of congratulation on the result of a Parliamentary victory in the Walthamstow Division, and edited by a member of the Council, I am bound to confess I had formed a different opinion. Messrs. Spalding and Cross, of course, mean by this that they did not inspire the following statements:—"That Mr. Dunford belongs to the Society of Architects, a small body, and considered of no importance in the profession," a statement, no doubt, interesting to the 600 architects who form that legally Incorporated Society. "That Messrs. Spalding and Cross have met Mr. Rowland Plumbe in competition and 'knocked him into a cocked hat.'" The classic elegance of the phrase will be appreciated! However, I am glad to have the disclaimer, but it has come none too soon.

Messrs. Spalding and Cross further say, previous to the institution of the competition, "The Council's surveyor sent us a plan of the site and we then prepared a plan of the baths and laid it before the Council." (Not the particular Council that instituted the competition.) "We, therefore, considered we were appointed architects to the baths; but ultimately Mr. Dunford, a local architect, was brought upon the scene."

This statement is decidedly disingenuous. It is evidently intended to lead your readers to believe that in the first instance Messrs. Spalding and Cross were officially approached by the Council. If this is the intention, it is untrue. The manner in which Messrs. Spalding and Cross first came before the Council is a matter of local notoriety.

A member of the Council has publicly stated "that Mr. Spalding called upon him at his house with plans, and he brought the name of the firm before the Works Committee the same evening, and so secured Mr. Spalding an interview."

The *Walthamstow Guardian* says, "According to this very amusing story, which might perhaps pass muster with the marines, a member of a well-known firm of architects without any previous communication called upon one of the rank and file of the Council, who was a complete stranger to him. Further, he was armed with plans, and by a strange coincidence he called on the very evening that the Works Committee were to meet. Truly, a wonderful yarn! Coincidences will happen; but is it customary among architects for a member of a firm to trot about with plans calling upon strangers in the hope of getting an appointment? We should have thought it would have been more business-like to have communicated with the chairman or the clerk."

After pushing themselves before the council, and making a sketch plan at their own expense, one can quite understand that they "considered we were appointed architects to the baths," and that their singularly humane and sensitive spirit was shocked when they heard a few months afterwards that a competition was to be instituted.

Having carried out the public library ("B. N." illustration, Sept. 28th, 1894) on the adjoining site to the entire satisfaction of the Local Board—a few months previous to Mr. Spalding's interview with the district council—I venture to say, that my claim to be considered in connection with the baths was at the time equal, if not superior, to the claim of Messrs. Spalding and Cross.

I observe that I am referred to as "a local architect." I don't know whether this is meant as a term of reproach or what? I am proud to think that I derive the title by residing in the district, and through my neighbours employing my services in connection with a public library, a church, one of the finest model bakeries in the kingdom, and other works, they know, if Messrs. Spalding and Cross do not, that I have also carried out over £100,000 of work in all parts of the country; that my designs have been carried out in all parts of the world, and that the first time I met Messrs. Spalding and Cross in competition I gained first place in the judgment of one of the most eminent architects of our time. I am quite content to be described "a local architect."

The basis of the competition was an expenditure of £7,000. Mr. Plumbe put the price of my design, after allowing for a sudden rise in the price of materials, at £8,000 (I stated in my report subject to 10 per cent.), and he pointed out that Messrs. Spalding and Cross's design contained nearly 130,000 cube feet more of building than my scheme, which at 6d. a foot brings their price up to £11,250; yet these gentlemen stated in their report it could be done for £7,000! To help them out of a difficulty the present Council has now agreed to an expenditure of £8,500! Will it stop there?

Considering that my appointment has only been rescinded by a majority of one vote (11 to 10), and solely owing to political reasons, I venture to say that Messrs. Spalding and Cross are not justified in accepting the position of architects to these baths.—I am, &c.,

J. Williams Dunford.

100c, Queen Victoria-street, E.C.

RE FIREPROOF CONSTRUCTED BUILDINGS.

Sir,—I have no desire to enter on a discussion nor to dogmatise on the matter; but I would ask your space to ventilate the following suggestions, in the hope that perhaps they will be found of value.

In the first place, I think it should be generally conceded that it is utterly impossible to construct any building that shall be absolutely proof against destruction by fire. You may have all the construction purely of iron, stone, brick, and "fireproof" plaster, but even then you can conceive of such construction being demolished by the demon fire. In this way, suppose a mass of highly combustible stuff, such, for example, as furniture, is stored in a room the walls of which are plastered with fireproof plaster, the floor of such room being of fireproof construction, the ceiling the same, and, in fact, that there is not an atom of combustible material used in the construction of such room. Nevertheless, we can conceive that if the furniture that is stored therein became ignited, that the heat generated by such combustion will be so great as to crack all the plaster from the walls, ceiling, and floor, and this, leaving bare the iron portions of the construction, be great enough to twist and bend the columns, pillars, and girders out of place to such an extent that the building will no longer hold together, but collapse. Metallurgy shows us that, provided the metallurgist can only obtain sufficient heat, he can reduce to the molten state practically all the metals; and if this is so, provided the burning mass generates heat sufficient to melt the metal used in constructing, a fireproof building will soon be reduced from its rigid form to the utter ruin of the building.

So far as the builder's art is concerned, all he can do is to construct a building that shall not readily permit its constructive parts to be destroyed by fire; but, as just foreshadowed, we can conceive of even the most elaborate precautions against combustion being upset by a sufficiency of heat being generated by a burning mass inside such building.

Now as regards fireproof plaster for covering all combustible materials and in the construction of a building, I should say that an advance on anything at present used would be a plaster that should be vitrifiable by heat—that is, that as it becomes hot its components would probably melt and form a vitrified glaze, like the enamel on china and glazed earthenware. Such a plaster would not so readily be cracked and displaced by heat as many of the so-called fireproof plasters at present in use.

Another suggestion I would venture to make is this. Construct each apartment, lobby, passage, &c., so that the means of at once extinguishing a fire is ready to hand. To do this, I would say that if pipes were fitted round the walls of rooms somewhere in the cornice, that these pipes were perforated with holes, and that they were connected with some appliance or apparatus for forcing water through them; then, on the outbreak of a fire in any room, &c., all that would be necessary would be to set the fire-extinguishing apparatus at work, and at once there would be a stream of water poured into the room from all sides on to the burning mass contained in it. The water should be as ice-cold as possible, so as to quench as much heat of the burning mass as possible, or the water could be impregnated with some fire-quenching fluid, like those used in hand grenades, fire extincteur, &c.

I have no wish to enter on a discussion, but have set forth the idea, and I hope others more interested in the building world than myself will thresh it out *pro* and *con.* to see what worth there is in it.—I am, &c., H. C. Standage.

Erdington, Birmingham, Dec. 4.

TIMBER.

Sir,—May I be allowed to ask your readers the question as to what is the difference between *red* deal and *yellow* deal, or, strictly speaking, red *pine* and yellow *pine* (*Pinus sylvestris*)? Should there be *no* difference, then why is the term "*yellow* deal" applied almost exclusively to floor-boards in the textbooks?

There still seems to be that confusion amongst architects on this subject (spoken of by Mr. Hurst), and it is not confined to architects alone, but builders, and even carpenters and joiners as well, who are in daily contact with the wood. Here in the South of England how many joiners planing up their deal, or in the North of Scotland dressing their redwood, would, if asked, inform you that it was *pine* they were working—very few indeed. It seems that the Scotch *fir* is really a *pine*, the self-same *Pinus sylvestris* to which, in English specifications, the vague term of *deal* is applied when describing joiners' work; but when describing the same wood in carpentry it is called *fir*, especially when cut out of balk.

I would suggest that architects, builders, &c., when dealing with this class of timber, should universally adopt the term "Northern pine," and state whether to be cut from *deals* or *balk*, thus preventing any confusion or misunderstanding on the subject.—I am, &c.,

D. Forbes Smith.

Colonel A. G. Durnford, R.E., Local Government Board inspector, has held an inquiry at Kingston-on-Thames into the Corporation's application to the Local Government Board for approval to the borrowing of £2,400 for the purposes of art, science, and technical schools.

The contract for the building of the new Bluecoat School at Horsham was signed on Wednesday in last week. Messrs. Langley and Son, of Crawley, are to be the builders, and the cost will be £294,243. The new school is to be finished in three and a half years.

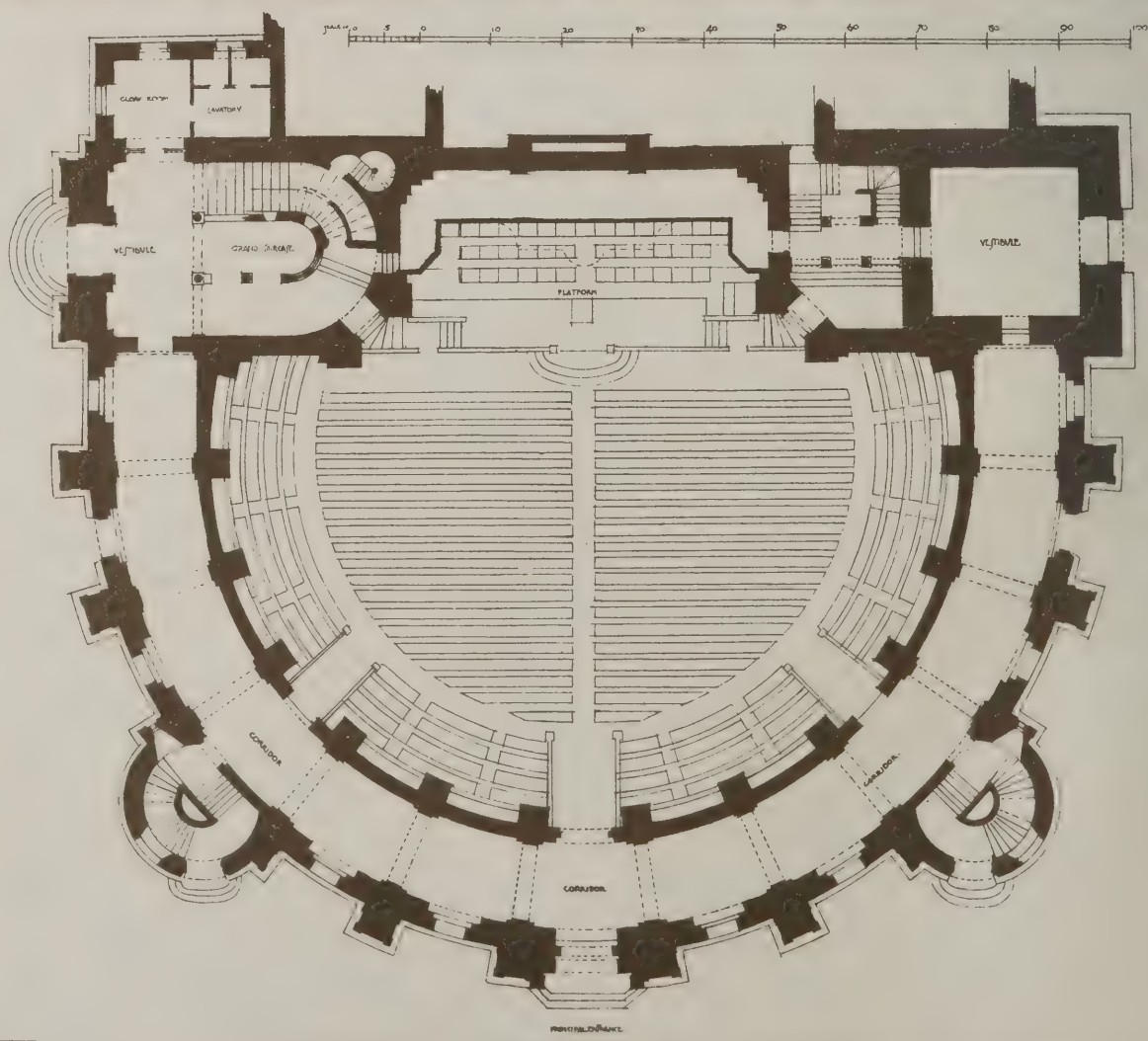
The Leith Town Council decided on Tuesday to increase the salary of Mr. Simpson, burgh assessor and town architect, by £50 a year.

On St. Andrew's Day, a vestry which has been added to St. Andrew's Church, Totteridge, was dedicated by Archdeacon Lawrance. The new building has been erected by subscription to commemorate the sixtieth year of Queen Victoria's reign. Mr. Charles Nicholson is the architect.

The completion of St. Andrew's Church, Willesden, N.W., has just been celebrated. The first section was opened in 1887, and on Wednesday the Bishop of London consecrated the nave and aisles which go to make up the completed church, which now gives accommodation to over 900 persons. The chancel (55ft. long), transept, and one bay of the nave formed the original building, and to this have been added four more bays and the side aisles. The whole is built of red brick with stone dressings, after the 12th-century style. It is designed by Mr. James Brooks.

PHOTO TINT ... Akerman ... Queen Square London W.C.

BURY · ART · GALLERY · & · PUBLIC · LIBRARY ·



"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.

THE Mc EWAN HALL, EDINBURGH UNIVERSITY.

THE Mc EWAN HALL,

OPENED ON DECR 3RD 1897 BY THE RIGHT HON

DR ROWAND AND

"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.

INBURGH UNIVERSITY,

HUR J. BALFOUR, M.P., L.L.D., CHANCELLOR,

ON. ARCHITECT

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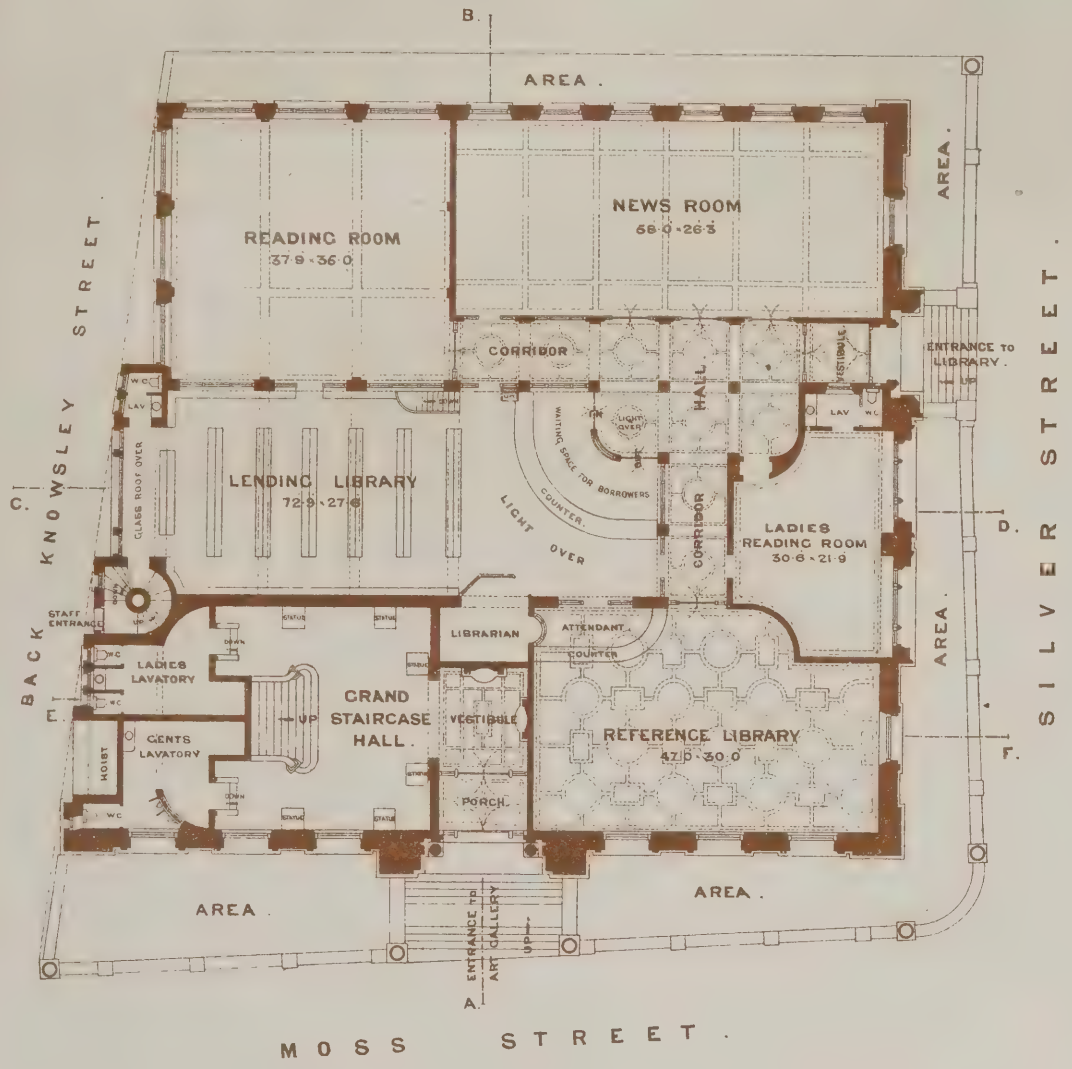
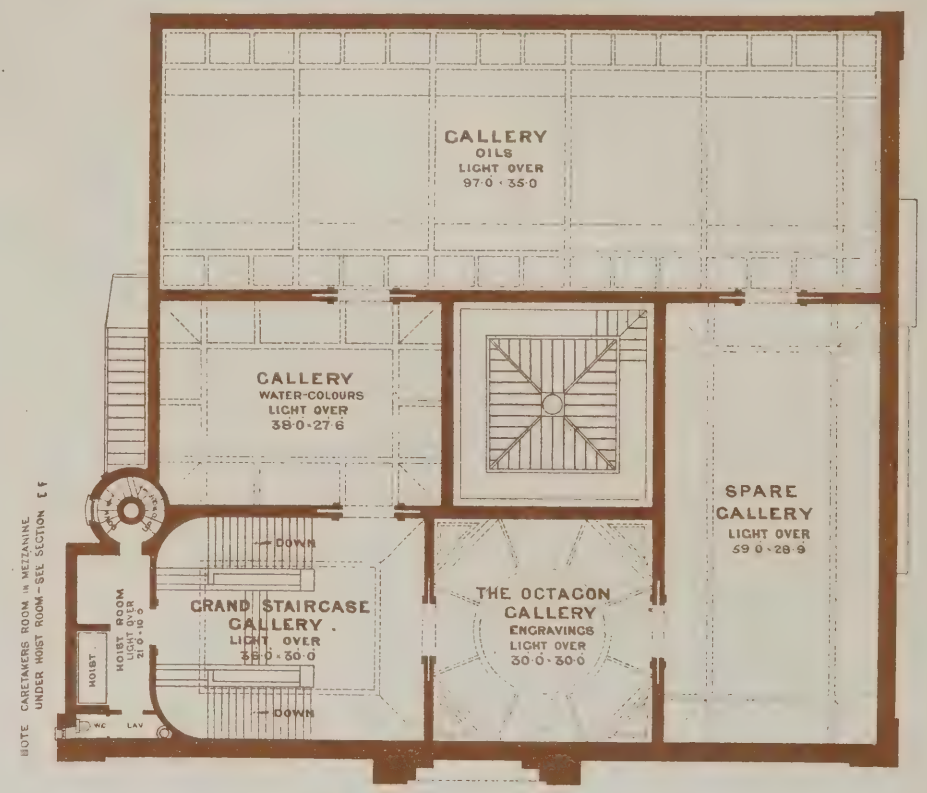
WELLS CATHEDRAL. FROM "THE CHURCH-TOWERS OF SOMERSETSHIRE." PUBLISHED BY MESSRS. FROST & REED, BRISTOL.

GROUND FLOOR PLAN.

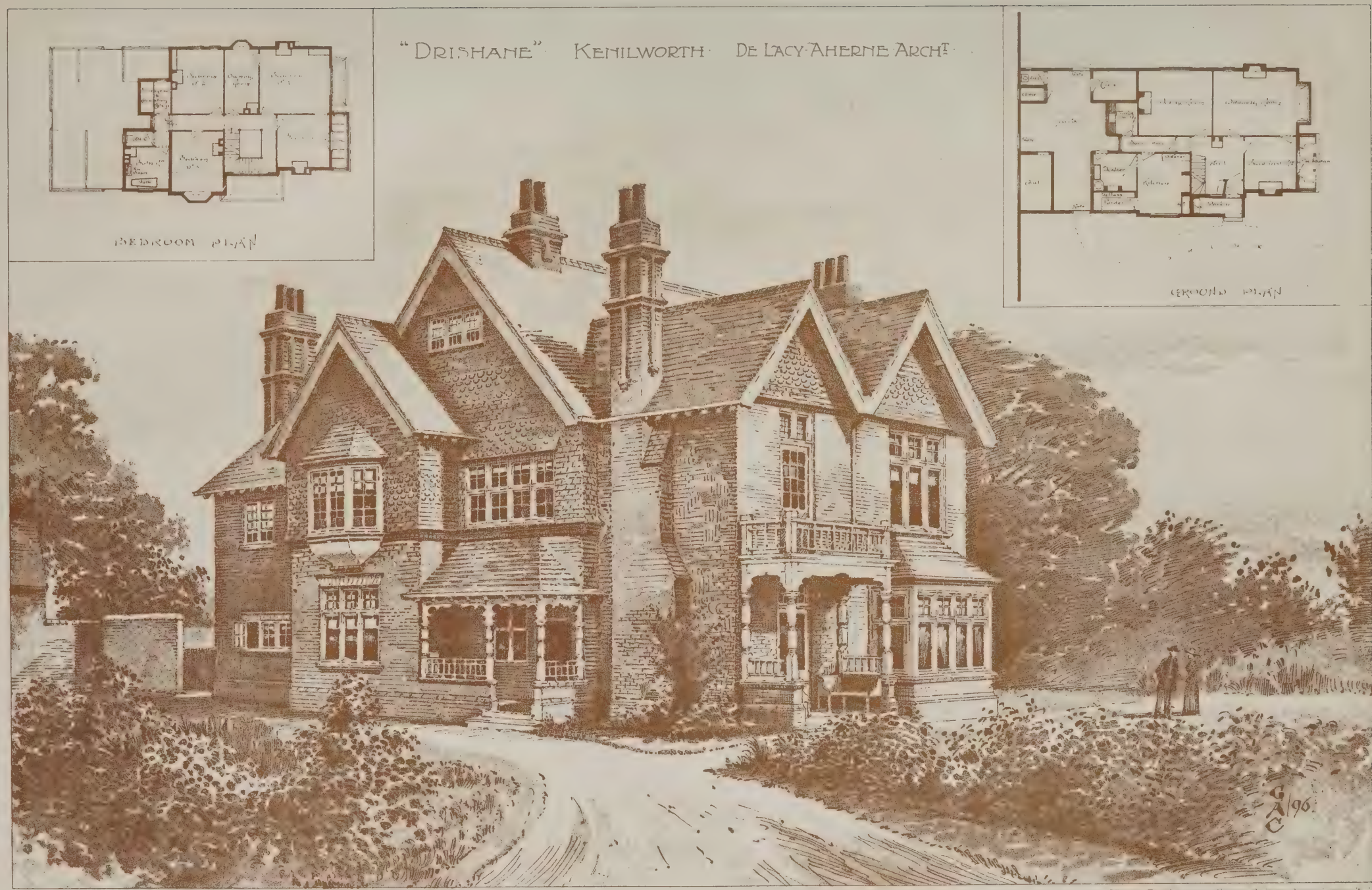


FIRST FLOOR PLAN.



SECOND PREMIATED DESIGN BY MESSRS CHEERS & SMITH ARCHTS

Photo-Lithographed & Printed by James Akerman & Queen Square W.C.


"DRISHANE" KENILWORTH DE LACY-AHERNE ARCHT.
BEDROOM PLAN
GROUND PLAN
GAC 96.

"PHOTO-TINT" [illegible]

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

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Front-page Advertisements 2s. per line, and Paragraph Advertisements 1s. per line. No Front-page or Paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

Situations.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is One Shilling for Twenty-four Words, and Sixpence for every eight words after. *All Situation Advertisements must be prepaid.*

NOTICE.

Bound copies of Vol. LXXII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

CHRISTMAS DAY.

In Christmas week this Journal will be published on THURSDAY, December 23, in time for Christmas Day. All Advertisements must, therefore, reach the Office by THREE p.m. on WEDNESDAY, Dec. 22, to secure insertion.

Received.—N. T. S.—A. A. and Co.—T. W.—B. T. F.—M. G. T. H.—W. S. and Son.—N. F.

"BUILDING NEWS" DESIGNING CLUB.

THIRD LIST OF SUBJECTS.

C.—A Small Public Library for a suburban district, the site being a corner one in a main thoroughfare, with a frontage of 110ft. and a depth of 80ft. The return road is on the left-hand side of the frontage which faces north, and main façade is to be set back 5ft. A porch or bays may project. No rights of light can be obtained on the right hand of the site. The accommodation required is to comprise a large newsroom, a magazine room, a reference room, and a lending library, all on the ground floor. A ladies' room and a boys' room, as may be contrived, and a librarian's room is necessary. Upstairs, a flat for his accommodation is to be provided, befitting an educated man with a limited income and small family. A filing space and workroom for the staff is necessary, and in the basement a heating-chamber, and lavatory, &c., for staff. The problem is to properly appropriate the relative sizes ordinarily required for the respective departments in a library of this class, remembering that ample counter space for the lending library is essential. Style left to the taste of designer. Cost, £5,000. Materials, red brick and stone. Scale, 8ft. to inch for elevations and sections. Plans, 16ft. to the inch. A sketch view wanted.

Drawings Received. — "The Bowery," "Maggot," "Wen," "Orb," "Bonum Consilium," "Mac," "Eric," "Klondyke," "Inexperienced," "Excelsior," "Spark," "Go," "Pantilo," "Wessex," "Olliwops," "Hotspur," "Centaur," and "Phantom."

Intercommunication.

QUESTIONS.

[11859.]—**Retaining Wall.**—Shall be glad if some of your able readers could give me the right proportion of wall—*i.e.*, thickness. The wall is to be of concrete, and to be on one or both sides of a street 18ft. wide. The height of necessary retaining wall or walls will vary from about 5ft. to 12ft. The total length of wall is about 700ft. —Concrete.

[11860.]—**Builders' Books.**—Could any reader recommend a good system of builders' bookkeeping, both jobbing and contract work? Something practical, concise, and thorough. Is there any recognised work or treatise published dealing with this?—Bookie.

REPLIES.

[11850.]—**Raising Water.**—There can be no difficulty—the pipe can, if desired, be made to follow slope of ground. I should recommend "Student" to consult an engineer who has had some experience in water supplies. —Ajax.

[11852.]—**Slate Roofs.**—The method of laying slates is described in textbooks, such as those publisned by Longmans, "Advanced Building Construction," and the treatise by Mitchell (Lockwood and Son). Battens are less expensive than boarding.—T. S. T.

[11853.]—**Fireproofing Iron Columns.**—One mode of fireproofing iron stanchions and columns is to inclose them in wire lathing like that of the Expanded Metal Co., particulars of which are given in the prospectus. Asbestos and asbestic may also be used on metal lathing. There are also fireclay or terracotta tiles, perforated, made to surround iron columns; these are often used in America, and are made to allow an air space between the iron column and the tile. The porous clay casing is found to be more fire-resisting. Portland cement plastering on fillets of wood or metal laths is also used; the results are less satisfactory.—G. H. G.

[11853.]—**Fireproofing Iron Columns.**—"A. S. T." will find that cement or concrete is worse than useless for coating iron, as the expansion of the metal, when heated, bursts the covering. A soft yielding covering, such as silicate cotton, which is both fireproof and non-conducting, is the only efficient coating for columns and girders.—H. M.

[11857.]—**Concrete Flooring.**—(1) The rolled steel joists may be placed from 2ft. to, say, 3ft. 6in. apart; but the distance ought to be regulated by the depth of floor and the section of concrete. (2) The concrete can be flat or cambered; in the former case, it may be a slab of, say, 4in. of concrete (Portland cement and furnace slag). If the distance of the joists is greater, wires may be introduced, extending over the top of main girders. (3) The relative merits of concrete in compression and tension depend entirely on the nature and proportions of the cement. (4) The steel joists ought to be protected by fireclay blocks or by wire lathing and asbestic plaster; but porous tile or terracotta is a good, desirable covering. (5) Coke breeze or slag is better than stone for concrete. (6) The method or patented system used as above stated will fix distance of joists. The fireclay blocks in the market protect the ironwork from the action of fire. (7) A good thickness for the concrete arching would be about 6in. to 8in. if the joists were 3ft. apart, including camber. Experiment only can determine the proper depth for certain loads.—G. H. G.

CHIPS.

For the erection of a new hall the city council of Wells have received eight sets of plans in competition from architects.

A new organ was opened at St. Michael's Baptist Chapel, Coventry, on Wednesday night. It cost £600, and has been built by Messrs. Nicholson and Lord, of Walsall.

The Salford Corporation at their last meeting decided to purchase the land lying between Langley road, Agecroft-lane, and the river Irwell, containing about 45 acres, at the price of £600 an acre, for the purposes of a new cemetery.

Mrs. C. Laurie Armitage, of 3, Hall-road, St. John's Wood, who died on the 13th of October last, aged 80 years, the widow of Mr. Edward Armitage, R.A., bequeathed a legacy of £10,000 to the Artists' Royal Benevolent Institution, and many other considerable sums to charitable institutions. A portrait of her husband by Mr. W. W. Ouless, R.A., and a bust of her husband by the late Sir Edgar Boehm, R.A., are left to the Royal Academy.

Mr. Tate has given instructions to the builders Messrs. Higgs and Hill, of Crown Works, South Lambeth, to at once proceed with the work of completing the Gallery of British Art according to the original design of his architect, Mr. Sidney R. J. Smith, F.R.I.B.A. This work, which will take about eighteen months to execute, will considerably more than double the size of the existing building, and give much more space for picture hanging, in addition to which two large rooms will be devoted to sculpture.

Messrs. Fambrini and Daniels, of the Architectural Concrete Works, Lincoln, have supplied the whole of the cornices, strings, heads, cills, &c., for the Cross Keys Hotel, situate at the corner of Upper Ground-street and Blackfriars-road, S.E. This firm have also recently supplied their material for the George and Guy, London, and the Owl, Edmonton, together with dressings for residential flats at Willesden Park, brewery extensions for Messrs. Whitbread and Co., Whitecross-street, London, and tracery windows for Catholic churches at Hull and Beverley. They have secured the contract for upwards of 100 moulded arches, modelled spandrels and pillars, perforated dado, panels, caps, &c., for arcading in the premises now being erected for Mr. J. Walsh, of Sheffield. Mr. R. Butson, the firm's sole London representative, has removed from Chancery-lane to 11, 12, and 13, Bridge-chambers, 171, Queen Victoria-street, E.C., where samples and specimens of modelling, and photos of public buildings in their material, may be seen.

LEGAL INTELLIGENCE.

Employer Fined by Trade Unionists.—The Liverpool County-court Judge, on Tuesday, gave judgment in the case of a master builder who sued the Plasterers' Union for £5, which he had, as he alleged, paid under pressure, as a fine levied by the operatives on him because he offended against the operative plasterers' rules by employing lathers to do the lathing work instead of plasterers, as provided by trade union rules. Until £5 was paid, all plasterers were withdrawn from the shop, and the employer was practically boycotted. The judge held that the payment was voluntary, as by it he got union men in consideration for the money paid. Verdict for the defendants.

The rural district council of Tiverton have adopted plans by Mr. Donald Cameron, city surveyor of Exeter, for carrying out a septic tank system of sewerage and sewage disposal at Thorverton, at an estimated outlay of £1,200.

As a permanent memorial of the Diamond Jubilee, a clock has been erected on Muston Church, near Humanby. Messrs. Wm. Potts and Sons, Leeds, are the makers. It was dedicated by the Ven. J. Palmer, Archdeacon of the East Riding, on Friday.

At the last meeting of the Burnley Town Council it was agreed that the sum of £100 a year paid for the last two years to Mr. Button as consulting engineer be added to the salary of Mr. G. H. Pickles, borough surveyor, as understood at the time of his appointment. It was explained that the salary of Mr. Pickles would now be £350 a year, or £200 a year less than was paid to Mr. Button, the late surveyor, on his resignation.

At a public meeting held at Brechin, N.B., on Thursday in last week, the proposal to raise funds for the restoration of the ancient cathedral was adopted, and a representative restoration committee was appointed.

A new house in Holburn-street, Aberdeen, which had just been completed by the contractor, fell inwards on Saturday afternoon. Two of the masons employed upon it, Charles Birnie and William Ritchie, sustained injuries from which they died, and other four were dangerously hurt. The contractor's son, Thomas Beattie, is suffering from concussion of the brain. It is believed that the fall occurred through the action of the weather. There had been a pretty severe frost, and a thaw set in, which had the effect of softening the mortar.

A new dispensary in Maingo-road, Mill-lane, Bedminster, was opened on Friday. The building is of red brick, with freestone dressings and Broseley tiled roof, and has cost £1,550. Mr. W. V. Gough, of Bristol, is the architect.

The fourth of the series of fortnightly lectures in the Glasgow Corporation Art Galleries on art subjects was delivered on Saturday evening by the Rev. John Hunter, D.D., of Trinity Congregational Church, whose subject was Tennyson's "Palace of Art." The lecturer said that Tennyson's great poem was a study of the deeper and larger movements of the intellectual, social, and religious life of the age. After an analysis of the poem, Dr. Hunter showed how it was the tendency of much of our devotion to knowledge, music, and art, to produce just such a type of character as Tennyson had idealised in his "Palace of Art"—a tendency which had been rightly named the new Paganism.

The Vale of Glamorgan Railway line, connecting Barry Docks with the mid-Glamorgan coalfields, was opened for both passenger and mineral traffic on Friday. The line, which is 18½ miles long, forms a means of communication between a vast agricultural district and Cardiff, Barry, and Bridgend.

A fatal accident occurred on the premises of Messrs. Lowe and Sons, contractors, of Burton-on-Trent, on Saturday. A large crane running on an elevated tramway was being used in the usual way on that morning to convey a block of stone, weighing about six tons, to the sheds where the masons were working. The whole structure collapsed and fell to the ground. One of the four men above, William Bowers, leaped from the crane to the ground, a distance of 20ft., but the other three—James Roe, George Whetton, and George Peach—were buried amongst the *débris*. Whetton and Peach were extricated alive, but seriously injured. Roe was shockingly hurt, and died in the infirmary the same evening. The other two men are progressing favourably.

The sanitary committee of the Bristol City Council have unanimously agreed to recommend the abolition of all fees payable on plans for new buildings and alterations.

The Duchess of Albany opened, on Friday, the new Victoria School buildings at Uppingham, erected from designs by Mr. T. G. Jackson, R.A., at a cost of £9,200, and unveiled a bust of the Queen by Signor Lucchesi, the gift of Mr. W. F. Rawnsley, an old Uppingham boy, and present tutor of the young Duke of Albany.

WATER SUPPLY AND SANITARY MATTERS.

London Water Commission.—At the adjourned sitting of this Royal Commission, held on Monday, Mr. H. L. Cripps Parliamentary agent for the London County Council (and previously acting in the same capacity for its predecessor, the Metropolitan Board of Works) was further examined on the London Water Supply. He said he believed that the purchase of the present water companies' interests would finally settle the question; that there would be great advantage in dealing with the whole of London as one area; and that by this means they would get rid of the unfair anomaly by which people in one district paid much less for water than those in another. He further believed that if the local authority acquired the water supply, there would be a reduction in the price. The Commission adjourned till Monday next.

CHIPS.

The rural district council for Truro elected Mr. James Paul Carbis as surveyor for the southern district, at a salary of £145 a year.

In the church of St. Nicholas at Kiddington a Jubilee chancel-screen, of carved oak, has been dedicated by the Bishop of Reading. It is Perpendicular in style, and has been executed by Messrs. Harry Hems and Son, of Exeter.

At the badly-managed bicentenary service for Freemasons, held at St. Paul's Cathedral on Thursday in last week, a statement was circulated setting out the works for decorating the cathedral which have already been completed, under the superintendence of Mr. F. C. Penrose, Messrs. Bodley and Garner, and Sir William Richmond; and referring to the works in course of construction, and to those which are wanted "immediately" and "in the future." The sum already expended on the decorations is £120,000, and the estimate for the rest of the work is about £100,000, "to be spread over many years, as money comes in." To this amount Thursday's collection—£809—will be given, and some definite panel or portion will be assigned by Sir William Richmond and the decoration committee to the Freemasons.

Notice is given of a Bill to incorporate a Company for the purpose of constructing an underground railway extending from New Cross-road, under the Old Kent-road, New Kent-road, and the Waterloo-road.

The Birkenhead Town Council, on Wednesday, approved the scheme for erecting a new pier, bridge, and stage at Rock Ferry, at an estimated cost of £15,000, and for providing two new screw steamers for the Woodside Ferry.

An area of 28½ acres of land at Brentwood has been purchased by the Metropolitan Asylums Board as a site for an ophthalmic school.

The sewerage works for Bury, Lancs, in the suburbs of Botany Bay, will be formally opened by the Mayor (Alderman Healey) on Saturday in next week, the 18th inst., when he will be presented by Mr. James Diggle, the engineer, with a gold key with which to open the door.

A special service was held at All Saints' Church, Hastings, when Archdeacon Sutton dedicated a stained-glass window. The subject of the window is our Lord in the Temple with the Doctors, the Virgin Mary and Joseph standing before him. In the tracery at the top of the window are the arms of Marlborough College and of Jesus College, Cambridge. The window was designed and executed by Messrs. Powell, Whitefriars.

The trustees under the Birmingham Churches Act have sold the site and building of Christ Church in that city to the trustees of the Colmore Estate for £65,000. The church, which is in the centre of the city near the town-hall, is one which is regarded as no longer necessary, and the final services there were held on Sunday in last week.

Notice has been given to the Hull Corporation to terminate their tenancy of a stoneyard adjoining the Paragon Station at Hull, rented from the North-Eastern Railway Company. The company require the land for the enlargement of Paragon Station.

New Baptist Sunday Schools in Mint-street, Lincoln, were opened last week. On the ground-floor are two shops, each 18ft. by 24ft, with warehouses behind. Space in the rear is utilised for storeroom and engine-room. A flight of stairs leads to the school-rooms on the first floor. The lecture-hall is 85ft. by 28ft., and adjoining are classrooms, the infant schoolroom accommodating fifty children, and the minister's vestry. The choir vestry, at the rear of the chapel organ-loft, is reached by another flight of stairs, and on this floor are four other classrooms. The chapel has undergone improvements, and it has been cleaned and redecorated. Messrs. Mortimer and Son were the architects of the new buildings, and Messrs. Wright and Son were the contractors, the total cost of the work being £2,300.

Our Office Table.

The Fire Brigade Committee of the London County Council report an instance in which the operations of the Works Department have resulted in a large saving. The Council authorised the execution by the department of some repairs, painting, and drainage work required at the Rotherhithe Fire Station, the architect's estimate being respectively £490 and £148, making a total of £638. The revised estimate of the work amounted to £658; but the actual cost has been £489, a saving of about 25 per cent. on the revised estimate. The manager of the department gives the following explanation of the saving:—"I attribute the greater part of this saving to the improvement in the organisation of the Works Department and the closer attention now given to detail in carrying out the work. Greater care is observed in collecting materials together before commencing the work, and advantage is taken of any circumstances by which a saving may be effected. In the present case the materials were collected in the yard and barged to the job instead of carting in small lots. We were able to save also by reason of having other work proceeding at the same time in the neighbourhood, and, further, were not interrupted by arrangements necessary for the convenience of the fire brigade as is generally the case. There were other circumstances which helped to increase the saving, and which we cannot expect always to find in other works."

Mr. Paton, curator of Glasgow Corporation Art Galleries, delivered, at these galleries on Tuesday night, the sixth of his series of addresses on Italian art, his subject being Raphael. Mr. Paton alluded to the general rise, culmination, and decline of schools, which in their early days were dominated by ideas and imagination beyond the artist's power of expression and technical control. At their culmination, conception and execution went hand in hand, and in their decline executive power was in excess of inspiration. In the Florentine school the culmination came in the persons of Leonardo, Michel Angelo, Correggio, and Raphael. Raphael had been called the Archangel of Art. His very perfection was an obstacle to the full appreciation of and sympathy with his marvellous endowments. His ideals were lofty, serene, joyous, and almost divinely perfect, like the grand ideals of Classical sculpture. He had a wonderful faculty of sympathetic appreciation, observed all, learned from all, and improved on all. The conditions of his birth, nurture, education, and surroundings were singularly favourable. His father was a distinguished artist and a poet of no mean ability: while the Court of Duke Federigo of Urbino was notable for its devotion to learning, art, and manly exercises. Raphael's great endowments were developed with untiring patient study and industry from his childhood to the last day of his brief life of exactly thirty-seven years. The lecturer afterwards dwelt on the three separate periods of Raphael's artistic activity, in Perugia, Florence, and Rome.

The Congress of Archæological Societies, of which Mr. Ralph Nevill, F.S.A., F.R.I.B.A., 13, Addison-crescent, Kensington, is the hon. secretary, is anxious to draw the attention of all municipal corporations and county councils to the extreme importance and value, not only for local but also for general historical purposes, of all such old documents as are now in, or may come into, their possession. The value applies not only to charters and list of freemen or burgesses, but to all manner of ancient documents, such as inclosure maps, leases, and other conveyances, the account rolls and books of treasurers, chamberlains, and other officers, leet and court rolls, and papers relating to lawsuits, &c., and also all county papers, which, before the Local Government Act, 1888, were in the custody of the Lord Lieutenants of the counties, and include the Quarter Sessions records, and papers directed by Act of Parliament to be kept by the Clerks of the Peace. It is impossible to foresee what important bearing such documents may not have upon general history, and this has in the last few years been very generally understood, and many corporations have not only carefully calendared all the old documents in their possession, but in some cases have printed, or are printing, the results. The attention thus given to the matter has brought to light many ancient documents the existence of which was unsuspected. The congress prays all corporations to have a diligent search made for all documents that may belong to them, and to have them calendared and placed in safety in some public office, or at least in their own fireproof safes. It also suggests that inquiries should be made for any old maces, staves, seals, and other badges of office not now in use that may be in existence, so that they may be preserved.

The City Council of Liverpool have discussed at considerable length the conditions of appointment of a new city engineer and surveyor in succession to Mr. H. Percy Boulnois, who has recently resigned the office after eight years' service. The duties are to be modified by the removal to another officer of the responsibilities attaching to the watching of building plans, so as to set the surveyor more free to attend to the roads and streets, and other matters. The Health Committee proposed to invite applications, and to offer an initial salary of £1,000 a year. To this Sir Arthur B. Forwood moved as an amendment that the salary be £1,500 a year, and that the appointment be placed in the hands of a special committee, but the amendment was rejected by the decisive majority of 58 votes to 7. It was urged that the suggested salary was quite inadequate to attract men of the first rank, and a further amendment was proposed, raising the amount from £1,000 to £1,200. It was defeated by 30 votes to 29, it being pointed out that the last time the position was vacant it was advertised at £850 a year, when there were 42 applicants, many of whom were quite competent to fill the vacancy. At this stage the Council adjourned for a fortnight, the proceedings of the Health Committee having not been confirmed.

Under the Public Health (London) Act, 1891, every sanitary authority is required to make and enforce such by-laws as may be requisite for the regulation and registration of houses let in lodgings. The by-laws are to provide, among other things, for fixing the number of persons who may occupy a house or a part of a house which is let in lodgings or occupied by members of more than one family, and for the separation of the sexes in a house so let or occupied, for enforcing drainage and promoting cleanliness and ventilation, and for taking precautions in case of any infectious disease. The medical officer to the London County Council has, under instruction, been recently making an inspection to see how far this portion of the Act is being observed in the various London districts. A report which he has presented to the Public Health Committee of the Council shows that in 31 districts the number of houses on the register ranges between six in Plumstead, and 1,500 in Kensington. In Bethnal-green, Lambeth, Lee, Paddington, Newington, Poplar, St. Saviour (Southwark), Stoke Newington, Battersea, and Chelsea, no houses were regulated at the time of the inquiry. In Lambeth the by-laws have recently been confirmed. In Paddington an inspector has lately been employed to deal with the subject. The committee report that in all cases but one in which by-laws had been made and confirmed 400c.ft. per adult person were required in rooms occupied by day and night; but in Clerkenwell, the exception referred to, the amount was 350. That was to be regretted, and they proposed to call the attention of the Local Government Board to the matter. In view of the fact that the statutory requirement that the by-laws relating to houses let in lodgings should be enforced was still so much neglected in many districts in London, they thought the Council should now make a complaint to the Local Government Board. The sanitary authority with regard to which they thought that course should in the first instance be taken was Bethnal Green, as that authority did not seem to have attempted to take any action with regard to houses let in lodgings.

The *Birmingham Post* animadverts upon the recent enforcement in that city of regulations relating to the lighting of basements by the insertion of glass slabs in the pavement, which regulations, it is complained, are a serious curtailment of the privileges which property-owners have hitherto enjoyed. Prior to the retirement of Mr. W. Till from the office of city surveyor the rule was to allow pavement-lights a foot wide along two-thirds of the frontages where they were desired, the corporation exacting no payment and making no special conditions. The result has been that a very large number of business premises in Birmingham have been so planned as to admit of the use of basements for offices, show-

rooms, and so forth, the value of the property being thereby considerably enhanced, and the rates being proportionately enriched. Some time ago it was intimated to persons who were about to erect properties on these lines that the pavement-lights would only be sanctioned subject to payment of 5s. per annum for each light of 6ft. by 2ft., the arrangement to be terminable at three months' notice. Agreements to this effect were entered into in some cases; but other persons concerned have taken the view that not only is the exaction of a rental for the use of a pavement-light illegal, but that the reservation as to the continuance of the light seriously vitiates the property-owner's title, rendering the leasing of basements so precarious as to leave no alternative but to revert to the primitive cellar or comparatively dark storeroom. Apart altogether from the depreciation in the value of the property to the extent of the charge now imposed, many building-owners do not consider themselves justified in going to the expense of constructing basements, and entering into leases with tenants for their occupation, if they are under liability to forfeit their pavement-lights at the caprice of another surveyor or a newly-constituted public works committee. Building-owners have, of course, the option of setting back their frontages so as to allow of the areas being constructed on their own land, but this would not only involve the sacrifice of a portion of the site, but might lead to many irregularities in the building-line. The city surveyor (Mr. John Price) states that the regulation has been adopted in order that the corporation may receive an equitable return for expense to which they are put in connection with pavement-lights, and also with a view to preserving the rights of the public in regard to the footpaths and the space beneath them. The new arrangement is in some respects only tentative, and it is not improbable that it will be modified if it appears to the committee to operate oppressively where properties with extensive frontages are concerned.

The Canadian Government decided last month on a change of policy regarding timber regulations applicable to the North-West and Manitoba. Timber reserves will be maintained. With this object in view the heavier timber belts will be withdrawn from settlement and the young trees will be preserved so as to foster a growth for the future. Guardians will be appointed to protect the reserves, particularly in the Turtle and Moose Mountain regions. Fires will be prevented as far as possible, and the settlers will be restrained from cutting young trees. Another step in contemplation is the devotion of labour and money toward the laying out of an effective fireguard. A fund for this object was voted at the last Session of Parliament. At the summit of the reserves mentioned are numerous lakes. These are to be connected by wide roads, which, when completed, will form an effective barrier to the progress of fire, it is thought. The theory is that the open spaces and the lakes will constitute an efficient firebreak.

On Saturday night Mr. Harry Hems celebrated the 31st anniversary of his finding of the lucky horseshoe and first arrival in Exeter by preparing a hot supper at his studio in Longbrook-street, of which 82 of his staff and a few personal friends partook. One of the large studios was converted, for the nonce, into a baronial banqueting hall, a large 15th-century oak screen now being restored, standing at the further end, adding to the effect. It was here a string band discoursed music, whilst in the intervals between Mrs. George Packham (*née* Hems), the Misses Hems, and Mr. A. Stevenz presided at the piano. Messrs. Hiscox and Tyndal White also gave solos on the violin and the 'cello. Before the toasts commenced, Mr. Frank Dyer, as senior employé, made on behalf of his fellow-workmen an apparently unexpected presentation to Messrs. Harry Hems and Sons as a small testimony of the high opinion they held for father and sons. The gift took the form of some beautiful antique silver. Mr. Harry Hems, supported by Councillors Orchard and Sidney Herbert, occupied the chair, and Mr. Greville C. Hems was in the vice-chair. After the loyal toasts, on the proposition of the chairman, the honoured memory of Stephen Shute, John Churchill, Mark Brock, Tom Cunningham, and William A. Lee, former workmen, was drunk in solemn silence. Councillor Sidney Herbert then proposed the toast of the evening, "Continued success and long life to Harry Hems and his sons." The toast was drunk enthusiastically with musical honours. Mr. Harry Hems, in his reply, said since he came to Exeter 31 years ago that day, he had spent a quarter of a million of money in connection with his business. He was glad to think that during the past twelve months since they last met under similar circumstances he had never said a single unkind word to one of them. Messrs. Greville C. and Harry T. Hems having also suitably responded, music and conviviality became the order of the evening.

An exposition of Pearson's Automatic Fire-alarm and Heat Indicator was given at the Charing Cross Hotel on Monday. The apparatus is undoubtedly a useful one. It gives instant indication of any dangerous rise in the temperature of any place by closing an electric circuit and ringing an alarm-bell at any place. At present West Ham and other outlying suburbs only are in position to take full advantage of such a system, owing to the high charges of the National Telephone Company; but if the telephone service were municipalised, as it ought to be, and if fire insurance companies reduced their premiums proportionately, as they should do for buildings thus protected, there should be practically no limit to the adoption of this extremely ingenious and inexpensive apparatus.

"Petrifite, Limited," which is launched this week with a capital of £300,000, is formed to work a new cement, which we noticed some time back, and which was again described in a paper read before the Architectural Association by Mr. H. D. Searles-Wood, which we gave on p. 680 in our issue of Nov. 12. Petrifite is composed principally of magnesite, and it has the property of binding together almost any kind of waste material, such as slate-dust, sea-sand, slag, &c., into useful building blocks.

CHIPS.

The new system of sewerage at Sidmouth was opened on Wednesday. The plan adopted was prepared by Mr. James Mansergh, and under it all the lower parts of the town have been re-sewered.

The Metropolitan Asylums Board have approved of plans of alterations and additions to the convalescent home at Leavesden Asylum for the purpose of enlarging the building for use as an isolation hospital.

Sir George Newnes, Bart., has intimated his intention of presenting his native town of Matlock with the undertaking of the Matlock Cable Tramway Company, Limited. The property is valued at £20,000, and this unique tramway connects Matlock Bridge with Matlock Bank, up a precipitous hill.

The death is reported from Morecambe of Mr. A. Baxter after a lingering illness. The deceased was sixty-two years of age, and was for fifteen years a member of the old Morecambe Burial Board. He carried on a successful joinery business in Union-street, in that town.

On Thursday afternoon in last week the science buildings, which have been erected on the grounds of the Wolverhampton Grammar School, were opened. The cost of the new structure has been £2,000. The buildings are two stories in height, and the accommodation includes a lecture-room, a preparation-room, a storeroom, and a balance-room on the ground-floor; and on the first floor are a chemical laboratory and a physical laboratory. Mr. H. Willcock was the builder, and Mr. G. H. Stanger the architect.

No less a sum than £200,548 was registered at the Estate Exchange last week as the results of the sales held at the Mart; and, in addition to this, a sale of City-road freeholds and New River shares was held by Messrs. Edwin Fox and Bousfield, bringing the gross aggregate to nearly a quarter of a million. There was no lack of demand for investments in house property; and, as has been the case for the greater part of the year, prices were very firm.

Dr. Tristram, Q.C., Chancellor of the Diocese of Canterbury, held a sitting in the parish church of Chiddingstone, near Penshurst, on Saturday, to hear an application for a faculty to authorise the removal of all the fittings in the church and monumental slabs in the pavements (but ultimately to restore and, in many respects, to alter the same), so as to lay down a cement concrete flooring, and for removing, if necessary, bodies interred within the church, and to re-inter them in the churchyard. The architect, Mr. M. E. Macartney, was examined, as well as the rector and churchwardens. The Chancellor decreed that no bodies are to be removed from their resting-places, and gave directions as to reverently covering over all graves, and as to the final restoration of the church. He also decreed the faculty to issue. The alterations and improvements will cost £800.

MEETINGS FOR THE ENSUING WEEK.

Monday.—Royal Institute of British Architects. "Report on the Third Series of Experiments on Brickwork," by W. C. Street and Max. Clarke. 8 p.m.
Society of Arts. "Guttapercha," Cantor Lecture No. 3, by Dr. Eugene F. A. Obach. 8 p.m.
Society of Engineers. Annual General Meeting and Dinner.
Bristol Society of Architects. "A Visit to a Cistercian Monastery," by G. H. Oatley. 8 p.m.
Leeds and Yorkshire Architectural Society. "Some Byzantine Churches in Greece," by S. D. Kitson. 7.30 p.m.

Tuesday.—Institution of Civil Engineers. "The Great Land Slides on the Canadian Pacific Railway in British Columbia," by Robert B. Stanton. 8 p.m.

Wednesday.—St. Paul's Ecclesiological Society. Exhibition of Objects of Ecclesiological Interest. 7.30 p.m.
Society of Arts. "Purification of Sewage by Bacteria," by Samuel Rideal, D.Sc., 8 p.m.
Distribution of Prizes to students of the Trades Training School, &c., by Sir J. Wolfe Barry, K.C.B., at Carpenters' Hall. 8.30 p.m.
Edinburgh Architectural Society. "Normandy," by J. Forbes. 8 p.m.

Thursday.—Society of Architects. Discussion on "The Lessons of the Late London Fire," St. James's Hall Piccadilly. 8 p.m.

Friday.—Architectural Association. "House Decoration," by L. A. Shuffrey. 7.30 p.m.

THE ARCHITECTURAL ASSOCIATION.
DECEMBER 17th, ORDINARY GENERAL MEETING, at No. 9, Conduit-street, W., 7.30 p.m. Paper by Mr. L. A. SHUFFREY, on "HOUSE DECORATION."
E. HOWLEY SIM, G. B. CARVILL, } Hon. Secs.

The Society of Architects.
Founded 1884. Incorporated 1893.
The SECOND ORDINARY MEETING of the Society of Architects for the Session 1897-98 will be held at the Rooms of the Society, at St. James's Hall, Piccadilly, W., on THURSDAY, December 16th, 1897, at Eight o'clock p.m., when a DISCUSSION will take place on "THE LESSONS OF THE LATE LONDON FIRE." At this meeting smoking will be permitted.
ELLIS MARSLAND, Hon. Sec.
MONTAGU BALDWIN, M.A., Sec.

Trade News.

WAGES MOVEMENTS.

Liverpool.—A memorial has been forwarded by the Liverpool Operative House Painters' Society to the master painters of Liverpool and district, in which they state: "Having only had an advance of ½d. per hour since 1874, and other branches of the building trade 1d. and 1½d. during that period, we request your consideration of the following alteration of Rule 3: Wages shall be paid by the hour all the year round, at the rate of 9d. per hour. This and other alterations to come into force on May 1, 1898."

A steam laundry and other additions are about to be made to the workhouse at York, at a cost of about £5,000.

A new industry—brickmaking—is being started near Wisbech. Arrangements have been made for the purchase of 126 acres of freehold land about four miles from Wisbech adjoining the Midland and G.N. Joint Railway on the south side and the Sea Dyke-road on the north side.

Owing to the favourable season, it has been possible to push the works of the electric mountain railway from Zermatt to Gorner-grat, which has gradients up to 25 per cent., so as to enable an official trial trip of the electric locomotives being performed before the winter sets in. The electrical equipment of the line has been supplied by Messrs. Brown, Boveri, and Co., of Baden, Switzerland, and marks an advance in the direct application of three-phase currents—viz., without rotary transformation to continuous current.

The committee appointed by the Board of Trade to inquire into the system of ventilation of tunnels on the Metropolitan Railway in their report conclude that by far the most satisfactory mode of dealing with the ventilation of the tunnels would be by the adoption of electric traction. The committee consider the ventilation of the tunnels by means of fans would be practicable; but state that, in view of the probable adoption of electric traction in the near future, it can hardly be expected that the company would incur the expense of at once providing artificial ventilation, and that if they did it would probably defer the more satisfactory solution of the question.

LIST OF COMPETITIONS OPEN.

Hackney—Electric Lighting Scheme		Geo. Grocott, Vestry Clerk, Town Hall, Hackney	Dec. 14
Westminster—Block of Dwellings, Millbank Prison Site	London County Council	T. Bell, Clerk, Spring-gardens, S.W.	,, 14
Nottingham—Laying-out and Planting Basford New Cemetery.	£100, £50	Samuel G. Johnson, Town Clerk, Nottingham	,, 15
Dorking—Workhouse Infirmary (£4,000 limit)	(No first) £15, £5	Geo. Scales, Clerk to Guardians, 35, High-street, Dorking	,, 15
Nottingham—Designs for Basford Cemetery Buildings: Chapels, Crematorium, Lodges, &c.	£100, £50	Samuel G. Johnson, Town Clerk, Nottingham	,, 15
Menai Bridge—Landing Pier (£3,000 limit)	£40	Thos. Hughes, Clerk, Min-y-Den, Menai Bridge	,, 16
Festiniog—Temporary Eisteddfod Pavilion for 10,000 (£900 limit)	10 Guineas	Wm. Jones, Hon. Sec., Pavilion Committee, Blaenau, Festiniog	,, 17
East Finchley—Mortuary Chapel in Islington Cemetery		Wm. F. Dewey, Clerk, Vestry Hall, Islington	,, 17
Bootle—Fire Brigade and Police Stations (£14,000 and £1,500 limits)	50 Guineas, 25 Guineas	J. H. Farmer, Town Clerk, Bootle, Lancs	,, 31
Altrincham—U.D.C. Offices	£20, £10	J. Stokes, Clerk, 64, Market-street, Altrincham	,, 31
Crich—Water-Supply Scheme (3,100 population)	15 Guineas, 5 Guineas	Joseph Pym, Clerk, Belper	Jan. 8
Carlton, Victoria—Children's Hospital	£100, £50, £25	J. Nicholson, Hon. Sec., Pelham-street, Carlton, Australia	,, 30
Leicester—Motor Refuse Carts	Corporation	E. G. Mawbey, Borough Engineer, Leicester	,, 31
Port Elizabeth—Free Library (Assessors, Sir F. Blaine and R. H. Hammersley-Hunan—£22,000 limit)	100 Guineas, 50 Guineas	G. Oettle, Librarian, Port Elizabeth, S.A.	Feb. 15
New York—Sun Dial (Plaster Model)	500dol., 250dol.	Sec. National Sculpture Soc., 215, West 57th-street, New York	,, 28
Newcastle-on-Tyne—New Infirmary (local Architects)	(No first) £150, £100, £50	Secretary Building Committee, Newcastle	Mar. 1
Belper—Sewage Disposal Schemes	50 Guineas, 25 Guineas	Joseph Pym, Clerk, Belper	May 1
Wadebridge—Schoolroom, adjoining Wesleyan Church	(No first) £5	Walter O. Wellington, Sec., Building Com., Wadebridge, Cornwall.	—
Lymington—New Forest Hall (Limited to Hampshire Architects)	25 Guineas	Clerk to Hall Committee, Lymington	—
Berwick—Police Station (£3,000 to £4,000 limit)	£50, £25	The Town Clerk, Berwick-on-Tweed	—

LIST OF TENDERS OPEN.

BUILDINGS.

Chorley—Infectious Wards, Administrative Block, &c., Heath Charnock	Joint Hospital Board	Jolly and Buckley, Architects, High-street, Chorley	Dec. 11
Darfield—Ten Houses		A. B. Linford, Architect, Kelvin Cottage, Wombwell	,, 11
Hatfield—Mortuary	Overseers	A. Whitby, Assistant Overseer, North-road, Hatfield	,, 11
Neyland—Baptist Chapel at Neyland		S. Wilson Edwards, Architect, Beach Mount Villa, Mumbles	,, 11
Macclesfield—Construction of Vaults and Entombments at Cemetery (for Three Years)	Cemetery Committee	W. Fred. Taylor, Town Clerk, Macclesfield	,, 11
Campbeltown—Temporary Hospital	Corporation	James Fullarton, Master of Works, Campbeltown	,, 11
Hull—Alterations to Workhouse, Beverley-road	Guardians of Sculcoates Union	J. P. Chatham, Clerk, Lincoln's Inn Buildings, Hull	,, 11
Grangemouth—Sixteen Houses, Marshall-street	Co-operative Building Society	G. D. Page, Architect, Old Glebe Chambers, Falkirk	,, 11
Hammersmith, W.—Disinfecting Chamber and Van Buildings, Chancellor's-road	Hammersmith Vestry	H. Mair, Surveyor, Hammersmith	,, 13
St. Johnstown's Castle—Alterations and Repairs		E. A. Hackett, Architect, Clonmel	,, 13
Trimdon—Board School	Wingate School Board	Jas. Garry, Architect, 27, Church-street, West Hartlepool	,, 13
Gelli—Congregational Chapel		Griffiths and Jones, MM.S.A., Architects, Town Hall, Tonypandy	,, 13
Guildford—Extension of Produce Shed in Cattle Market	Corporation	Ferdinand Smalpeice, Town Clerk, Guildford	,, 13
Llangynidr—Additions to National Schools		F. Baldwin, Architect, 8, Lion-street, Brecon	,, 13
Upholland—Waterworks Workshop	Urban District Council	J. Bassett, Clerk, Council Offices, Upholland	,, 13
Newcastle-on-Tyne—Primitive Methodist Schools		Dawson and Bendle, Architects, 33, Grainger-street West, Newcastle	,, 13
Morecambe—Additions to House	Dr. Glegg	James Marshall, Architect, Bank-crescent, Morecambe	,, 13
Chester-le-Street—Shop and Wareroom in Market		R. G. Cowe, Architect, Chester-le-Street	,, 13
Nottingham—Additions to Lunatic Asylum	Corporation	G. T. Hine, Architect, 35, Parliament-street, Westminster	,, 13
Birstall—Addition to Shop, Market-place		John H. Brearley, Architect, Hanover-street, Batley	,, 13
Dewsbury—Iron Shed at Gasworks		G. Trevelyan Lee, Town Clerk, Town Hall, Dewsbury	,, 13
Raglan Station—Cottage	Great Western Railway Co.	G. K. Mills, Secretary, Paddington Station, W.	,, 14
Annakera—Cottages at Monaghan-road Crossing	Great Nrthern Railway Co. (Ireland)	T. Morrison, Secretary, Amiens-street Terminus, Dublin	,, 14
Colchester—Stables and Coach-house, Crouch-street	Corporation	Herbert Goodyear, Borough Surveyor, Colchester	,, 14
Loddiswell, Devon—Cottages	Great Western Railway Co.	G. K. Mills, Paddington Station, W.	,, 14
Devizes—Additions to Wilts Lunatic Asylum		Charles S. Adye, County Surveyor, County Offices, Trowbridge	,, 14
Woodbridge, Guildford—Additions, Fever Hospital	Joint Hospital Board	E. L. Lunn, Architect, 36, High-street, Guildford	,, 14
Cork—Stores and Residential Quarters, Patrick's Quay	City of Cork Steam Company	James F. McMullen, M.S.A., Architect, 30, South Mall, Cork	,, 14
Garra Bridge Station, Devon—Cottages	Great Western Railway Co.	G. K. Mills, Paddington Station, W.	,, 14
Pound-lane Crossing, Portadown—Cottages	Great Nrthern Railway Co. (Ireland)	T. Morrison, Secretary, Amiens-street Terminus, Dublin	,, 14
Blundesden—House		S. Rivett, M.S.A., Architect, 3, South Quay, Great Yarmouth	,, 15
Fowey—Club-house	Fowey Yacht Club	Sampson Hill, Architect, Green-lane, Redruth	,, 15
Collingham Bridge—Organ Chamber and Vestry, Bridge Church		C. Hodgson Fowler, F.S.A., Architect, The College, Durham	,, 15
Rathdown—Cemetery Buildings	Board of Guardians	J. D. Cope, Clerk, Loughlinstown	,, 15
Forres—Shops and Dwelling-house, St. Catherine's-road	William Fletcher	John Forrest, Architect, 129, High-street, Forres	,, 15
Southend—Railway Tavern, Cliff Town-road		Thompson and Greenhalgh, Bank Chambers, Southend-on-Sea	,, 15
Tewkesbury—Laundry, Fever Hospital	Urban District Council	H. A. Badham, Town Clerk, Tewkesbury	,, 15
Hartburn—Additions to Landieu, Hartburn	M. Robinson	A. Whipham, A.R.I.B.A., 59, High-street, Stockton-on-Tees	,, 15
Barrow-in-Furness—Electric Lighting Station, Buccleuch-street		Borough Engineer, Town Hall, Barrow-in-Furness	,, 15
Merthyr—Piggery at Eglosmerther Farm	James Freethy	George Gow, Tregothnan Office, Truro	,, 15
York—Extending Carriage-Building Shops	North-Eastern Railway Co.	C. N. Wilkinson, Secretary, N.E.R. Offices, York	,, 15
Wolverhampton—Additional Platform and Awnings	Midland Railway Co.	James Williams, Secretary, Derby	,, 16
Chorley—Free Library		Jolly and Buckley, Architects, High-street, Chorley	,, 16
Bromley, Kent—Four Pairs of Cottages	Bromley Co-operative Society	E. Bragg, East-street, Bromley	,, 16
Llanwrtyd Wells—Three Houses and Shops		David Jenkins, F.R.I.B.A., Architect, Llandilo	,, 16
Ancoats, Manchester—Additional Stabling	Midland Railway Co.	James Williams, Secretary, Derby	,, 16
Bridlington Quay—Four Houses, East Side	W. Baldwin	J. Earnshaw, M.S.A., Architect, Wellington-road, Bridlington Quay	,, 16
Glanton—Two Houses	Mrs. Cummings	George Reavell, jun., Architect, Alnwick	,, 16
Malvern—Timber Engine-Shed	Midland Railway Co.	James Williams, Secretary Derby	,, 16
Horsforth—Seven Houses and Shop, New-road Side		J. P. Kay, Architect, 34, Prudential Buildings, Leeds	,, 17
Cefn Coed—Library and Dwelling-House		R. C. Jenkins, Surveyor, Cefn Coed	,, 17
Bradford—Herring-Curing Establishment, Buck-street		Hodgson and Farrar, Old Bank Chambers, Bradford	,, 17
Grimsby—Alterations to Premises, 242, Cleethorpe-road	Councillor M. Abrahams	Mitchell, Son, and Co., Surveyors, 112, Cleethorpe-road, Grimsby	,, 18
Bridlington—New Grammar School		Botterill, Son, and Bilson, Architects, 23, Parliament-street, Hull	,, 18
Tunbridge Wells—Offices, Central Electric Station	Corporation	W. C. Cripps, Town Hall, Tunbridge Wells	,, 18
South Bank—Additions, Police Station	North Riding County Council	Walter Stead, County Surveyor, Northallerton	,, 18
West Burton—Wesleyan Chapel and School		Wm. Lawson, West Burton	,, 20
Mynyddislyn—Additions, Pontlanffaith School	School Board	C. R. Lyne, Clerk, Westgate Chambers, Newport, Mon.	,, 20
Briton Ferry—Villa Residence		H. Alex. Clarke, Architect, Briton Ferry	,, 20
Shronwell Cross, Tipperary—Two Schools		Rev. Dr. O'Neill, P.P., Lattin	,, 20
Derrygonnelly—Dispensary	Guardians of Enniskillen Union	Richie Wilson, Clerk, Workhouse, Enniskillen	,, 21
Barking—Electric Light Station, East-street	Urban District Council	Edwin H. Lister, Clerk, Public Offices, Barking	,, 21
Buenos Ayres—Central Railway Station (cost, 4,000,000 piastres)		Legation of Argentine Republic, London	,, 26
Manchester—Thirty-two Two-story Tenements, Cornwall-street, and Eighteen Cottages, George Leigh-street	Sanitary Committee	The City Surveyor, Town Hall, Manchester	,, 28
Bideford—Alterations and Repairs, Post Office	Bideford Bridge Trustees	Charles W. Hole, Bridge Steward's Office, Bideford	,, 28
Manchester—Thirty-six Two-story Tenements, Chester-street	Sanitary Committee	The City Surveyor, Town Hall, Manchester	,, 28
Burnley—Extension to Electric Lighting Station		G. H. Pickles, Borough Surveyor, Town Hall, Burnley	,, 29
Frinton-on-Sea—School (150 children)	School Board	A. R. Chamberlayne, Clerk, Station-road, Clacton-on-Sea	,, 31
Copenhagen—Repairing Cemented Walls of Thorvaldsen's Museum	Corporation	F. Meldahl, Copenhagen	Jan. 1
Ladywell, S.E.—Workhouse for 800 Persons, Slagrave Farm	St. Olave's Board of Guardians	E. Pitts Fenton, Clerk, 30, Tanner-street, S.E.	,, 13
Bury—Two Houses and Shops, Elton-road		J. Sellars and Son, Architects, Union Chambers, Bury, Lancs	—
Keighley—Houses, Skipton-road	Robert Feather	Peterson and Lawson, Architects, 1, Bank-street, Bradford	—
Yatton—Additions to Claverham House		A. C. Rowley, Architect, 20, Nicholas-street, Bristol	—
Mallaig—Business Premises		Dun. Cameron, Architect, Inverness	—
Harrogate—Additions to George Hotel	Oliver Barber	A. A. Gibson, Architect, 8, Cambridge-crescent, Harrogate	—
Fleetwood—Shop and Dwelling-House		D. Rankin, Church-street, Fleetwood	—
Dudley—Additions to Conservative Clubhouse		A. Gammage, Architect, High-street, Dudley	—
Colmonell, Ayrshire—Free Church		Alex. Petrie, Architect, 134, Wellington-street, Colchester	—
Castleford—Victoria Hotel	W. Pickerskill	A. Hartley, Architect, Carlton Chambers, Castleford	—
Consett—Fifteen Houses		J. Bloom, 9, High West-street, Sunderland	—
Colchester—Reinstating Two Houses after Fire		C. E. Butcher, Architect, 3, Queen-street, Colchester	—
Blackpool—Four Detached Houses, Lytham-road		Goldsmith and Son, 63, Faulkner-street, Manchester	—

THE BUILDING NEWS
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FRIDAY, DECEMBER 17, 1897.

LESSONS FROM THE GREAT CITY FIRE.

THE evidence already given before the City coroner in his inquiry into the cause of the great City fire practically confirms much of what we have said, that the buildings in the area destroyed, amounting to four acres, were built according to the requirements of the old Building Acts in force at the time, and were therefore not in accordance with our recent building law. According to the evidence given by Mr. E. Woodthorpe, F.R.I.B.A., district surveyor of the northern division of the City, many of the buildings burned down were erected during the lifetime of his father, and had been much altered within the last 18 years. Except the four walls, external and party structures, there was little or nothing of a fire-resisting nature in the buildings; indeed, the only surprise is that there have not been more fires. They were, in fact, merely brick shells, filled with inflammable fittings and stocks of goods. In another particular our remark is borne out that the ironwork let into the stonework let the buildings down, and to this cause was responsible a great deal of the damage and collapse of walls. "Very few walls," Mr. Woodthorpe said, "remained upright: several had collapsed that had been shaken by the sudden expansion and contraction of the ironwork, and the stone and brickwork were damaged by the excessive heat"—a statement which goes to prove the absolute uncertainty of ironwork, or the so-called "fireproof" qualities of buildings erected at that period. We were unaware whether there were many buildings in the destroyed area which could be classed as "fire-resisting." According to this witness, there "was not a single floor throughout the burned-out area that was fireproof or fire-resisting in any way." But as there was ironwork in some of the warehouses, which had helped to pull about the walls, it seems probable that there had been attempts in this direction, though they were anything but perfect, and that the ironwork was put up under former provisions. The number of "dangerous structure" notices served by the borough surveyor since the fire, and the number of walls that had collapsed, show the dangerous condition of walls in which iron has been fixed in rigid connection.

Then as to the interiors of these buildings, we learn that from the floors to the ceilings were practically "large wooden pigeon-holes with narrow passages between," that the staircases were of wood, the walls and ceilings match-lined—conditions most favourable to the rapid spread of fire. And we may be sure that this woodwork was dried almost to the point of ignition, especially the match-lined ceilings. But what is there to prevent warehouses being built now with wooden linings and ceilings, and with ill-protected staircases and wellholes? We know several warehouses and factories and offices full of wood-lined partitions where naked lights are used, staircases not inclosed by walls or fire-resisting partitions, where the rules of the new Building Act are not followed. And how many of these buildings are provided with fireproof doors of iron, or, if provided, are kept closed? Several openings in the warehouses in Jewin-street had no iron doors. The Building Act is powerless to cope with this danger, even though providing the means. Then we are told that local authorities are not able to enforce new rules; that they have no statutory authority to prevent reconstruction on the same principle as the old. The new regulation as to party-walls—that they should be 3ft. above the roof—may be insisted on; but the surveyor cannot prevent well-holes. Again, only those buildings used wholly or in part as dwellings are provided with trap-doors or other access to roof.

The evidence showed that Winchester House, where there had been several fires, resisted the spread of the flames, owing to the fact that its floors were of iron and concrete, and there was a stone staircase. Mr. J. W. Penfold, F.R.I.B.A., bore out the evidence of Mr. Woodthorpe, and his remarks on the narrowness of the former streets, which varied from 11ft. 6in. at Aldersgate-street to 15ft. 3in. at Red Cross-street, are important. The Goldsmiths' Company were freeholders of the Cripplegate area, and many improvements had been made by them. The total ground-rent was about £14,000. Other questions were raised of a subsidiary kind as to the coal and water supply; but the chief points of interest are those of structural resistance to fire. No doubt it would be impossible to expect the same fire-resisting construction in a warehouse as that of many City buildings; but the least that ought to be done would be to insist on iron and concrete floors, iron doors to all openings and windows, and proper escapes.

A large and influential deputation of owners, occupiers, and ratepayers of Cripplegate attended a meeting of the City Commission of Sewers, to state what great losers they had been by the fire. They proposed several street improvements, to render the area less crowded by buildings and to give better access to the warehouses in the narrow streets and alleys which abound in this part of the City. One of the schemes approved by the deputation was that of Mr. H. H. Bridgman, a late member, to construct a wide new street from the corner of St. Giles's Church diagonally through the scene of the fire to Aldersgate-street, Barbican, and Goswell-road and Long-lane. This road would be a direct line of thoroughfare from the East End to the markets and Holborn viâ Fore-street, London Wall, &c. It would also relieve the traffic at the Mansion House. Jewin-street must also be reconstructed, as there the houses are back to back, and offer great facilities for the spread of fire. The memorial was referred to the Improvement Committee for consideration. The reconstruction scheme cannot be delayed, and whatever plan be adopted, the widening of the spaces between the blocks of building is of the first importance.

ROYAL ACADEMY SCHOOLS PRIZE DESIGNS.

WHETHER under the Academical *régime* there is something repressive of artistic genius we will not now discuss: certain it is that the Royal Academy Schools have not achieved any eminent success. What can be more disappointing than the amusing, almost comical, display of talent exhibited under the name of Historical Painting, the numerous competitive efforts for which have so far fallen short of the most ordinary standard that the Gold Medal and Travelling Studentship have not been awarded? Sir E. J. Poynter, the President, in distributing the prizes, speaking of the results, had to acknowledge, in regard to painting, which always held the principal place, as it was the most popular art of the three, that:—"Amongst the paintings in the gold medal competition were more than one which just fell short of the combined qualities that went to make a great work." It was, at least, discouraging that out of a large number of competitors for the subject given, "Cleopatra Clandestinely Introduced into the Presence of Cæsar," not one was thought worthy to receive the medal. We see every conceivable presentment of the Egyptian queen, graceful and coarse, refined and voluptuous, many of them hard and commonplace conceptions, and a few not unlike ballet dancers; but the way in which she is introduced, bodily dragged into the presence of Cæsar, or disclosed accidentally by the removal of draperies and Oriental wraps, is quite amusing. Then we see equal diversity in the conception and treatment of Augustus. In some cases he looks a "beak" or sitting magistrate of a Metropolitan police-court, except for his Imperial robe; in others he is a diminutive, pallid old man. Here we have him in all the pomp and ceremonial display of the Imperial palace; there he is painted as if he were crouching behind a desk or just entering a room. In short, the many and opposite conceptions appear humorous, if not ludicrous. In landscape painting there is a more agreeable standard of quality. Waning light and shade are more determinable elements than those involved in a figure composition, and hence the studies for "An Afterglow" are more successful. Alfred Priest wins the Turner Gold Medal and Scholarship of £50. The competition for "A Lock" shows a few clever works, and the prize is awarded to C. M. Q. Orchardson. The designs for the decoration for a public building, subject "Spring," show some invention. Miss Mary E. F. Brickdale wins the £40 prize for a design, which we shall publish. The composition is clever, and the scheme of colour decorative.

The architectural designs are not equal to our expectations. The subject given, "A Nobleman's Country House," demanded not only an acquaintance with Domestic architecture in its best periods, but also an experience of the requirements of a gentleman's residence in the country. Not everyone could bring these qualifications to the task, although a list of accommodation was furnished. Mr. Archibald H. Christie has taken the Gold Medal and Travelling Studentship (£200). His plan is broken, but fairly compact. A *porte-cochère* is provided on the entrance side, leading to a large hall with principal staircase. A cloakroom and lavatory on the left side, and a billiard-room on the right hand, are well arranged. A butler's pantry and corridor, access from kitchen offices, a serving-room near the dining-room, leave little to be desired in arrangement. The dining-room, sitting-room, and drawing-room occupy a projecting centre in the garden front, the business rooms are located in a wing, and the kitchen block on the other side. The internal corridor to these offices is not well lighted. The external design is shown by a carefully-drawn ink perspective, a Late Domestic Gothic building of stone. The windows are mullioned, and the entrance front is gabled. These gables are simply coped in stone, with rounded apices; and a very plain, almost hard, stone treatment is shown without any attempt at detail. The porch is repulsively plain and heavy. No. 222 has a clever quadrangular plan, and courtyard in centre. The hall is on the south-west side, with a wide corridor to reception rooms along a terrace. The business entrance, secretary's and steward's rooms, with their own corridor, are on the north-west side, and the kitchen offices on the north-east form a projecting wing. The hall is 60ft. by 30ft., the large drawing-room 26ft. by 23ft., with projecting mullion bays. A Tudor style is adopted, with bay windows; these and the details are weak. The lighting, partly by inner court, has been considered; the plan is better than the exterior design. No. 223 is a very confused plan. It has a hall in centre 50ft. by 30ft., and open court, which lights the principal stairs and butler's pantry. The front corridor is ill-lighted, also the servants' corridor in office block. The plan is cut up by breaks, which would entail cost. The design is chiefly of stone, with half-timber in gables

of small drawing-room, &c.—a mixture of material that is hardly justifiable. The drawings and perspective show a masterly hand. Several other designs, some very pretentious Italian and Classic buildings, are hung. No. 215 is in Georgian taste. The plan is symmetrical, with large central octagon hall, round which are grouped the reception-rooms. The vestibule is on the north-east side, and the kitchen offices and billiard-room, &c., form wings. The perspective shows the site laid out in straight avenues and parterres. No. 220 is another brick mansion in the same style, with wings, but the plan is wastefully distributed in hall and approaches. No. 218, in an English style, shows a few good details; but the plan is straggling. A great deal of labour has been thrown away in this competition by students who positively know little of the qualities of good planning. One design shows an oblong with prodigious angular projections at the corners.

In another gallery we see a plan for an art gallery, the prize being won by Mr. Horace C. Hide. In this competition plan only is studied. A central hall in front with entrance, the museums and picture galleries being arranged round two open courts—a far too ambitious theme for a student.

Turning to the sets of architectural drawings, the 1st silver medal has been taken by Arthur Maryon Watson for measured drawings of the library of Lambeth Palace—a carefully-executed set, the Juxon Hall, now the library, is drawn to a large scale. The second medal is not awarded. A purer Late Gothic example might have been taken. George J. J. Lacey wins the £25 prize for a tinted drawing of a groined gateway to college quadrangle. It has octagonal turrets at corners, and there is some freshness in the ornamental relief over the archway. We think the design (234) in Late Gothic character, in pencil, commendable also; a clever and original treatment (235) for stone, though rather severe. John Stevens Lee wins the prize for a set of drawings of a lych-gate, simply treated, the roof of green Westmoreland slates carried on oak beams. The details are plain and appropriate. One or two designs for a block of college rooms are also sent in.

We can only just refer to the prize cartoon of a draped figure. "Hermione as a Statue—the 'Winter's Tale,'" by Mary Towgood, the design of which we hope to give. The gold medal and travelling studentship for sculpture has fallen to a composition entitled "Charity," by Alfred Turner, for a conception in which there is promise and encouragement, and a knowledge of the figure. The other model, "Gladiators Fighting," the first prize of which is given to Gilbert W. Bayes, has also been well handled, with a sense of movement and of good outline.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

An ordinary meeting of the Institute was held on Monday evening, the President, Professor Geo. Aitchison A.R.A., in the chair. The President moved that the resolution agreed to at the special general meeting of the 29th November be confirmed—viz.: That in order that the Council of the Royal Institute may remain in office until the close of the last general meeting in June of the year following that in which they were elected, the following alteration be made in Bylaw 30—viz., that in the last line but one of the final clause the word "last" be substituted for "past." The motion was unanimously adopted.

DEATHS OF WELL-KNOWN MEMBERS.

The President, who spoke with evident emotion, said he regretted to announce the death of their poor friend Mr. Octavius Hansard, who met with a terrible death by accident on the Metropolitan Railway; together with the hon. secretary, secretary, and many members of committee, he (the President) attended their friend's funeral at Brompton Cemetery last Thursday. They had sustained a still greater loss in the death of the Royal Gold Medallist, Mr. Pearson, who was at work in his office almost until the very last. His own recollections of Mr. Pearson went back to 1855, and all who also enjoyed the privilege of his friendship would agree that Mr. Pearson was a very fine specimen of the English gentleman, and, apart from this, he was a most distinguished church architect, if not the greatest of the present day; his works were to be seen all over the country, the principal one being Truro Cathedral, of which a leading Roman Catholic layman recently said it was the only modern church in which a Catholic could worship. All who knew Mr. Pearson loved him, and those who only know his works admired his genius. A vote of condolence with Mr. Pearson's family was passed in silence. Mr. W. Emerson, hon. secretary, announced the recent deaths of Mr. William Stephens Cross, a Fellow since 1882; Joseph Battye, of Rusholme, Manchester, an Associate since 1881; and Arthur James Forge, of Gresham-buildings, E.C., an Associate since 1894.

REPORT ON EXPERIMENTS ON THE STRENGTH OF BRICKWORK.

The report on the third series of experiments, conducted by the Science Standing Committee to ascertain the average duration of various qualities of brickwork, was presented and read by Mr. William C. Street, being a completion of the statements made before the Institute, and reported in our issues of April 3 and Dec. 18, 1896, p. 485 Vol. LXX. and p. 874, Vol. LXXI. The third series of tests were made by Messrs. Street, Clarke, Matt. Garbutt, and others, the site, as before, being land in front of the chief engineer's office and close to the hydraulic engine-house at the West India Docks, kindly lent by the docks committee. The hydraulic ram and engine were generously placed at the disposal of the committee by Sir William Arrol. The sections of wall were carefully built on platforms resting on tramway rails, and were run on the lines beneath the girder, the pressure being applied from below. The experiments were completed by the crushing of 20 short lengths of brick walls, each about 6ft. high by 27in. long, and 18in. thick. The committee did not propose at present to give any fixed rules based upon the results or information gained by these experiments, as it was hoped that the Council of the Institute would sanction the preparation of a careful analysis of the facts contained in the three reports, and issue it in a suitable shape. If this were done it might be possible to generalise and formulate rules to govern the use of different kinds of brickwork as the supporting features of the structures erected under their superintendence. Meanwhile a few impressions could be given. The resistance of brickwork in lime mortar to crushing seemed to vary from one-sixth to one-eighth of the resistance offered by the brick itself, while in cement mortar it varied from one-half to one-fifth of that strength. So, while cement mortar materially aided the weaker bricks in their combined strength, it could not materially affect the ultimate power of resistance in brickwork made of a harder variety. The different specimens in lime mortar and those in cement mortar showed comparatively little difference in the respective rates at which the beds were crushed. The only question was how long the bricks would be able to resist the pressure if the load were increased at these rates. The average thickness of the bricks was 2¾in., and the total thickness of the mortar beds 6in., while the compression of the lime mortar beds averaged 1in., and that of the cement mortar beds about ⅓in. This proved that the mortar generally was well crushed and disintegrated long before the final collapse of the several examples of brickwork. In dealing with the working load that might be calculated upon care must be taken not to impose such a load as would materially damage the structure of the brickwork. At one-fifth of the crushing load the compression in lime mortar averaged $\frac{7}{32}$in. in 6ft. of brickwork, and in cement mortar it averaged $\frac{5}{32}$in. The great difference between dead and live loads must not be lost sight of. Taking a safe load as one-fifth of the crushing load, it might be assumed from the results obtained, that in lime mortar stock brickwork is equal to about 3½ tons, gault 6 tons, Fletton 6 tons, Leicester reds 9 tons, and Staffordshire blue 23 tons per square foot. In Portland-cement mortar, 1 to 4, stocks would be equal to about 8 tons, gaults 10 tons, Flettons 11 tons, Leicester reds 17 tons, and Staffordshire blue 24 tons per square foot. Under the ordinary or average conditions of practice, the form of brickwork did not greatly affect the strength, the 18in. square piers having given approximately similar results per square foot to those obtained from specimens 27in. by 18in. With regard to the effect of age upon the different varieties of brickwork, results showed that, except in the case of blue bricks in cement, those built three months gave very similar result to those built five months. The difference in the case of the blue bricks was partly due to the fact that the bricks of which the specimens 27 by 18 were built were from a stronger lot than those of which the 18in. square were built, the samples from each delivery failing respectively at 779 and 701 tons per square foot. The Committee's conclusions as to the results of the present experiments are set forth in the following table:—

THIRD SERIES.—CRUSHING LOADS IN TONS PER SQUARE FOOT.

—	Stocks.			Gault.			Fletton.			Leicester Red.			Staffordshire Blue.		
	No.	—	Aver.	No.	—	Aver.	No.	—	Aver.	No.	—	Aver.	No.	—	Aver.
Bricks crushed at			84·27			189·20			220·85			362.10			779·60
Brickwork in lime at	34	17·44		36	31·34		42	30·82		38	45·94		40	118 12	
	35	19·83	18·63	37	30·94	31·14	43	30·54	30·68	39	44·78	45·36	41	110·56	114·34
Brickwork in cement at ...	44	39·24		46	51·50		52	54·88		48	80·94		50	139·52	
	45	39·34	39·29	47	51·19	51·34	53	57·63	56·25	49	85·78	83·36	51	131·35	135·43

Mr. Street's report was supplemented by some remarks by Mr. Max Clarke, who exhibited and explained a series of lantern reproductions of photographs of the five classes of brick set in mortar and cement, and pointed out the manner in which the several materials gave way. The softer bricks, such as stocks and gaults, yielded slowly; but the harder ones, Leicester reds and Staffordshire blues, snapped so suddenly that it proved almost impracticable to obtain a satisfactory photograph at the exact moment of collapse. Mr. Clarke replied to some criticisms of the experiments, and said that they were conducted with the greatest care, were perfectly accurate, and agreed generally with independent tests. The committee would have liked to have carried the experiments further; but the £200 raised had been exhausted, and there was, indeed, a balance against them. He mentioned that, having seen an advertisement by a maker of a Fletton brick that the material had withstood pressures of 230 tons per square foot, the committee, astonished at so high a record and one so far beyond the results obtained by them, obtained samples which broke at 44 tons—about the average for these bricks. While exhibiting the views, Mr. Clarke replied to many questions put by the President, Messrs. W. Woodward, William White, Silvanus Trevail, Francis G. F. Hooper, and others.

Mr. Percival Gordon Smith, architect to the Local Government Board, as Chairman of the Science Committee, moved a hearty vote of thanks to Messrs. Street and Clarke and their colleagues on the sub-committee, pointing out that on this occasion the tests dealt with short lengths of walling, 18in. by 27in., and 6ft. in height, instead of with square piers as before. He wished that a little more money could have been furnished to carry the tests further. In the vote of thanks he included the names of Sir William Arrol and Mr. H. F. Donaldson, the engineer to the West India Docks Committee.

CRITICISM OF THE REPORT.

Professor W. Cawthorne Unwin, F.R.S., regretted that the series of experiments which had been three years in progress had been brought to a close. At the same time, he must remind members that the final report was not drawn up by the general committee, but only by two members of that body; and while he would be the last to suggest that Messrs. Street and Clarke had not given enough time and trouble to the tests, he felt compelled to offer some criticism

of the report as drawn up. As it was the last report of the kind, he thought it was rather a pity that some matters to which he had previously invited attention had not been noticed. The headings of the tables, he must still contend, contained errors, and a year ago he objected altogether to the tabulation of the results, because they completely confused the teaching of the experiments. He would just allude to the history of the three series of tests. Before the work was commenced—when the arrangements were being made—he drew attention to the want of supervision by the committee of the quantities of lime and sand used in the mortar, and the mode in which those ingredients were mixed. He was told by the architects on the committee that they only desired to make experiments on ordinary piers built under ordinary conditions and under ordinary supervision, and therefore that it was unnecessary to take notice of these matters. The result was, that they had piers built in the ordinary way, and which, of course, gave only ordinary results. The committee themselves seem to have been so far dissatisfied that they ordered certain piers to be rebuilt and retested. The second series of piers were built under much closer supervision, especially as to the way in which the mortar was mixed and used, and he understood at the time that better sand was used than in the first series. Mr. Max Clarke, however, wrote to him afterwards, and said that on this point the speaker was mistaken; but even Mr. Clarke did not seem quite certain, and invited him to come and examine the records. Whether this was recorded or not, from personal observation he had no doubt that the mortar used in the second series was very much better than that employed for the first piers, for after three months the mortar used in the first series crumbled in the hand in a manner he had never seen before. Finally, there came to be built a third series of walls, in which quite a new quality of sand—a very superior quality—was employed for making the mortar. A very small sample of this sand, just enough to make two tests was sent to him, and he was able to pronounce it very much better. He must say that he was surprised to hear in this third report no reference made to the different sand and the consequently better mortar used. He attached very great importance to the quality of mortar used in these tests, and believed that the results of these experiments were largely, almost exclusively, due to the different quantities of sand used in building the piers. It was quite clear that they must not mix the results of the first and second series with those of the third. Happily, he had not much to dissent from in the conclusions arrived at in the report, although he could not coincide in every individual point. The committee had practically drawn up a series of fixed rules as to the crushing strength of various classes of bricks by taking one-fifth of the crushing strength as the safe limit. They ought to have said that these figures applied only to brickwork which was not loaded until after it had been built for three months, for the real test in everyday construction was under one month after erection. He had taken the results and had retabulated them, and it would be seen that the anomalies under this arrangement were by no means so great as in the tables of the committee (given above). The results were, to be sure, not absolutely regular; but the discrepancies were not more than they might expect to get when using such discrete materials. He tabulated the results as follows:—

CRUSHING STRENGTH PER SQUARE FOOT.

Mortar.	Age (Months).	Stocks.	Gault.	Flotton.	Leicester Reds.	Staffordshire Blue.
Single Brick.....	—	84	189	221	362	780
Sand Pier	—	—	—	—	15	—
First Series:—						
Lime	3½	10·4	21·9	—	30·7	74·3
	10	12·5	21·6	—	34·1	73·7
Cement	3½	14·9	17·8	—	58·5	72·8
	10	19·7	30·0	—	50·4	82·5
Second Series:—						
Lime	3½	18·3	—	—	—	—
Cement	3½	—	49·6	—	86·4	103 1
Third Series:—						
Lime	5	18·6	31·1	30·7	45·4	114·3
Cement	5	39·3	51·3	56·3	83·0	135·4

Mr. William White, F.S.A., said they were all indebted to Professor Unwin for his observations. He felt that the report did not make nearly enough allowance in the ordinary work as to the stability and quality of the mortar, the quantity used, and the mode in which it was made. In such tests as these it was absolutely essential that the circumstances should be as equal as possible throughout the experiments.

Mr. William Woodward regretted that the funds of the Institute would not permit of complete tests being made. He suggested that a fourth series of tests, under the supervision of Professor Unwin, would enable architects safely to specify the loads for various classes of bricks, and, that the inquiry might, with lasting advantage to the profession, the building trades, and the public, be extended to granite, Portland, red Corsehill, and Bath stone.

Mr. J. Douglass Mathews inquired why the safe load had been taken at one-fifth instead of the usual one-fourth.

Mr. Bruce J. Capell and Mr. Lewis Solomon having spoken, the President, in summing up, said it seemed to him most extraordinary that experiments had been made with brickwork containing mortar such as no architect who had any acquaintance with building need think of using. The employment of such a proportion as 2 of sand to 1 of lime was now quite exploded, and 3 of sand to 1 of lime would be twice as strong. However, the variations in experiments of this class must always be very great, and should be allowed for in considering the results, for such a thing as homogeneous brickwork was unattainable. They owed a debt of gratitude to the committee for all the time, care, and trouble they had devoted to the task, and the results of the previous tests were now being acted upon in large buildings.

Mr. Max Clarke, in replying, explained that as an absolute fact the first and second series of piers were built of the same quality of materials, while as to the third, a particularly good sample of sand was sent by Messrs. Cliff, which was exhausted before the work was completed, and another quality was used to finish with.

CARDIFF MUNICIPAL BUILDINGS COMPETITION.

Fifty-six sets of plans were sent in for the new town hall and law-courts about to be erected for the corporation on the Cathays Park, Cardiff. On Thursday afternoon in last week the members of the town hall committee met, and after conferring for some considerable time with Mr. Alfred Waterhouse, R.A., as professional assessor, decided upon the plans as follows:—1st premium of £500: Design No. 22, sent in by Messrs. H. V. Lanchester, J. S. Steward, and E. A. Rickards, of 50, Bedford-row, W.C. 2nd premium of £300: Design No. 25, sent in by Messrs. J. S. Gibson and S. B. Russell, of 11, Gray's Inn-square, W.C. 3rd premium of £200: Design No. 6, sent in by Messrs. A. W. Cooksey and Alured Cox, of 4, Adam-street, Adelphi, W.C. Under the conditions, the successful competitors will be engaged to carry out the construction of the buildings, and their premium will be merged into the commission which they will receive for their services, and this commission will be calculated at the rate of £5 per cent. upon the total cost. The amount to be expended on the town hall is not to exceed the sum of £125,000, and on the law-courts £75,000, exclusive of architects' commission and furnishing, but including drainage, lighting, heating, ventilating, water supply, and all contingent works.

Mr. Waterhouse has stated that the plans, on the whole, were very satisfactory. He thought the successful designs were very good. The allocation of the two buildings on the ground in this design was capital. The plans were cleverly designed, and the elevations had a certain severity and dignity about them which seemed especially suitable for a building of the class in question. Then there were various reasons about the arrangement of the offices and rooms that induced him to recommend them. He thought the elevation might be improved if it was carried a little higher, and it was probable that the tower would not be erected in its present form. There was, of course, some rubbish among the designs sent in, but perhaps this was usually the case.

According to the first premiated plans, which are Italian Renaissance in style with some French features, the new law-courts and police department will be placed between the North-road and the Avenue, and the municipal buildings on the eastern side of the Avenue. The police department and that in connection with the law-courts are to be placed to the north of the courts, and the public entrances to the police-court and the head constable's department are to be direct from the North-road. The front elevation of the new town hall will be 250ft. in length and 40ft. high, whilst the elevation to the Avenue will be 308ft. in length and 40ft. in height, with a central tower 200ft. in height. The law courts will have a front elevation of 180ft., and there will be elevations of 300ft. to the Avenue and to the North-road. Locally it is considered doubtful, however, if the tower will be erected, or, at any rate, in its present form. On the ground floor of the new town-hall there will be, on the left of the grand entrance, offices for the borough treasurer and his staff, with general rate and rentals receiving-offices and strong-rooms. On the right of the entrance there will be accommodation for the borough engineer and his staff, some 15 rooms being devoted to this department. At the rear of the rating offices will be quarters for the medical officer and the health superintendent. In addition to these, photo.-rooms, cloak-rooms, and rooms for the hall-keeper will also be provided. On the first floor there will be the council-chamber, assembly-room, ante-assembly-room, four committee-rooms, a sub-committee and deputation-room, a reception-hall, mayor's parlour and deputy-mayor's parlour, press-room, luncheon-room, members' private room, with accommodation for the town clerk, deputy town clerk, electrical engineer, waterworks engineer, clerk of the peace, deputy clerk of the peace, and inspectors. The weights and measures inspectors will be put on the second floor, where stores and workshops will also be provided. On the ground floor of the law-courts there will, according to the plans, be the magistrates' clerks' department, including a clerk's office, waiting-rooms for witnesses, two police-courts, consultation rooms for barristers, solicitors, and witnesses, clerks' general office, strong-room, magistrates' room, room for stipendiary magistrate, &c., and the head-constable's department, which will include the head-constable's office, charge office, clerk's office, parade-room, store-rooms, waiting-rooms, twenty cells, offices for the force, photographer's room, &c. On the first floor there will be two assize courts, a wreck inquiry court, a grand jury room, and various consultation and retiring-rooms, as well as a refreshment room. The whole of the designs, including those which have been awarded the first, second, and third premiums, have been and are on view to the public in the Assembly Rooms, Town Hall, Cardiff, up till to-morrow (Saturday) evening, between the hours of 11 a.m. and 8 p.m.

That the competition has attracted some competitors of the foremost rank will be evident from the following complete list of competitors: 1, Mr. Marks, London; 2, Mr. Bran, Croydon; 3, Messrs. Hall, Cooper, and Davis, Edinburgh; 4, Mr. A. Sykes, London; 5, Messrs. Margave and Peacock, Swansea; 6 (awarded third premium), Messrs. A. W. Cooksey and Alured Cox, 4, Adams-street, Adelphi, London; 7, Messrs. Humphrey and Hopkins, London; 8, Messrs. Spalding and Cross, London; 9, Mr. Morley, Bradford; 10, Messrs. Cooper and Cousens, Hastings; 11, Mr. L. de Ville, London; 12, Mr. Gough, Bristol; 13, Mr. J. J. Cresswell, Grimsby, and Messrs. Smith, Brodrick, and Lowther, Hull; 14, Mr. Pawley, London; 15, Messrs. Brewill and Bailey, and Messrs. Grococh and Mollows, Nottingham; 16, Mr. J. H. Sellers, Carlisle; 17, Messrs. Stark and Cooper, London; 18, Mr. A. N. Prentice, London; 19, Mr. A. Cleaver, London; 20, Mr. T. B. Whiney, London; 21, Mr. T. E. Colcutt, London; 22, Messrs. H. V. Lanchester, J. S. Steward, and E. A. Rickards, 50, Bedford-road, London (first premium); 23, Messrs. Hurrell and Taylor, Manchester; 24, Mr. Cheers, London; 25, Messrs. J. S. Gibson and S. B. Russell, Gray's Inn-road, London (awarded second premium); 26, Messrs. Simpson and Allen, London; 27, Mr. Mountford, Strand, London; 28, Messrs. Colson, Farrow, and Nisbett, London; 29, Leening and Leening, London; 30, Mr. W. A. Pile and Mr. Balfour, London; 31, Mr. James Darling, London; 32, Messrs. Malcolm, Stark, and Rowntree, Glasgow; 33, Messrs. Jones, Richards, and Budgen, Cardiff; 34, Mr. Chisholm, London; 35, Mr. Hikens, Liverpool; 36, Messrs. Baker and May, Colchester; 37, Mr. Wilkinson, London; 38, Messrs. Wilson, Moxham, and Boughton, Swansea; 39, Messrs. Ingall and Sons, Birmingham; 40, Mr. J. Coates Carter, Cardiff and Penarth; 41, Mr. S. B. Beale, London; 42,

Messrs. Gould and Scott, Falkirk; 43, Mr. B. Pite, London; 44, Mr. A. H. Hart, London; 45, Mr. F. Baggallay, London; 46, Mr. Herman, Birmingham; 47, Messrs. Bruton and Price, London and Cardiff; 48, Mr. A. J. Rowley, Oxford; 49, Mr. E. Seward, R.S.A., Cardiff; 50, Mr. E. J. Williams, Cardiff; 51, Messrs. Harrington, Ley, and Adams, London; 52, Messrs. Wills and Kennedy, Swansea; 53, Messrs. James and Morgan, Cardiff; 54, Mr. J. H. Phillips, Cardiff; 55, Mr. Telford Evans, Cardiff; 56, Mr. A. B. Thomas, Queen Anne's Gate, London.

ELECTRIC LIGHTING NOTES FOR ARCHITECTS.—XII.

By an Assoc. Inst. Elect. Engs.

Conductors in Practice.

METHODS OF DISTRIBUTION.

THE varying conditions which are met with in practice demand different methods of connecting the lamps and other receiving devices according to the nature of the requirements. As we have already explained, when dealing with the arrangement of circuits, there are two different methods of connecting the receiving mechanisms —*i.e.*, the *series* and *parallel* arrangements; and it is now necessary to consider the various features and modifications of these arrangements according to cases for which they are applicable. We shall consider them in the natural order in which they were introduced.

Series Distribution.—As is obvious, the simplest and most primitive method of distributing electrical energy is to connect directly one receiving device to the generator or source of supply, and this was the method adopted in the first attempts at distribution, and it necessitated but short leads. As the distribution of electrical energy developed, the natural result was to include in one circuit several receivers, placed so that the same current

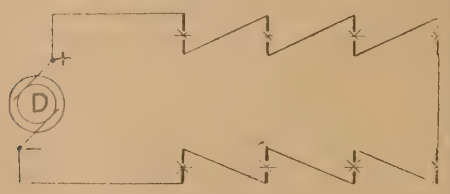

Fig. 16.

passed through them in succession, giving rise to the term *Series Distribution.* Such a system of distribution is represented in Fig. 16, in which the receiving devices are arc lamps.

Since each lamp requires a definite and constant current, it follows that the pressure impressed on to such a circuit varies with the number of lamps in the circuit. The constant current, of course, is that required by each receiver, and the conductor forming the line will have a constant cross-sectional area throughout, fixed by the strength of the current traversing the circuit. As will be observed, the current commences at the positive terminal of the generator, and passes successively through the lamps back to the negative terminal of the generator, and, in general, this system is restricted to working arc-lamps in series and to the transmission of power (motor working). It is also evident that the number of lamps is limited. Since the output of a generator is given by the product of the pressure and current, or—

$$W = C \times E,$$

and with series working the current C is constant; therefore—

W is proportional to E,

or, in other words, the output of a series generator is limited by the electromotive force generated. Thus, if e be the pressure required by each of the n individual lamps connected in series, then the total E.M.F., E, which the dynamo must generate may be found as follows:—

$$E = n \times e + \text{drop in volts in the leads} + \text{drop in volts in the dynamo.}$$

Now, arc lamps take from 45 to 50 volts and 10 or 12 ampères, and it is clear that with 50 lamps in series, from 2,000 to 3,000 volts will be required, so that the generators used in connection with series working are high-pressure machines. But high-pressure generators introduce difficulties. Perfect insulation in the dynamo itself is more difficult to attain, and it is difficult to collect and commutate the current at such high pressures without excessive sparking; from which it is clear that the pressure got from

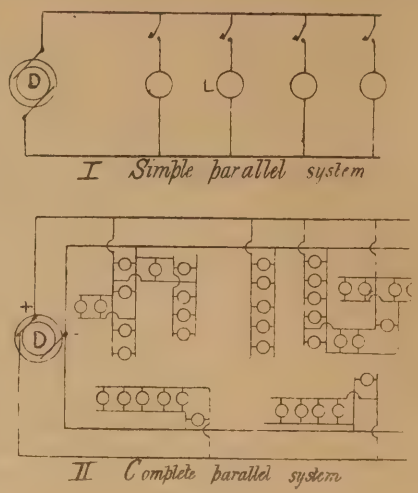

Fig. 17.

one dynamo is limited, and, therefore, the number of lamps is limited. With closed-coil armatures about 2,000 volts is the limit for safe working, whilst with open-coil armatures about 3,000 volts is the limit. In America, where arc-lighting has grown rapidly and is used extensively, the circuits often have more than 100 arc lamps connected in series, in which case the E.M.F. required exceeds that given above as the limit for a single generator. It is, therefore, an advantage to be able to connect two generators in series, for by so doing the pressure difficulty is successfully overcome. The usual method of doing this is to couple two generators mechanically to one driver—engine or turbine—and to couple the two armatures in series electrically. Usually the number of arc lamps in a circuit varies but little, and when it is necessary to vary the E.M.F. impressed on the circuit, it is necessary to alter the speed of the engine, the position of the brushes, or the excitation of the field-magnets, since a series machine will not automatically regulate itself. It will, therefore, be evident that street-lighting by arc lamps offers the most favourable conditions for the series method of distribution, for in street or open-space lighting the lamps may be placed at regular intervals apart. Furthermore, if we consider the economical condition of the line—*i.e.*, cost of the copper—it is apparent that the capital expenditure is small, since the pressure is high and the current small. The annual waste of energy (the C^2R losses) are also diminished by increasing the pressure, in addition to which the length of the circuit and the distance between the lamps may be increased. We may mention here that the illuminating power of the lamps is not altered if the pressure given by the generator is proportional to the number of lamps in use, and the current be maintained constant, because the illuminating power depends on the current only. Whilst by increasing the pressure the percentage loss of pressure in the mains for a given length is diminished; it must, however, be borne in mind that a more perfect insulation is required, and prime cost of line is thereby increased.

Although distribution by the series system is

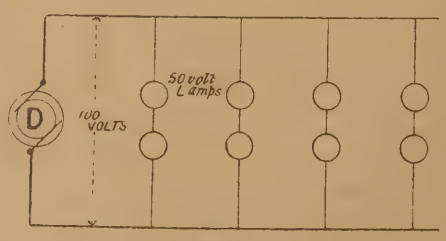

Fig. 18.

specially adapted for series arc-lighting, for which purpose it is economical, it is not generally applicable for general distribution purposes, and in some respects possesses decided disadvantages. We have already shown that the number of lamps that can be used is limited; it is not, therefore, applicable for incandescent lighting for houses, as the number of lamps required is often large, nor would it be safe to take high pressures into the houses. Then, again, if the circuit be broken at any point—as would be the case when a lamp filament breaks—all the lamps would go out unless each lamp be provided with an automatic arrangement for short-circuiting the lamps when not in use. Series arc lamps are in all cases provided with such devices. Moreover, the copper losses in the leads remains the same with the series distribution, whether all the lamps are in use or only part of them: there is thus at times an unproductive expenditure in the mains. These remarks apply more particularly to incandescent lighting than to arc-lighting, in which the shunting device or automatic cut-out works well. For the series system to work economically, it is necesary to have a uniform and constant load, as very little flexibility exists.

Parallel Distribution.—When incandescent lighting was introduced the supply of electrical energy developed much more rapidly than it had done during the period when arc-lighting only was possible on a commercial scale, and it was soon found that more variation in the strength of the current and in the amount of energy supplied to individual customers was required than the series distribution permits. More flexibility generally and individual independence of the lamps were also demanded, and by a process of evolution distribution by constant current changed to distribution by constant pressure and varying currents. As is well known, this system satisfies most of the conditions imposed, and, as we shall show, permits great flexibility, modification, and extension, and, generally speaking, may be said to be applicable to the varied conditions met with in practice. The method

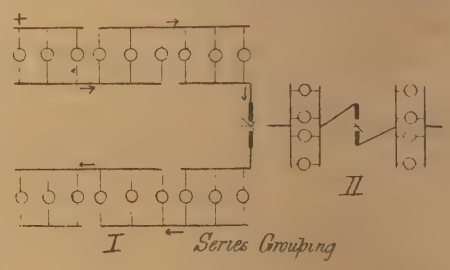

Fig. 19.

adopted is to form a number of separate paths, so that the current is divided into branch circuits, as shown in Fig. 17 I, and although the separate branches are not necessarily parallel, the general characteristic parallelism has given rise to the term *parallel* or *multiple arc distribution.* As will be observed, the separate branches containing a lamp or motor are placed between the main cables, which, being connected to the generator, is maintained at a constant potential. Each branch or receiving appliance is supplied with a switch, by which means each lamp is independent of all the others, and adding or taking out a lamp has very little effect on the others. Since the essential condition for the successful working of the method is constant pressure, it is evident that a generator giving varying currents at constant pressure is required as the source of supply. This difficulty has practically been overcome by introducing the compound-wound dynamo, which permits much variation in current strength without much attention. Furthermore, the E.M.F. impressed on to the circuit to give a steady light must correspond to that required by the lamps, whilst the current must be proportional to the number of lamps in use at any time. For the sake of economy, the pressure should also be high, though compared with that impressed on the arc-light circuit it is small. When we remember, however, that the common lamp voltage is 100 volts, and that the present tendency is to use 200 or higher voltages, it is evident that the generator must give more than 100 volts in the first case and over 200 volts in the latter, since there is a definite loss of pressure in the mains equal to C × R. But the current C varies with the number of lamps in use, and since—

$$c \text{ (current per lamp)} = \frac{\text{watts}}{\text{volts}}$$

$$C \text{ (total current)} = n \times \frac{\text{watts}}{\text{volts}}$$

where n = number of lamps in use. It is there-

fore evident that the current will be large, necessitating mains of large cross-sectional area if the loss in pressure is to remain small. In this respect the system compares unfavourably with the series distribution. The cost of the main conductors being prohibitive for extended areas, and the farthest lamp should not be more than 200 yards from the generator, as the prime cost

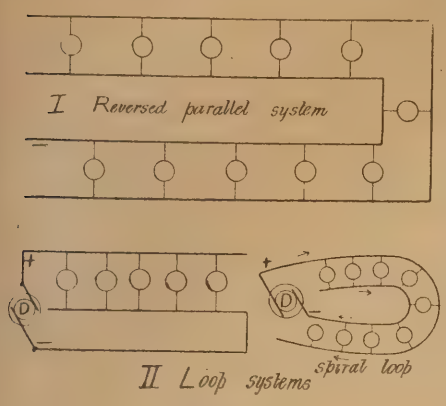

FIG. 20.

of the mains increases rapidly. If the size of the mains is diminished for the sake of economy, then the loss of pressure increases, and the essential feature of the system is to keep this small, and with little variation, so that a compromise or a satisfactory mean between the two limits is taken. On the other hand, it is evident that the waste of energy in the mains is at all times proportional to the useful energy, since the current varies with the load; that satisfactory insulation is readily attained; that the system is simple, and that there is no danger from shocks. It is, in fact, a system specially adapted for small and private installations. Fig. 17, II., represents a complete example of parallel distribution.

To overcome the disadvantage of the pressure falling as the distance from the dynamo increases, a number of modifications and combinations of the series and parallel systems have been proposed and adopted in practice.

In the *Multiple Series* arrangement shown in Fig. 18, two or more lamps of smaller voltages are connected in series between the mains. In this case it is evident that the total current will be—

$$\text{C (total current, 2 in series)} = \frac{n}{2} \times \frac{\text{watts}}{\text{volts}},$$

so that only half the current will be used, necessitating only half the cross-sectional area of the mains. This saves copper. Two 50-volt lamps, for instance, may be connected in series across 100-volt mains; but there is this disadvantage, that if one lamp goes out, both go out.

In the *Series Grouping*, shown in Figs. 19, I. and 19, II., a group of incandescent lamps are connected in series. This method may be adopted when it is desired to use glow lamps on arc-lighting circuits. Fig. 19, I. represents a combination of incandescent and arc-lighting. If the arc lamps take ten ampères, then each group of glow lamps must take ten ampères, and no variation in the number of lamps used can take place, for we have here a constant

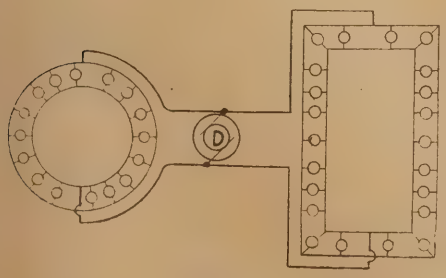

FIG. 21.

current circuit. The disadvantage of this combination is that the remaining lamps may be injured by the excess of current if one or more lamps break. It is convenient for business premises where a small number of arc lamps are required. Fig. 19, II., represents a similar arrangement.

As a means, however, of preventing unequal fall of pressure, the *loop system* (Fig. 20, II.) and the *reversed parallel system* (Fig. 20, I.) are probably the best that have been devised. It is clear that the light from the lamps will be more uniform because of the tendency to equalise the fall of pressure by sending the current used round the whole circuit. The disadvantage of this method is that the first cost is greater, and the fall of pressure is not equalised unless the same amount of current is used at different points. We shall refer to this later.

A very useful modification known as the *ring method* is shown in Fig. 21. The distributing mains are arranged as a ring or other closed figure, so that there is the same length of main on the two sides of the feeding points. This method is particularly adapted for dome lighting, in which case the mains would be arranged as circles. So far, we have not dealt with the quantitative relationships in connection with the methods explained. The following worked examples will therefore be useful, and will show how to tackle the problems which occur in practice. The student will find it interesting and useful to take several example for making comparison between the various systems.

Example 1.—What percentage loss of potential is there when 50 ampères are sent through 100 yards of copper ⅛in. diameter, if the initial potential is 110 volts? A foot of copper wire 1mil. in diameter has 10 ohms resistance.

Since drop in volt or loss of potential $= e = C \times r$, and r, the resistance of 100 yards of ⅛in. copper

$$= 10 \text{ ohms} \times \frac{100 \times 3 \text{ (feet)}}{1 \text{ (foot)}} \times \frac{(\cdot 001)^2}{(\cdot 125)^2} = 0\cdot 192 \text{ ohm}$$

$$\therefore \quad e = 50 \text{ (ampères)} \times 0\cdot 192 \text{ (ohm)} = 9\cdot 6 \text{ volts.}$$

$$\text{And—} \quad \underset{\text{volts}}{110} : \underset{\text{volts}}{100} :: \underset{\text{volts}}{9\cdot 6} : p \text{ (percentage loss)}$$

$$\therefore \quad p = \tfrac{96}{11} = 8\tfrac{8}{11} \text{ per cent.}$$

Example 2.—Determine the diameter of copper bars employed to carry 4 000 ampères from a dynamo to a furnace, 10 yards apart, if the drop in volts in the bars is 0·1 volt.

Let r = resistance of the 20 yards of the bar (lead and return), then—

$$0\cdot 1 \text{ volt} = 4{,}000 \times r$$

$$\text{and—} \quad r = \frac{0\cdot 1}{4000} = 0\cdot 000025 \text{ ohm}$$

$\therefore$ resistance per inch of bar

$$= \frac{0\cdot 000025}{3 \times 20 \times 12} = \frac{0\cdot 0000025}{72} \text{ ohm.}$$

Now the resistance of a cubic inch of commercial copper is 0·00000068 ohm (see Article X., p. 788), and resistance is inversely as sectional area

$$\therefore \frac{0\cdot 0000025}{72} \text{ ohm} : 0\cdot 00000068 \text{ ohm}$$

$$:: 1\text{sq.in.} : \text{A (area of bar)}$$

$$\text{and—} \quad A = \frac{0\cdot 00000068 \times 72}{0\cdot 0000025} \text{ sq.in.} = 19\cdot 584\text{sq.in.}$$

$$\text{But area of round bar} = \frac{\pi}{4} d^2$$

$$\therefore d = \sqrt{\frac{19\cdot 584 \times 4}{\pi}} = 4\cdot 99\text{in.}$$

Example 3.—If 10 arc lamps, each having a 1·5 ohm resistance, are arranged in series 40 yards apart, what must be the diameter of the leading wires if the conductance is 90 per cent. of that of pure copper, and the total resistance of the leads is 4 per cent. that of all the lamps? The dynamo is 20 yards from the first and last lamp. The resistance of pure copper wire 1ft. long and 1mil. diameter is 9·94ohms.

Total resistance of the 10 lamps $= 10 \times 1\cdot 5 = 15$ ohms
" " " leads $= \frac{4}{100}$ of $15 = 0\cdot 6$ ohm.
" length " " $= (2 \times 20 + 9 \times 40)$yds.
$= 400$yds. $= 1{,}200$ft.

$\therefore$ resistance per foot of leads

$$= \frac{0\cdot 6}{1{,}200} \text{ ohm} = \frac{1}{2{,}000} \text{ ohm.}$$

and since resistance varies inversely as sectional area—

$$\therefore \frac{1}{2{,}000} \text{ ohm} : 9\cdot 94 \text{ ohms} :: \frac{\pi\,(\cdot 001)^2}{4} : \pi \frac{d^2}{4}$$

where d is the diameter required.

$$\therefore \quad d = \sqrt{9\cdot 94 \times (\cdot 001)^2 \times 2000}$$
$$= 0\cdot 141\text{in.} = 14\cdot 1 \text{ mils.}$$

Example 4.—Determine the area in square inches of the copper leads required to carry the current for 250 60-watt 100-volt lamps connected in parallel. The lamps are all placed in a room 75 yards from the dynamo, and the loss in volts has not to exceed 2 per cent.

$$\text{Current for each lamp} = \frac{60 \text{ watts}}{100 \text{ volts}} = 0\ 6 \text{ ampère.}$$

Total current $= 250 \times 0\cdot 6 = 150$ ampères, and lost volts for 2×75 yards $= 2$ volts.

$\therefore$ resistance of 150 yards of leads $= r = \frac{2}{150}$ ohm.

$$\text{Now—} \quad r = \frac{\rho L}{A}$$

where ρ = specific resistance of the copper $= 0\cdot 00000068$ ohm (per cubic inch).

L = length in inches and A = area in square inches.

$$\therefore \frac{2}{150} = \frac{\cdot 00000068 \times 150 \times 3 \times 12}{A},$$

and—

$$A = \tfrac{150}{2} \times \cdot 00000068 \times 150 \times 3 \times 12 = \cdot 2754\text{sq.in.}$$

Example 5.—A, B, and C are three points, each at a distance of 157 yards from the next. At A there is a dynamo, at B a group of 200 incandescent lamps requiring 110 volts at 0·75 ampère each, and at C a group of 250 lamps requiring 100 volts and 0·83 ampère each. Calculate the diameter of the copper conductor that must be used for the lead and return wires between A and B and between B and C respectively, if the potential difference maintained at the terminals of the dynamo is 112 volts. One yard of commercial copper wire 1sq.in. in section has 0·00002435 ohm resistance.

The arrangement and particulars of the circuit are given in Fig. 22.

The total current used—

$$= (200 \times \cdot 75) + (250 \times \cdot 83)$$
$$= 150 + 207\tfrac{1}{2} = 357\tfrac{1}{2} \text{ ampères.}$$

(*a*) Since the lamps at B require 110 volts, the permissible drop in volts between A and B (lead and return) is $112 - 110$, or two volts—that is, the resistance of 157 yards of the cable used

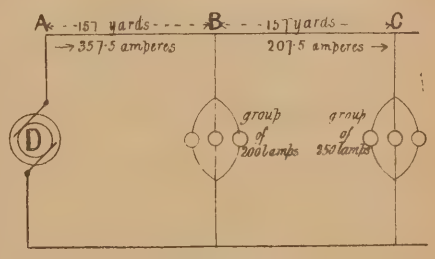

FIG. 22.

between A and B must be sufficient to diminish the pressure one volt. That is—

$$1 \text{ volt} = 357\cdot 5 \text{ ampères} \times R \text{ ohms,}$$

$$\text{and—} \quad R = \frac{1}{357\cdot 5} = \frac{2}{715} \text{ ohm.}$$

But 157 yards of copper 1sq.in. section has resistance of $157 \times 0\cdot 00002435$ ohm. Therefore, if d = diameter of the conductor A B—

$$\frac{2}{715} \text{ ohm} : 157 \times 0\cdot 00002435 \text{ ohm} : 1\text{sq.in.} : \frac{\pi}{4} d^2$$

$$\therefore d = \sqrt{\frac{157 \times 715 \times 0\cdot 00002435}{2 \times \cdot 7854}} = 1\cdot 3\text{in.}$$

(*b*) The current required for lamps at C

$$= (250 \times \cdot 83) \text{ ampères} = 207\cdot 5 \text{ ampères.}$$

And the drop in volts between B and C (lead and return) is $110 - 100$, or 10 volts, that is, the resistance of 157 yards of cable used between B and C must be sufficient to diminish the pressure 5 volts.

$$\therefore 5 \text{ volts} = 207\cdot 5 \text{ ampères} \times R \text{ ohms,}$$

$$\text{and } R = \frac{5}{207\cdot 5} = \frac{10}{415} = \frac{2}{83} \text{ ohm.}$$

And, as above—

$$\frac{2}{83} \text{ ohm} : 157 \times 0\cdot 00002435 \text{ ohm} :: 1\text{sq.in.} : \frac{\pi}{4} d^2,$$

from which $d = \cdot 449$in.

Example 6.—Current is required along a street 2,000ft. long, at the rate of 1 ampère per 10ft. of frontage. Give sectional area of conductor, so that the difference of pressure between any two lamps shall not exceed 2 volts in the following two cases:—

(*a*) The current being supplied at one end.
(*b*) The current being supplied midway. (N.B.

The resistance of a copper bar 1,000ft. long,

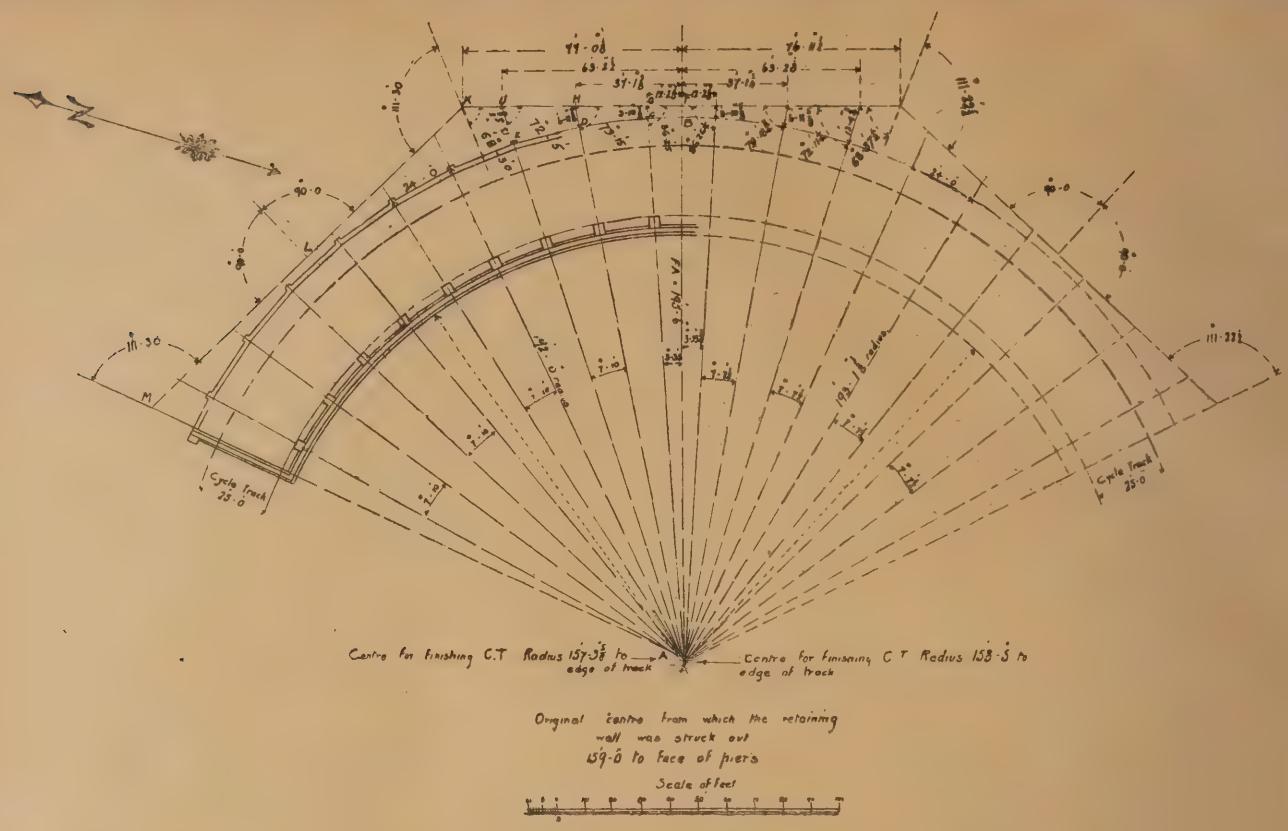

Fig No. 1

and 1sq.in. in cross section, may be taken as ·008 ohm).

(*a*) Current supplied at one end—

$$\text{Total current} = \frac{2{,}000}{10} = 200 \text{ ampères,}$$

and assuming that the current is uniformly distributed along the mains, the mean or average current required—

$$= \tfrac{1}{2} \times 200 = 100 \text{ ampères.}$$

And since the drop in volts between the first and last lamp = 2 volts, the resistance of 4,000ft. of the mains (lead and return)—

$$= \frac{2}{100} = 0{\cdot}02 \text{ ohm.}$$

Now the resistance of a copper bar 4,000ft. long and 1sq.in. in cross section—

$$= 4 \times {\cdot}008 = {\cdot}032 \text{ ohm.}$$

$\therefore$ ·02 ohm : ·032 ohm : : 1sq.in. : A square inches,

$$\text{and } A = \frac{{\cdot}032}{{\cdot}02} = 1{\cdot}6\text{sq.in.}$$

(*b*) Current supplied midway. Mean current = 50 ampères.

$\therefore$ Resistance of 2,000ft. (lead and return) of mains

$$= \frac{2}{50} = {\cdot}04 \text{ ohm,}$$

and resistance of 2,000ft. of a copper bar 1sq.in. in cross section = 2 × ·008 = 0·16 ohm.

$\therefore$ ·04 ohm : ·016 ohm : : 1sq.in. : A square inches,

$$\text{and } A = \frac{{\cdot}016}{{\cdot}04} = 0{\cdot}4\text{sq.in.}$$

(*To be continued.*)

NOTES ON SURVEYING AND LEVELLING.—IX.

By Walter Tester.

MENAGERIE UNDER CYCLE TRACK.

THE plan, Fig. 1, and section, Fig. 2, show the building to be erected under the end of the cycle track for a menagerie, aquarium, &c.; it is to be inclosed by the concrete retaining wall already mentioned, which is returned to form the end walls, and by a brick wall at the front, the track being carried by steel girders resting on piers in the walls, and on intermediate stanchions as shown on the section, Fig. 2. In order that the length and the level of the girders shall be uniform, the upper portion of the concrete wall and the front brick wall require to be set out to follow the curves of the cycle track from the correct centres for finishing the latter, which are put in on the formation level, as explained in the article on the Athletic Grounds, and it will be assumed that the upper part of the retaining wall has been adjusted by varying the projection of the piers, the front faces of the latter being made coincident with the edge of the track. The lower portion of wall being struck out with a radius of 159ft. to the face of the piers, and the radius for finishing the part of the cycle track on the north side of the axis line being 157ft. 3⅝in. to the edge of the track, then if the centre point is moved 1ft. 8⅜in. towards the wall the curve will coincide with the original one at the centre line, but will draw inside it as the distance from the axis increases, the face of the piers next the centre line running straight up without an offset, and the set-back increasing with the distance from the axis. The body of the upper portion of the wall can be struck out concentric with the lower part. In a similar manner the wall on the south side of the centre line is dealt with; but as the difference between the radius for the lower portion of the wall and the one for finishing the cycle track is only 7in., there will be less variation in the offsets of the piers.

The front wall has to be proceeded with and the stanchions erected in readiness to receive the girders at the same time that the upper portion of the retaining wall is being completed; and when the brick wall has to be set out, the sheeting for concreting is fixed in position, and standing up a considerable height above the ground on the football field side which has not yet been filled in against the retaining wall. The front wall must be set out independently of the concrete wall, as the lower portion of the latter is not sufficiently accurate to measure from; and as the ground on the menagerie side is something like 16ft. below the top of the close sheeting, it would be difficult to measure out lengths from the centre-points, and the surveyor decides only to run the axis-line out and to measure accurately the required dimension and then to set out lines on the lower level for marking the points on the curves for the brick wall.

In order to carry out this intention, a number of dimensions must be calculated (see Fig. 1.) The conditions to which the surveyor has to conform are as follows:—The brick wall is to be built in straight lengths between the piers, which are spaced 24ft. apart from centre to centre, and the radius of the wall B C D E on the north side of the axis is to be 192ft. to the outer main face at the points where the straight lines meet at the centres of the piers.

Taking one full bay, and running lines to the centre point to form a triangle A C D, the three sides of which are given—viz.:—

CD = 24ft. AC, AD each = 192ft.

$$\text{Then—} \quad \text{Cos. A} = \frac{AC^2 + AD^2 - CD^2}{2\,AC \times AD}$$

$$\text{Cos. A} = \frac{192^2 + 192^2 - 24^2}{2 \times 192 \times 192}$$

$$= {\cdot}9921875 = \text{Cos. } 7^\circ\ 10'$$

Therefore each bay is subtended by an angle of 7° 10′ at A, and the angle next the axis line is 3° 35′ corresponding to half a bay.

Adopting a line F K at right angles to the centre line A B, and keeping it a sufficient distance outside the brick wall to be clear of the excavations for the foundations so that the pegs will not be disturbed, say—

A F = 195ft. 6in.

and producing the radial lines for each bay to cut F K in G H and J, three right-angle triangles are obtained—viz., A F G, A F H, and A F J containing angles at A of 3° 35′, 10° 45′, and 17° 55′, and of which the length of one side A F is known. Then each of the other sides and angles can be obtained by calculation, and, the lengths of the lines A G, A H, and A J being found, by deducting 192ft. from each, the distances G C, H D, and J E back to the points on the curve will be arrived at.

The save calculation, and for convenience in setting out, F K is only continued a short distance to cut a radial line through the centre of a bay, and then another line, K L, is adopted, making the same angle with the radial line, and lying in a similar position in relation to the curve as F K, and it will only be necessary to reverse the order of the measurements at point K. At L the dimensions will again reverse the line L M, corresponding to K L and F K. Then, in the triangles—

	AFG.	AFH.	AFJ.	AFK.
Angle A=	3° 35′	A=10° 45′	A=17° 55′	A=21° 30′
,, F=	90 0	F=90 0	F=90 0	F=90 0
,, G=	86 25	H=79 15	J =72 5	K=68 30
Totals..	180° 0′	180° 0′	180° 0′	180° 0′

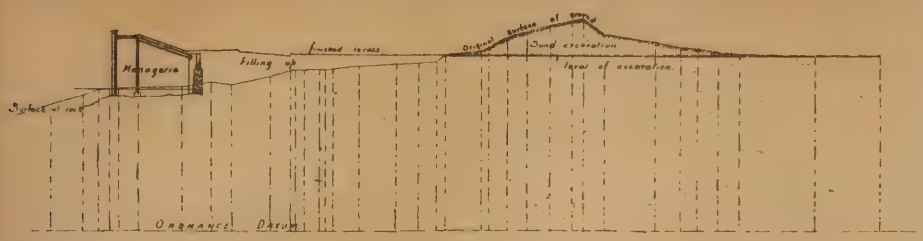

Fig. 2.

Using the formulæ for right-angle triangles :—

In A F G :—
F G = A F × Tan. A = 195·5 × Tan. 3° 35′
A G = A F × Sec. A = 195·5 × Sec. 3° 35′

F G = 195 5 × ·0626226 = 12ft. 2⅞in.
A G = 195·5 × 1 0019589 = 195ft. 10⅝in.

In A F H :—
F H = A F × Tan. A = 195·5′ × Tan. 10° 45′
A H = A F × Sec. A = 195·5′ × Sec. 10° 45′

F H = 195·5 × ·1898559 = 37ft. 1⅜in.
A H = 195·5 × 1·0178621 = 198ft. 11⅞in.

In A F J :—
F J = A F × Tan. A = 195·5 × Tan. 17° 55′
A J = A F × Sec. A = 195·5 × Sec. 17° 55′

F J = 195·5 × ·3233125 = 63ft. 2½in.
A J = 195·5 × 1·0509667 = 205ft. 5⅝in.

In A F K :—
F K = A F × Tan. A = 195·5 × Tan. 21° 30′

F K = 195·5 × ·3939105 = 77ft. 0⅛in.

Then—
G C = 195′ 10⅝″ − 192′ 0″ = 3ft. 10⅝in.
H D = 198′ 11⅞″ − 192 0 = 6ft. 11⅞in.
J E = 205′ 5⅝″ − 192 0 = 13ft. 5⅝in.

Similar calculations are made for the part of the wall on the south side of the axis line, the first operation being to determine the angle which each bay represents at the centre-point for this portion, which is 1ft. 1⅜in from point A. The three sides of the triangle are, therefore—

		24ft. 0in.
192ft. 0in. + 1ft. 1⅜in =	193	1⅜
	193	1⅜

Then, using the same formula as before, the angle at the centre-point is found to be 7° 7⅛″. All the other dimensions required are obtained in precisely the same manner as already described. They are given on Fig. No. 1, and need no further explanation.

The surveyor can now proceed to set out the dimensions on the ground, and commences by producing the central axis line with the theodolite and measuring out the length 195ft. 6in. from A, carefully plumbing down from the higher to the lower level at the outside of the concrete wall, and making sure that F is correct in position. He also marks a point on the line a considerable distance beyond F, retaining all lines by pegs with nails in them, set to the exact positions with the theodolite.

The instrument is then placed over F, and a line is set out at right angles to, and on each side of, the axis ; the length of the centre line beyond F being used, as the surveyor cannot see back on the line towards A.

Along the portion F K the lengths 12ft. 2⅞in., 37ft. 1⅜in., 63ft. 2½in., and 77ft. 0⅛in. are measured, and the corresponding dimensions at the other side, then at each of the points G, H, and J, the theodolite is placed in succession, and the angles which the radial lines make with F K are set out, the points being retained with permanent marks on the concrete wall. The instrument is next placed at K, and the line K M set out at an angle of 137° with K F. Along K M the lengths to the points where the radial lines cut and the angles are set out as for F K. In the same manner the position on the south side of the axis line is marked out, using, of course, the proper dimensions and angles for that side.

A line can be strung between points G H I, &c., and the marks on the concrete wall and lengths 3ft. 10⅝in., 6ft. 11⅞in., 13ft. 5⅝in. &c., measured out for the brick wall ; also the requisite dimensionsfor fixing the position of the stanchions, which must line with the piers.

The radial lines can easily be marked out on the higher level with angles set with the theodolite, placed at the centres, and if the surveying operations have been carried out accurately, the piers on the brick wall and the stanchions will be exactly on the lines, and as the piers on the concrete wall are spaced to line with them, and there is plenty of width to allow a little play, there will be no difficulty in getting the steel girders into position.

As soon as the concrete arching is done, the surveyor can put in the section lines and levels for finishing the cycle track in a manner similar to that already described for the other end of the track.

BUILDING MORTAR.

A RECENT correspondence in the Building News suggests the desirability of reviewing the present state of our knowledge of the materials ordinarily employed in making building mortars, and doing so in a manner to render the subject intelligible to practical men who have little time or opportunity to study the history and science of the matter for themselves. The substance of these articles must, therefore, be more or less elementary in character, and involve statements already well within the knowledge of chemists and others who have studied the subject; but will probably be altogether new to many persons engaged in building who have used limes and cements frequently without giving the chemistry of the subject a thought, though an acquaintance with this would be of the utmost importance to them. Lime, as is well known, is the principal ingredient which has been used in making mortars and cements for binding bricks and stones together in all buildings, from the earliest times to the present day. The Phœnicians, Egyptians, Greeks, and Romans, as well as other civilised people, all used lime mortar to bind the materials of their walls together, and the goodness of this mortar as a permanent cementing material has passed into a proverb. Coming nearer home, and to more recent times, lime mortar was used throughout this country by the Mediæval builders, and its badness as a cementing material is equally proverbial, for whilst Roman mortar is now found to be as hard as the stones and bricks themselves, it is no uncommon occurrence to find much of the mortar of our old churches without cohesion of any kind, and little better than dry sand. The writer has had to deal with piers, thick walls, and other apparently solid masses of masonry in the work of church restoration, and in every case, without exception, the mortar of the hearting poured like water through any cracks or cavities made in the ashlar facings, when the bulk of the work was disturbed by settlement or otherwise. Lime, then, being at all times and in all places absolutely necessary to the making of building mortar, it becomes necessary to ask what is it? and what do we know of its properties? Lime was formerly called an alkaline earth, earth being a name given by chemists a century ago to certain non-metallic substances which were insoluble in water, and infusible at high temperatures. It was observed that lime possessed some of the properties of an alkali, for it neutralised acids and changed vegetable blues to green and yellow, so that, in addition to being an earth, it became an "alkaline" earth. Lime had two companions, the other alkaline earths, with properties almost similar to it, these were baryta and strontia: both are obtained in the laboratory as greyish-white powders, and, like lime, they readily combine with water, evolving intense heat, and forming substances known as hydroxides or hydrates. The heat evolved by baryta in combining with water is so great that the mass becomes incandescent. Up to 1808 chemists were well acquainted with these three alkaline earths, and believed them to be simple substances. In chemistry, a simple substance is one not made up of other substances ; iron, for instance, is a simple substance, for by no conceivable process can it be made to yield anything but iron. Water is a compound substance, as may readily be seen by dropping the wires from any powerful electrical battery into it, when bubbles rise rapidly to the surface from the extremity of each wire. If these are collected in separate glass vessels in the usual way, one will be found to contain oxygen and the other hydrogen. If these gases are again mixed, and a light applied to the mixture, they combine to form water; hence it is concluded that water is a chemical compound of oxygen and hydrogen. It is further observed that the gases obtained in this way invariably bear the same proportion to each other—viz., 1 part, by weight, of hydrogen to 8 parts of oxygen, and this same rule holds good for all chemical compounds, the substances composing them are combined in certain fixed proportions, and no other. The proportions, of course, vary for different compounds ; but in the same compound the simple substances are always present in the same proportion. In passing, it is necessary to observe that a peculiarity of a chemical compound is that it is unlike any of its constituents, and possesses no property in any way common to them. Water, for instance, extinguishes fire ; but one of its constituents is an inflammable gas, and the other a powerful supporter of combustion. From this it follows that lime mortar is not a compound, but simply a mechanical mixture. When, however, mortar begins to set changes take place in it, and compounds are formed which conform in every way to the definitions of chemical compounds given above; but, on the whole, lime mortar is a mechanical mixture of lime and sand, for these may be seen lying side by side in it, and they may readily be separated by mechanical means. So far, the consideration of this subject has necessitated the adoption of a few elementary definitions and simple laws of chemistry. As a knowledge of these is absolutely necessary to a clear understanding of what follows, it is of importance these should be repeated here as clearly and concisely as possible.

1. A simple substance, in chemistry, is one which cannot, by any known means, be decomposed into other substances. Chemists know about 66 such substances, and they are called chemical elements.

2. A compound substance is one which can be decomposed into two or more simple substances.

3. A compound substance possesses properties entirely differing from those of its constituents. Simple substances, water, for instance, extinguishes flame, whilst of its constituents, one supports combustion, and the other burns freely on a light being applied to it.

4. A compound substance cannot be resolved into its constituent substances by purely mechanical means. Heat, light, chemical action, or electricity is necessary for this purpose.

5. The chief distinguishing characteristic of a compound substance is that its constituent substances are invariably present in the compound in a fixed proportion by weight, and examples of compound substances may be increased indefinitely to prove the truth of this law, which may be stated briefly thus : — Chemical combination always takes place in fixed proportions. Why this should be so in not known. A consideration of the above leads to the conclusion that, although compounds may be decomposed into their constituents, and then again be made to re-combine, there is no gain or loss of matter in either case ; the quantity of it is fixed and unalterable, as the substances acted on merely undergo apparent change. Returning now to lime, we find that up to the year 1808 it was considered to be a simple substance. In that year Sir Humphrey Davy submitted a paste made of carbonate of lime to the action of a galvanic battery, and he discovered in this way that lime was a compound substance, the base of it being a metal, to which he gave the name of calcium. In fact, he decomposed the compound substance lime into its constituent simple substances, calcium and oxygen. Davy did not succeed in obtaining the metal in a coherent, metallic state ; this was first done by Matthesen in 1856. Until this time calcium was known as a white metallic powder. Calcium is now known as a whitish metal something like silver, tenacious, malleable, harder than lead, rusting or oxidising rapidly in moist air. It is a little heavier than water. When thrown on it the water is decomposed, and hydrogen evolved, which bursts into flame from the heat generated by the violence of the decomposition. Neither calcium nor its compound with oxygen, lime, is found isolated in nature; they are invariably in combination with other substances. Lime in combination with carbonic acid is found in huge deposits in rocks of all periods. Though the Lower Silurian rocks are

chiefly shales and slates, yet they contain beds of limestone, known as the Bala limestone, this is 50ft. thick in the Berwyn Mountains. Beyond Penmachno this limestone passes into nodular calcareous ash. The massive white and pink limestones of the Coniston group in the North of England belong to the Lower Silurian rocks. The Upper Silurian rocks, consisting chiefly of sandstones and shales, have also important beds of limestone. The Aymestry, Wenlock, and Woolhope limestones all belong to these rocks. The Aymestry limestone is about 50ft. thick near the place from which it takes its name. The Wenlock nodular limestone is about 340ft. thick at May Hill in Gloucestershire, and the Woolhope limestone is fully 150ft. thick at Malvern; so that in a series of rocks not remarkable for large deposits of carbonate of lime there are no less than three striking deposits, attaining in all a thickness of about 550ft.! The Devonian rocks contain beds of nodular impure limestone, which were at one time largely worked for agricultural lime. The limestones of Plymouth and Torquay belong to this series. The Carboniferous system is, however, that which *par excellence*, is remarkable for its limestone rocks;—under the coal measures and millstone grits of this series, they attain a thickness of upwards of 8,000ft.! In Ireland, these limestone rocks form more than one-half the entire surface of the country, covering it from sea to sea. The Permian rocks yield magnesian limestones, and also gypsum or alabaster, which is a limestone combined with sulphur instead of carbon. The Jurassic rocks yield the Portland limastones, about 170ft. thick, the great and inferior oolites 850ft. thick, and the lias limestone beds, jointly about 1,300ft. thick, including the lias clays. In the next series of rocks—viz., the cretaceous, there are vast deposits of nearly pure carbonate of lime, such as the chalk, which is about 1,050ft. thick. The most recent rocks, those of the Hantonian system, have their limestones also in the Bembridge beds; these latter are remarkable for having supplied the limestone used in Winchester Cathedral. The limestones enumerated above are none of them chemically pure carbonate of lime, though chalk approaches more nearly to it than any of the others. They are all mixtures of carbonate of lime with sand, clay, and other matters, and in many instances the proportion of sand approaches so nearly to that of the carbonate of lime, that the stone may be classed either as a calcareous sandstone or sandy limestone, and when clay predominates, the rock may be termed an argillaceous limestone. In fact, the rock containing carbonate of lime may consist altogether of that substance, or contain it in such small quantity as to be practically a sandstone; the limestones, therefore, may gradually take up more and more of sand and clayey matter, until they cease to be correctly described as limestone at all.

Though some of the limestones differ much in texture and appearance, still, whether they are soft, pliable, and earthy as chalk, or compact and crystalline, as mountain limestone, chemically they are the same. Both these rocks contain about 94 or 95 per cent. of pure carbonate of lime. In colour the limestone rocks are white like chalk, cream like the oolites, and various shades of bluish-greys like the lias and mountain limestones. Limestone rocks are easily recognised: they may be scratched with a penknife, and they effervesce freely when treated with dilute acid. This effervescence indicates that the rock contains a carbonate, and this is generally found to be carbonate of lime. Nearly all the older limestones are coral reefs, scarcely altered in structure; these contain (fossilised, of course) the remains of marine animals imbedded in them. Our English chalk is very largely made up of the shells of Foraminifera, which shows that this immense deposit of carbonate of lime has been secreted from the water in which it was deposited by these tiny animals; in fact, all the pure or nearly pure limestones have been formed by the agency of marine animals. Impure limestones have been formed by the wearing down of the purer limestone into mud. This calcareous mud will in every case be mixed with other deposits, such as clay or sand, and the whole when thown down on the sea bottom formed rocks like our lias and other limestones of a similar kind. But all pure limestones, so far as we know, have been formed by the agency of animals, and in no other way. All lime used for building purposes is obtained by calcination from rocks composed of carbonate of lime. The lime will, of course, be more or less pure as the rock from which it is obtained is so; in other words, the purity of the lime will depend on the purity of the rock from which it is obtained. A pure carbonate of lime, like Carrara marble or Iceland spar, is a compound substance consisting of lime and carbonic acid, both compound substances in themselves. These may be resolved into calcium and oxygen, and carbon and oxygen. They are represented in chemical notation thus:—

Carbonate of lime	Lime	Calcium	40
		Oxygen	16
	Carbonic acid	Carbon	12
		Oxygen	16

The numbers represent the combining weights of the various simple substances, and may be read thus:—40lb. of calcium will combine with 16lb. of oxygen to form 56lb. of lime, and 12lb. of carbon will combine with *twice* 16lb. of oxygen to form 44lb. carbonic acid, the whole combining to form 100lb. of carbonate of lime. Nearly one-half the weight of any dry block of carbonate of lime is therefore carbonic acid. Quicklime is obtained by heating lumps of carbonate of lime to redness in an open fire or limekiln. Heat decomposes this carbonate, the carbonic acid passing off with aqueous vapour and the gases of the burning fuel, the residue being quicklime. It is necessary that the carbonic acid evolved during this decomposition be allowed to pass off, for if it is retained in the kiln the carbonate of lime may be fused without decomposition.

"BUILDING NEWS" DESIGNING CLUB.

A SUBURBAN RESIDENCE.

[WITH PHOTOLITHOGRAPHIC ILLUSTRATIONS.]

THERE could hardly be chosen a more suitable subject for the trial essay of a young architect than such a problem as this with which our present session was opened. It represents a class of building not only of the widest possible general interest, and at the same time well within the knowledge of most people, but usually the first commission intrusted to the would-be practitioner takes the form of a small house. It must not, however, on that account be supposed that the subject is quite so easy to master successfully as the unexperienced might think. Indeed, to secure the utmost amount of accommodation in a really inexpensive manner, and at the same time in an artistically effective and convenient way furnishes an exercise for the skill and patience of any architect, while it is evidently one in which not so very many men after all have distinguished themselves. That the average merit and interest of contemporary house-building has wonderfully improved of late years no one can deny, thanks to the artistic influence of such men as Mr. Norman Shaw and his school of art workers, but every town and village is still being deplorably disfigured by a vast quantity of ungainly, ill-contrived, and badly-built house property which possibly may make money for the speculator, but, in other respects, has no advantage for anyone. Every serious endeavour to show how commonsense requirements in everyday house-planning may be architecturally realised must always possess an interest and prove suggestively useful. This is all we venture to claim for the designs which we now give as the result of the opening contest among our Designing Club members, and we are prepared to admit that neither of the plans near perfection. The following are the conditions issued to the competitors:—

FIRST LIST OF SUBJECTS, 1897-8.

A.—A Suburban Dwelling-house, for a City gentleman, to cost £2,000. Economy of plan on a limited site are points of leading importance. The frontages are at the corner of two roads, facing south and west. The main road side of the plot measures 50ft., and has a return of 150ft. The elevation must set back 18ft. from the boundary fence on the main road side. A large dining-room or living-room is to take the preference over the drawing-room or parlour. A third sitting-room, not less than 12ft. square, is to be provided for a study or breakfast-room. That need not necessarily be on the ground-floor. A mezzanine arrangement is suggested. There must be six bedrooms in all; two of these may be attics. Bathroom essential, and two w.c.'s, besides kitchen and offices. There may be a small cellar. The entrance must be roomy but not wasteful, and the stairs not less than 3ft. 3in. wide. Materials brick, with stone dressings sparingly used. Roofs covered with tiles, style optional. Size of rooms to be governed by the money expenditure. Drawings required: Three plans, two elevations, and a section scale 8ft. to the inch. Plans may be 16ft. to the inch; sketch view necessary.

We place "Centaur" first, "Pantile" second, the third place being assigned to "Petticoats." All three plans are herewith illustrated, and, perhaps, three more different schemes could scarcely be conceived. These are chosen out of the total number of 63 designs received for this subject.

"Centaur" is the author of a square, homely, unpretentious design, which at first sight some may style uninteresting, and, perhaps, even commonplace. This, in our judgment, would hardly be justified by a closer consideration of the three plans. Compactness of arrangement is of the first consequence, and particularly where a site is so restricted. The lobby at the entrance is a little too small, and is encumbered somewhat by the door opening on to that of the lavatory, and we are not so sure that a w.c. so close to the main entrance is not a mistake. Its window is so much in evidence; but if we locate it round the corner the balance in the composition of the entrance is lost. The hall is roomy, and the staircase is well out of view from the entrance. The kitchen is very much cut up by doors, and is none too large. The outbuildings, including a "bike" shelter, are thoughtfully made out, and do not necessarily intrude the domestics upon the enjoyable use of the little garden when the family are out there. The bedrooms open off a corridor, and all have fireplaces. The bathroom and closet are situate over the scullery, and a good cistern-room is managed above. The staircase-hall is tastefully treated. Economy has been well-considered, though we scarcely think £2,000 would pay the total cost.

"Pantile" wastes valuable space in passage, hall, and landing. He manages his study on the ground plan, and has two staircases. In these head room has not received that close attention which is needful. The ground-floor w.c., next the garden entrance, would be very low, and a tall man could not get up to the attics, as the section makes manifest. The top floor bedrooms are not actually so spacious as the plan indicates, owing to the slope of the roof timbers. The hipped roof on the side does not project enough for good effect from the front and rear gables. The design is pretty in some respects, and is broadly treated, considering a somewhat too evident attempt after the picturesque, which rather mars the building in our opinion.

"Petticoats" hardly does himself justice, and does not economise the superficial areas of his passages; but there is always a charm in a long, low, straight ridge-line. Here the uncertain manner in which the chimneys occur somewhat spoils the idea, and, considering the site has its narrow end facing the main road, it is more than likely that the reception-room bays would only have a second-rate prospect in the side road. The views seem to suggest a good view over a village-green. "Petticoats" makes a good third, but the author ought to do better things than this.

"By Go" we place fourth, but he is too fond of fanciful conceits, and strives after the symmetrical too evidently to do good work. Still, his plan has merits which we have not overlooked. He is not justified, however, in occupying the whole width of the site, and so making his tradesmen's door open directly from the pavement of the street. We do not like a flash style of draughtsmanship. It is misleading, and not artistic. "Dachs" is a woolly sort of draughtsman, using a too blue ink to reproduce well. We like his side elevation very well, with its two gables grouped together, but the ugly parapet over the eaves is as ungainly as it is unmeaning. The plan is in some ways good, but we do not like the built-in dark staircase, and the way in which the back and main staircase meet on one landing is a great objection. "Bantam" is more ordinary, and we see little to admire in his angle-set stone porch. Still, we think his drawing is marked by indications of better things by far than this maiden attempt. There is at present much room for improvement. "Byd" seems devoid of any sense of proportion in scheming his elevations, bald, bare gables coming over one-sided arrangements of bay windows, so that the gables seem as if their original openings had been bricked up, and other windows cut in afterwards. The plan is not good, and visitors would need finger-posts to enable them to find the main entrance. "And Co." draws but poorly, and plans but little

better; but there is a quaint idea about the grouping of his roof which deserves a note. The main bedrooms are, however, a little better than attics, and few City gentlemen would care to build such a house in the suburbs. "Gib" is not devoid of merit, but his plan shows little attempt to get away from the everlasting villa type. His perspective is brightly drawn, and the eaves give good shadows. "Turret" gives us a design which might pass muster for a bungalow, and the hall runs up on two floors most wastefully. Oddly enough, the main feature in the upper hall is the linen cupboard. The three gables on the return front are pretty, but "Turret" trifles with our judgment when he shows a carriage sweep in front of his entrance in the view while the plan indicates only a 5ft. space. "Wessex's" elevation in front looks like a pair of conventional villas. "The Man in the Moon" breaks away from this type of thing, but overdoes his oversailing eaves a little too much for the style adopted. Not that we are inclined to fetter our students by limitations of mere style. Still, a sense of fitness demands some regard to association. In the plan the cellar stairway and kitchen look much too near the drawing-room door for the City gentleman's wife's comfort on "at home" days. "R. W. P.," in a meaningless way, imitates the plastered 4½-brick wall style, with raking or battered chimney breasts and buttresses supposed to represent the massive rubble mode of old village buildings. To our taste this looks more like the sandpaper toy style of house-building more befitted to nursery books in illustration of the domicile of "Old Dame Trot." "Ard" draws in a coarse way which we cannot admire, and he makes his main front at the side, the garden entrance being towards the west. The tall chimneys look overdone. "Checkmate" is quiet and unambitious, giving us a building in what some would call the "Parsonage" style. There is little to find fault with, and not much to greatly admire. The author ought to do better before long if he will take good models as his guide. "Chameleon" makes a house which rather looks like a small public institution of quaint proportion and a pronounced eaves-line. The passage, which cuts the plans in half, is a very ungainly feature. "Orb" shines with no unusual brightness, and his design looks far too costly for the money limit imposed by our instructions. The plan is ingenious, and the grouping is picturesque. We shall expect the author to rank far higher another time. "Bonum Consilium" puts his doorway in the centre, and, after limiting himself by this common device, works out a somewhat convenient plan, nearly scoring a success, but his ground-floor windows, on which the façade so much depends, are not pretty, and the drawing is but indifferent. "Wen's" plans are far better than his elevations, though the ingle-nook in so small a hall is distinctly out of place. Externally, the building looks too much like two houses. "Ant" does not illustrate his design to any advantage, though here and there an artistic touch is discoverable. The breadth displayed in the design, for example, is welcomed, though the windows are too low and small for health and comfort. We shall look to "Ant" to contribute among the leading members of our club; but, to do this, better planning and better drawing will be needful. "Grip" draws with much neatness, and arranges his house with economy and care. His breakfast-room is contrived at a higher level than the ground-floor rooms, and so the author gets a cellar in a sort of half-basement; the way down to it, however, is immediately in view of the front door. The elevations are not very attractive; but they are simple and suitable for the money limit. "Klondyke" in some ways is more effective in respect to the external treatment, but his plan is far inferior. The author has not scamped his work, and we desire to urge him on in these competitions, for he does know how to try. "Kirby Hall" is the ambitious motto of another member who has clearly done his best, sending a well-considered plan with a kitchen nicely isolated, which is always a difficulty in a small house. His perspective spoils his design. "Spinningdale" comes next, and then "Hotspur," whose house looks very big for the money—a square Georgian building, uncompromisingly plain, gable one end, and hips to the roof at the other. "Ivy's" plan is roomy and square, with an inoffensive elevation. "Gossip" cramps his kitchen badly, and, externally, his bays are poor. "Vim" is ambitious, and so introduces an octagonal turret. He wastes space on the first floor meaninglessly. "Microbe" is another angle-tower man, favouring us with an extinguisher-like roof. His living-room is not the chief apartment in the house as required by our conditions. "Eldon" knows the value of ample wall space, and shows a degree of quaintness which is noted, but his drawing leaves much to be desired; his hall is wasteful. "Spark" will not set the Thames on fire if he does not do better than this, though his plans have several points of merit, and his perspective is freely delineated, too freely to be vertical, in fact. Space prevents our enumerating more than the mottoes of the remaining designs, which we do in their order of merit:—"Phantom," "Strax," "Pup," "Bernard," "Don," "Solo," "Bull's-eye 5," "Bee," "Stone," "Olliwops," "Wun-hi," "Industry," "Chuckle," "Crow," "Spero," "Pen and Ink," "Cobden," "E. G.," "Auld Syne," "Hubert," "Derige," "Medusa," "Oak," "Nowhere," "Simplicity," "Eric," "Vita," "Spectator," "Chess," "Suburb," "Inexperienced," "Bow Bells."

THE STABILITY OF SOILS.

A MEETING of the Bristol Association of Engineers was held at the Queen's Hotel, Clifton, last week, under the presidency of Mr. H. W. Pearson, when Mr. A. P. I. Cotterell read a paper entitled "The Stability of Structures in Contact with Soil and Similiar Material." He said his object was to bring forward a more accurate and scientific method than that generally followed of calculating the dimensions necessary for stability in structures in contact with soil and similar material, such as clay, sand, gravel, and, in fact, all substances that are capable of assuming an angle of repose. Having explained the ellipse of stress, he said by means of this ellipse certain fixed formulæ might be obtained applicable (1) for calculating the depth to which a wall or other structure must be carried to secure a stable foundation, (2) the thickness to which a retaining wall should be built to prevent its being overturned by the pressure of the soil. In the latter case the pressure would be found to vary according to the way in which the earth was sloped behind the wall, and the thickness must be varied accordingly, being greatest where the wall was surcharged by earth standing at a steep angle behind it. There were other conditions to be taken into account in designing foundations and walls, such as the compressibility of the earth causing a possibility of settlement, and in piled foundations the skin friction of the piles. The stiffness of retaining walls might also be increased by the use of counterforts which key back into the soil. All foundations should be at such a depth as to be safe from the effects of frost and drought. In cities the effect of closely-packed buildings was to increase the bearing power of the soil, and to render land formerly unfit to carry buildings sufficiently stiff to do so. It is a curious fact, explained by the ellipse of stress, that the soakage of oil into engine foundations was likely to make them settle. In designing both foundations and walls, the subsoil should be geologically studied, as a rocky base might easily have a softer stratum under it. Great interest attached to the tall buildings erected in America, some of these 20 and 22 stories in height. Those in Chicago were built upon the clay, the rock being at a prohibitive depth. The foundations were spread over as large an area as possible by means of steel joists imbedded in concrete so as to give a bearing pressure of not more than 4,000lb. per square foot. Even with this, settlement of six or more inches was always expected, and the footings were constructed to allow for it. It would be found that when the ellipse of the stress was used for calulating walls and foundations, greater accuracy was secured, and there was far less chance of settlement.

AN ARCHITECT'S EXPERIENCES.*

AN autobiography is perhaps less appreciated by the reviewer than many others. It seems to defy analysis, because we cannot go behind an author's own personal mind and experience, and we can only deal with it as a narative of impressions felt by one mind, and, therefore, not amenable to ordinary rules of criticism. Mr. Alfred Darbyshire, F.S.A., F.R.I.B.A., has written his experiences—professional, artistic, and theatrical—and we must accept them as embodying the life and career of an architect in a large and varied practice in Manchester. Articled to Mr. P. B. Alley, of that city, at a time when there were few architects practising there, he had a good opportunity of acquiring a practical knowledge of the profession. The firm of Lane and Alley, a curious combination of names, had been well known as Classic architects of Manchester, and it was in this school that the author received his first impressions of architecture. While this firm tried to Classicise every building, Mr. Edward Walter, to whom is due the credit of introducing the Italian Renaissance, did much to foster a more appropriate and elastic style in the streets of Manchester, and many of his great warehouse façades are still pleasing examples of that revival. The Gothic Revival which followed was reserved for Mr. Waterhouse, R.A., and his followers. Mr. Darbyshire chats freely and pleasantly of friendships he formed at this period, and of the opening of the great Art Treasures Exhibition in Manchester of 1857; and it was here, he says, he became impressed with the beauty of the Pre-Raphaelite School, and formed pleasant relations with some of that brotherhood, and also with the late Lord Leighton, P.R.A., whose great picture of the "Procession of Cimabue's Madonna," hung in this Exhibition, and the influence of this wonderful art revival helped, he says, to shape out his "future line of art." During his pupilage our author became associated with many young men who have since become eminent in art, amongst them Arthur H. Marsh, now a member of the Royal Water-Colour Society, Joseph Knight, now a member of the R.I.P. Many well-known painters were connected with the Manchester School of Art and other local societies, and a good photo-block portrait of Frederick Shields, A.R.W.S., is given. Mr. Waterhouse, R.A., who commenced his career as a Gothic architect in the "fifties," is not overlooked. Mr. Darbyshire's professional work in enlarging the Prince's Theatre, for the late Mr. Calvert, was the beginning of his connection with theatre construction and the art of the stage, and several chapters are devoted to this subject. The author's plans for the Manchester abattoirs, which were successful, are described; also his work at the Lyceum for Sir Henry Irving, and his connection with this theatre brought our author into contact with many illustrious persons; but we must skip many interesting chapters, in which the author refers to many incidents of his professional life, and notably his theatrical experience, safe theatres, and the art of the stage. Mr. Darbyshire touches on a host of incidents and reminiscences, historical, political, and artistic. His connection with stage architecture, his remarks on the Shakespearian drama, the acting of Calvert, Sir H. Irving's rendering of "Hamlet," and the old and modern styles of acting will be read with interest by many for their genial reference to many notabilities of the past and present.

* An Architect's Experience: Professional, Artistic, and Theatrical. By Alfred Darbyshire, F.S.A., F.R.I.B.A. Manchester: J. E. Cornish.

At Tuesday's meeting of the urban district council for Smethwick, attention was called to the large increase in the number of houses in the parish. Mr. T. Potter (Chairman of the Buildings Committee) said the committee had recently passed plans for the erection of 126 houses, and there were about 260 or 280 houses now in course of erection.

Mr. James Green, the arbitrator in the claim for reinstatement brought by Messrs. Gratrix against the Great Northern Railway Company in respect of the demolition of their premises in Alport Town for the purposes of a new goods station in this city, has fixed his award at £56,622. Taking the whole of the various items presented by Messrs. Gratrix, the claim in round figures amounted to about £111,600.

At the meeting of the Bristol Town Council on Tuesday, it was decided to borrow £10,000 for the purpose of extending wood paving to certain streets. Mr. Yabbicom was appointed district surveyor under the Bristol Improvement Acts, and it was resolved that, from Dec. 31, surveyor's fees on buildings which had been chargeable under these Acts should be abolished. Upon this point a memorial was presented from the Bristol Master Builders' Association, and Alderman Proctor remarked it was not often that one was able to return so ready an answer to the requests of memorialists. It was, after a long discussion, decided to increase the salary of Mr. Yabbicom from £500 to £800, and afterwards, by yearly instalments of £100, to £1,000 per annum. Mr. Ashmead's services will be retained as consulting engineer at a salary of £500 a year.

THE LATE MR. JOHN L. PEARSON, R.A.

THE rapidly dwindling school of Gothic Revivalists has lost its most distinguished exponent, by the death, at the age of fourscore years, of Mr. John Loughborough Pearson, R.A., F.S.A. The eminent ecclesiastical architect, whose decease will be widely regretted in the profession, had only been ill a week, and passed away at his residence and office, at 13, Mansfield-street, W., on Saturday. Mr. Pearson, whose portrait we gave in our issue of Jan. 3, 1890, was born in Brussels on July 5, 1817, being the youngest son of William Pearson, water-colour painter, of Durham. At the age of 14 he was articled to Ignatius Bonomi, architect, of the latter city, and, after spending a short time with Anthony Salvin, he became an assistant to Philip Hardwick, R.A. In his last years in that office, 1843, Hardwick was erecting the hall of Lincoln's Inn, and Mr. Pearson was engaged both upon the drawings of that building and the superintendence of its execution. The same year he commenced private practice, and the Rev. C. Townsend (in whose Sunday School at St. Margaret's, Durham, he had been superintendent for two years) intrusted him with the designs for a small new church, St. Ann's Chapel, Ellerker, East Riding. Some signs of the individuality, power, and grasp of Gothic details and grouping which afterwards distinguished Pearson's work are to be seen in this little building, consisting as it does, but of a nave, chancel, and south front, the west-end wall only pierced by a pair of lancets, and surmounted by a simple bellcote. Other small churches were built from his designs at Elloughton and Ellerton, and a somewhat larger one at North Ferriby; while seven or eight churches in the immediate neighbourhood on the banks of the Humber were restored under his supervision. In 1850 he commenced for Archdeacon Bentinck the church of Holy Trinity, Bessborough Gardens, Vauxhall Bridge-road. In all its details it is a conventional rendering of the Decorated style, but makes a new departure in plan, in the chancel being of greater width than the nave. This church gained him encomiums from Barry, Pugin, and Scott, the latter declaring it to be "the best modern specimen of a 14th-century English church." Pearson's style was profoundly affected by the publication of Viollet-le-Duc's "Dictionnaire Raisonnée d'Architecture," and henceforth his work depended largely for effect on strong lines and broad proportions, with a sparing use of modified Early French detail, but in later years there was a partial return to English features. Following on his schools for St. Peter's, Vauxhall, noteworthy as the site of the first memorial-stone laid by the Prince of Wales, he designed for the present dean of St. Paul's, Dr. Gregory, the church itself — the first modern example of a brick vault on stone ribs, and a treatment he subsequently adopted for all his larger churches. Before he received the commission for St. Peter's, Vauxhall, he had been induced to study very carefully the principles of Gothic vaulting during the restoration of Stow Church in Lincolnshire. Here the vault had fallen, as the unbuttressed walls were not able to withstand its thrust. Mr. Pearson surmounted the difficulty by building the lower part of the groin in solid courses, with horizontal beds, so forming a counterpoise of sufficient weight to withstand the thrust of the arched vault. The discovery of this mechanical contrivance greatly influenced his subsequent designs, as by its aid he was able to build vaults of wide span without the assistance of the great arched buttress which is so conspicuous a feature in French churches, and so apparently defying the law of gravity. Among other early works were Ireberfydd House, South Wales, and Quar-wood, Gloucestershire. In 1870 he was appointed architect to Lincoln Cathedral, and in the following year he designed the great church of St. Augustine, Kilburn, the most important of his parish churches, and now being completed by the erection of the great tower and spire. The well-known church of St. John the Evangelist, Red Lion-square, another plainly-treated 13th-century design, carried out in red brick with slate roof, followed, and at somewhat later periods, St. Michael's, Croydon, St. John's, Upper Norwood, and St. Alban's, Birmingham—all cruciform, vaulted, brick churches, with aisles and side chapels, and simply-treated fenestration. He also carried out Headingley Church, near Leeds, with its two unequal aisles and a tower and spire carried on detached piers within the nave, and rising to 200ft. in height; St. Stephen's, Bournemouth; St. Agnes', Toxteth Park. Among domestic buildings may here be named Lechlade Manor House; the reconstruction of Westwood, Sydenham (a Renaissance building); Lord Armstrong's Northumbrian seat, Craigside; and St. Peter's Convalescent Home, Woking.

On the death of Street he was appointed architect to the Dean and Chapter of Bristol, and has completed the nave of the cathedral, with its western towers, and also designed the new reredos. He was also architect to Rochester and Chichester Cathedrals, and was at the time of his death engaged in preparing a design for rebuilding the north-western tower to the latter fabric, while his report for the eastern extension of Wakefield Cathedral Church as a memorial to the late bishop, Dr. Walsham How, appears elsewhere in our columns. He was also consulting architect to Exeter and Gloucester, and was one of the consulting architects to the Church Building Society. His successful and careful work in the conservation of Peterborough west front, and the newspaper controversies the resetting of the masonry gave rise to, will be fresh in the recollection of our readers, and, unlike many of the earlier Gothic revivalists, he never allowed himself to be entangled in public correspondence, nor replied to the oftentimes obviously unfair and ill-informed criticisms upon his work.

His great memorial will, however, be the new Cathedral at Truro, where, even in its present unfinished condition, his success in dealing with the difficulties of the plan arising from the retention of the old parish church as a south aisle, is very striking. On May 20, 1880, the foundation-stone of Truro Cathedral was laid by the Prince of Wales, and on November 3, 1887, the first portion of the building was consecrated. At present the central tower just shows above the roof, and only two bays of the nave have been completed, though the foundations of the nave have just been put in as the beginning of a memorial to the late Archbishop Benson; but the design includes a central and two western towers and spires, an octagonal chapter-house, and a small, irregular cloister.

Among his other works must be named the restoration of the upper part of the north transept of Westminster Abbey, the doorways having been previously restored under Sir Gilbert Scott; the renovation of the south aisles to nave and choir; the alterations to Westminster Hall, completed in 1884; and the new wing to University Library, Cambridge, built two years later, and additions to the colleges of Sidney Sussex and Emmanuel in the same university town. Besides these he carried out a large number of vicarages and schools, as well as many mansions, country seats, and private residences. His latest works are the charming Astor Estate Office at the foot of the Temple steps, on the Embankment; a cemetery chapel at Malta; the Catholic Apostolic Church at Maida Vale; a rood screen and chapel at All Saints', Maidstone, a 15th-century collegiate church he restored a dozen years since; and All Saints' Church, Hove, which we shall illustrate in an early issue.

Mr. Pearson, who had long been a Fellow of the Society of Antiquaries, became an Associate of the Royal Academy in 1874, and a Full Member in 1881. He joined the Royal Institute of British Architects as a Fellow in 1860, being No. 39 on the present roll of membership, and in 1880 received the distinction of the Royal Gold Medal, a year when he was serving on the council of that body. At the Paris Exhibition of 1878 he was awarded a gold medal and the knighthood of the Legion of Honour.

He married in 1862 Jemima, youngest daughter of Henry Curwen Christian, who died three years later, leaving an only son, Mr. F. L. Pearson, who follows his father's profession.

The funeral took place at noon yesterday (Thursday) in Westminster Abbey, for so many years under Mr. Pearson's care, and was very numerously attended by professional colleagues and other friends. The first part of the service was held in the choir, and was fully choral. After Schubert's Solemn March had been rendered on the organ by Sir F. Bridge, the well-known sentences of the Burial Service were sung to Purcell's chant by the choir, and the funeral procession then moved forward into the space under the lantern, while the Lesson was read from the altar steps by Canon Duckworth. The chief mourners were Mr. Frank L. Pearson (son) and Mr. Henry Christian (brother-in-law), Mrs. Christian and daughters. The coffin, a massive one of oak, with a cross on the ledger lid, bore the inscription: "John Loughborough Pearson, R.A., Surveyor of the Fabric, Westminster Abbey. Born July 15, 1817. Died December 11, 1897." It was almost laden by wreaths and offerings of flowers. The pall-bearers were the Bishop of St. Andrew's (Dr. G. Howard Wilkinson, second Bishop of Truro), Sir Edward J. Poynter, P.R.A., the Right Hon. George Shaw-Lefevre, M.P., Mr. Alfred Waterhouse, R.A., LL.D., Professor George Aitchison, A.R.A., P.R.I.B.A., the Dean of Peterborough (Dr. W. Clavell Ingram), the sub-Dean of Lincoln (Rev. J. Clements), Sir Arthur W. Blomfield, A.R.A., and Mr. T. G. Jackson, R.A. Among those present in the choir and transepts were Sir W. B. Richmond, and Messrs. W. J. Yeames (treasurer), H. H. Armstead, Thomas Brock, F. Goodall, W. W. Ouless, R. Norman Shaw, Hamo Thornycroft, J. W. Waterhouse, and H. T. Wells, Royal Academicians, and Mr. F. A. Eaton, secretary, representing the Royal Academy; Messrs. H. L. Florence, Alexander Graham, E. A. Gruning, and Aston Webb, vice-presidents, James Brooks, past vice-president, William Emerson, hon. secretary, and W. J. Locke, secretary, a deputation from the Royal Institute of British Architects; Mr. G. B. Carvill (formerly in Mr. Pearson's office) and Mr. B. Flight Fletcher, representing the Architectural Association; Mr. J. P. Seddon and the Rev. R. M. Blakiston on behalf of the Incorporated Church Building Society, and Messrs. R. Phené Spiers, F.S.A. (of the Royal Academy Schools), W. D. Caröe, F.S.A. (former assistant), J. A. Gotch, F.S.A., E. T. Hall, John Slater, Paul Waterhouse, C. Forster Hayward, F.S.A., Professor T. Roger Smith, William White, F.S.A., L. Stokes, H. P. Burke-Downing, Alex Payne, John Norton, J. J. Stevenson, Lacy W. Ridge, and T. H. Watson and other architects; Mr. H. C. Richards, M.P., Mr. Wright, clerk of works at the Abbey, and among the clergy there were Canons Furze, Wilberforce, and Gore, and the precentor, the Rev. Dr. Troutbeck, by whom the musical arrangements were conducted. The Lesson having been impressively read by the sub-dean, Canon Duckworth, S. S. Wesley's anthem "All Go to One Place" was rendered by the choir, and the procession was reformed and returned through the choir to the nave, where on the south side, close to the pulpit, a wide space on the floor had been draped with black and white cloth, containing the grave space in the centre. The site is close to the resting-places of Mr. Pearson's immediate predecessors in office—Sir G. Gilbert Scott and George Edmund Street. Here the concluding portion of the service was read by the Dean, Dr. Bradley, and the body having been reverently committed to the grave, Dyke's well-known hymn, "Now the Labourer's Task is o'er" was sung, and the benediction having been pronounced, the familiar strains of the Dead March in *Saul* pealed forth from the organ.

On Saturday Lady Evelyn Cavendish laid the foundation-stone of a new church at Flockburgh, Lancs. The new building will accommodate 650 persons, will be Early English in style, and is estimated to cost £8,000. Messrs. Paley and Austin, of Lancaster, are the architects.

New business premises are in course of erection in Moor-street, Birmingham, for Messrs. Coleman and Oldland, wholesale clothiers. The architect is Mr. John Statham Davis, of Cobden Buildings, Corporation-street, and the contractor Mr. William Hopkins, of Thorpe-street, both of that city.

A family memorial has been placed in the east window of the chancel of Ellerker Church, Brough, by Mr. N. M. Levitt to the Marshall and Levitt family, designed and executed by Mr. T. W. Camm, of the studio, Smethwick, near Birmingham, the subject being the Ascension, which occupies the whole of the three lights and tracery.

The members of the Scarborough Master Builders' Association dined together at the Albemarle Hotel, on Wednesday evening. The chair was occupied by the president, Councillor Bland. After the loyal toast, that of the "Builders' Association" was proposed by Mr. Sinclair, and responded to by the chairman. The "Town and Trade of Scarborough" was proposed by Mr. Peckett, and responded to by Mr. Abraham Moore, who dwelt on the extensive improvements which had been carried out, and the growth of the town, which had been largely assisted in its development by the builders present. Songs were sung by the members present accompanied by the secretary of the association, Mr. R. H. Carr.

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ILLUSTRATIONS.

THE LONDON SCHOOL OF MEDICINE FOR WOMEN.—ENNISKILLEN TOWN HALL.—THIRD PREMIATED DESIGN FOR THE BURY FREE LIBRARY AND ART GALLERY.—DESIGNS FOR A SUBURBAN RESIDENCE.—STAIRCASE AND HALL IN HOUSE AT BERLIN.

Our Illustrations.

LONDON SCHOOL OF MEDICINE FOR WOMEN.

The school has been established in Handel-street, Brunswick-square, for about 25 years, and, from comparatively small beginnings, has gradually increased in size and importance till it has outgrown its present accommodation. New premises have, therefore, become necessary, and the Council have begun the entire rebuilding of the school on its present site. When completed it will form three sides of a quadrangle, the principal entrance being in Hunter-street. On this, the west side, will be the hall and staircase, the boardroom and secretary's office, the students' common-room, and refectory; the Anatomical and Materia Medica Museums, the Pharmacy and other Classrooms, with the caretakers' and servants' rooms and kitchen in the basement. On the south side are the students' general cloak-rooms and dressing-rooms, the Biology Laboratory, the Library, and Lecture Theatres. On the east side are a series of Laboratories for physics, chemistry, physiology, and anatomy; this latter block is being erected first, and is now being roofed in. The contract has been taken by Messrs. Holloway Bros., of Victoria Works, Battersea. The materials used externally are red-facing bricks, with Portland stone dressings, and red tiles for the roofs. Internally, the several laboratories will be fitted and furnished with all the latest appliances for their special purposes, so that, when finished, it is hoped the institution will be one of the most completely and thoroughly equipped schools in London. It has been designed, and is being carried out, under the superintendence of Mr. J. M. Brydon, architect.

NEW TOWN HALL, ENNISKILLEN, CO. FERMANAGH: SELECTED DESIGN.

This is the design which was placed first in the recent competition for a new town-hall at Enniskillen. The building is now in course of erection. Accommodation is provided for the usual municipal offices, comprising council chamber, clerks' office, and chairman's room or Mayor's parlour, borough surveyor's and collectors' offices, and a public reading-room and book store. There is a large assembly hall for public entertainments, with stage and dressing-rooms, having separate lavatories, and another hall for smaller gatherings. Lavatories are provided on the different floors. The staircase will be of marble, and the floors of the entrance halls and corridors of iron and concrete, finished with Stuart's granolithic. The external face of walls is of Carrick-Creagh limestone, with dressings, cornices, &c., of Dungannon sandstone. The roofs are covered with Westmoreland slates, and the domes of tower and vent flèche with copper. Messrs. Anthony Scott and Son, of Drogheda and Navan, are the authors of the design, under whose superintendence the works are being carried out by the contractor, Mr. James Harvey, of Enniskillen.

BURY ART GALLERY AND PUBLIC LIBRARY: THIRD PREMIATED DESIGN.

We have already illustrated the selected design, as well as that for which the second premium was awarded. To-day we give the view and plans of Mr. John Johnson's design, to which the third prize was given. The plans display a practical knowledge of the requirements conveniently worked out with a careful reference to ample lighting, as well as a squareness of proportion which looks straightforward and is easy of administration. The perspective accompanying the plans will enable our readers to compare the relative attractions of the three premiated designs by placing all three views side by side. The first prize drawings appeared in our pages on the 3rd inst., and the second prize plans were published last week.

"BUILDING NEWS" DESIGNING CLUB: A SUBURBAN RESIDENCE.

For description and awards see p. 864.

STAIRCASE HALL IN A BERLIN HOUSE.

The sketch which we give this week shows the picturesque treatment of a staircase in a house situated in the Fasenenstrasse, Berlin, by Herr Hans Grisebach, architect. The balustrade to stairs and landing above is richly-carved with panels of cupids and dolphins, &c. The dado round hall is elaborately decorated, and near the door to the left a wooden statue of the Virgin and Child is attached to the wall.

CHIPS.

At the Workington Town Council on Tuesday night a resolution was passed pledging the town to subscribe £150,000 towards the making of a deep-water dock. This is an addition of £50,000 to the resolution carried on November 25, and has been found necessary owing to the increase in the estimates.

The benediction of the church-house for Old St. Pancras, which has been built from plans by Mr. C. R. Baker King, of Spring-gardens, took place on Saturday last.

The Archbishop of York on Saturday consecrated St. Peter's Church, Bentley, which has been erected at a cost of about £10,000, contributed by Mr. C. E. S. Cooke, of St. Catherine's, Doncaster.

Peterhead Town Council, at a private meeting on Monday night, had under consideration a recommendation of the finance committee that Mr. Geils, burgh surveyor, be asked to resign office within three months. There was practical unanimity in adopting the course suggested by the finance committee.

On Friday a special meeting of the Poole Town Council was held to consider a report from the sewerage committee relative to the stoppage of the sewerage works consequent upon the determination of the contract with Mr. Reeks. The committee recommended the council to invite tenders for the execution of the unfinished work, and this was agreed to.

The Berkhamstead Rural District Council having applied to the Local Government Board for sanction to borrow sums of £7,814 and £3,186 for purposes of sewerage and sewage disposal for the parishes of Berkhamstead and Northchurch, an inquiry was held last week by Mr. George W. Willcocks, M.I.C.E., accompanied by Mr. Boulnois, in reference to the application. Some opposition was raised to the proposed outlay.

Mr. A. Bowes, of the borough engineer's office, Salford, has been appointed surveyor to the urban district of Newton-in-Makerfield, out of a large number of applicants.

Colonel Yorke, as representing the Board of Trade, on Saturday made an official inspection of the extensions which have recently been made on the Edinburgh tramway system (1) from the railway bridge at Coltbridge to the burgh boundary at Corstorphine; (2) from the Suburban Railway bridge at Gorgie-road as far as Balgreen-road; (3) from the Braid Hills Hotel to the golf course cross-road; and (4) the Craigmillar extension. The engineers, Mr. Cooper and Mr. W. M. Colam, were in attendance.

The Queen of Italy is about to assist materially Italian science by having an observatory built on the summit of Mont Rosa, 14,820ft. above the level of the sea. This observatory will be the loftiest in the world.

COMPETITIONS.

Battersea.—New public baths and wash-houses are to be erected in Battersea Park-road, and, from the 15 designs submitted in competition, the plans of Mr. Francis J. Smith, F.R.I.B.A., of Westminster, have been chosen. The excellence of this plan is undoubted. The second premium has been awarded to Mr. J. Hatchard Smith, of Moorgate-street; and the third place is taken by Mr. A. Hessell Tiltman, of Bedford-row. The three premiated designs are to be on public view at Battersea.

Harrisburg, Pennsylvania.—It will be remembered, says the *American Architect*, that six architects were specially invited to submit designs in the recent competition for the Harrisburg Capitol, and were promised, in consideration of their doing so, compensation to the extent of 1,000dol. each. This compensation is to be withheld from five of the six architects in question, on the ground that, as their designs could not have been executed, without modification, for 550,000dol., they have violated their part of the contract, and are not entitled to require from the State performance of its part. The sixth competitor, whose design could, it is claimed, have been carried out for the sum mentioned, and will, therefore, receive his 1,000dol., is the one whose drawings were excluded from competition by the experts, on account of their violation of the terms of the programme. The Capitol Commissioners have further refused to pay the expert jurors the agreed compensation for the time and trouble which they expended in examining and reporting upon the competitive designs.

Plymouth.—The prize offered by Mr. C. King, chairman of the Three Towns Branch Devon and Exeter Architectural Society, to students of the branch for the best measured drawing of any, or part of any, building, has been awarded to Mr. R. Sims Baker, of St. Blazey, Cornwall, and until lately a pupil of Mr. B. Priestley Shires, A.R.I.B.A., of Plymouth, for his drawing of part of Plympton St. Mary Church. Mr. H. F. Roskruge, a pupil of Mr. H. G. Luff, A.R.I.B.A., of Devonport, obtained second place for his drawing of Maker Church.

The plans of the proposed alterations and additions to the Royal Opera House, St. Leonard's, prepared by Mr. John P. Briggs, of Effingham House, Arundel-street, Strand, have been passed by the Hastings Town Council.

Excellent business was done at the Auction Mart last week, the aggregate realisation amounting to £138,908, and the properties disposed of being of very varied descriptions. Prices were firm, as has, in fact, been the case for some time past. It is now safe to say that 1897 will produce a better record than 1896, although that was a good year.

The parish church of St. Mary Magdalene, Gedney, was reopened last week in the presence of the Bishop of Lincoln, after restoration at a cost of £2,000. The architect has been Mr. W. D. Caröe, F.S.A., of Whitehall. The roof of the nave and north aisle has been releaded throughout, the floors replaced by wood blocks laid upon concrete, the old high pews removed, and the upper part of the tower arch opened out. The work of repair and preservation has been going on for fourteen months.

At the meeting of the parishioners of St. Sepulchre, E.C., on Friday, it was announced that her Majesty's Judges had expressed their intention of approving the plans submitted by the Corporation of London for the erection of a new central criminal court, and the work of demolition would then proceed at no distant date to make way for the new building. The delay has been caused by an endeavour to retain the corner piece facing Giltspur-street as a stronghold for the City of London in the event of any future rioting. It has now been decided to agree to the removal of the portion of the prison referred to, so that the buildings might the more speedily be taken down.

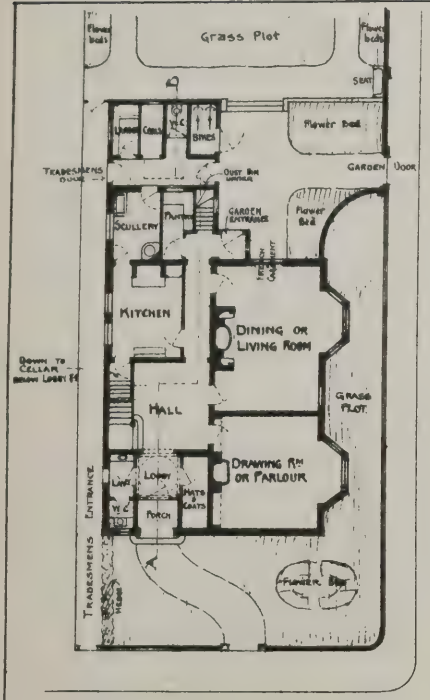
At the last meeting of the Barton board of guardians the workhouse extension and building committee reported that a sum of £30,000 would be required to complete the union hospital at Patricroft. In March, 1896, it was estimated that the sum required for the uncompleted works at the new workhouse would be £15,194. The building committee had been informed by the architect that the price of labour and material since that date had increased by 33 per cent., and this would involve an additional outlay of £5,065. The alteration in the plans made by the Local Government Board, and the extra buildings required to be erected, would necessitate the expenditure of a further sum of £8,320, making a total of £28,579.

STAIRCASE-HALL IN A HOUSE IN FASANENSTRASSE BERLIN HERR HANS GRISEBACH ARCHT.

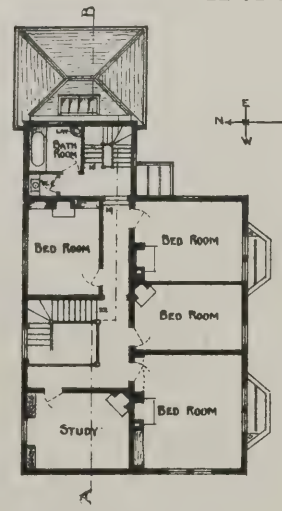
B.N.D.C. A SUBURBAN RESIDENCE. BY "CENTAUR".

Cubical contents roughly about 64,000 feet @ 7½d per foot £2,000.

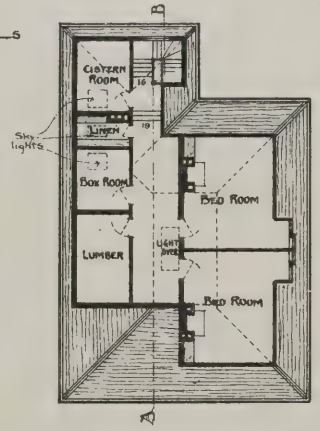
Materials
Red Brick. Tile Roofs. Stone Copings, Cills. Keystones & Chimney Caps. Lead R.W.Ps & Heads. Shutters painted dark green, and remaining exterior woodwork including Main Cornice painted white.



Plan of Ground Floor.

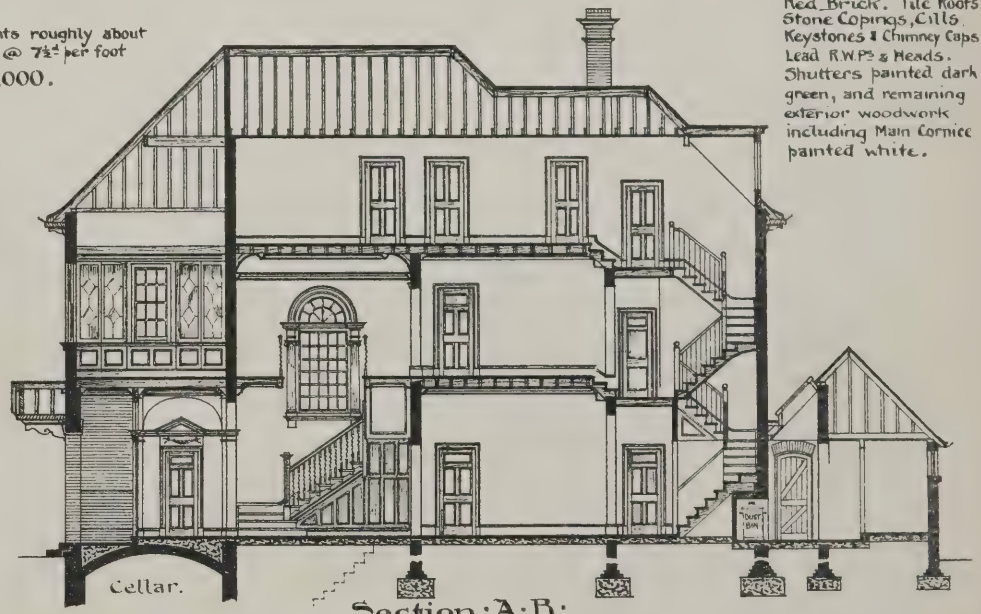


Plan of 1st Floor.



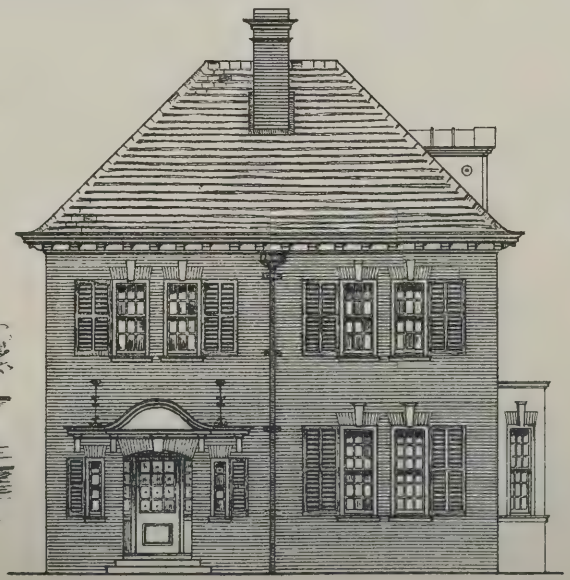
Plan of Attics.

Plans. 10 5 0 10 20 30 40 50 Feet.
Elevations 10 5 0 10 20 30 Feet.

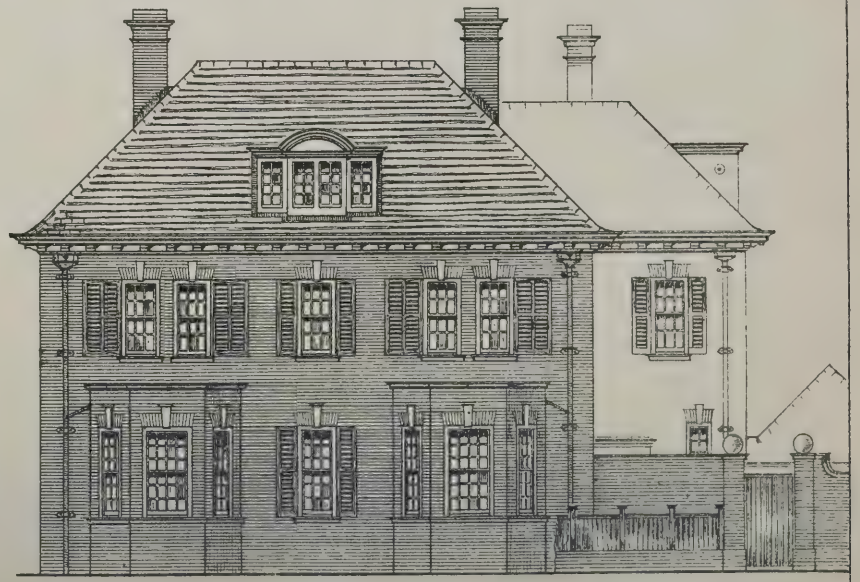


Section A·B·

S.W. View.



West Elevation.



South Elevation.

PLACED FIRST

Nov.r/97.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

Drawn by G. Cattermole.

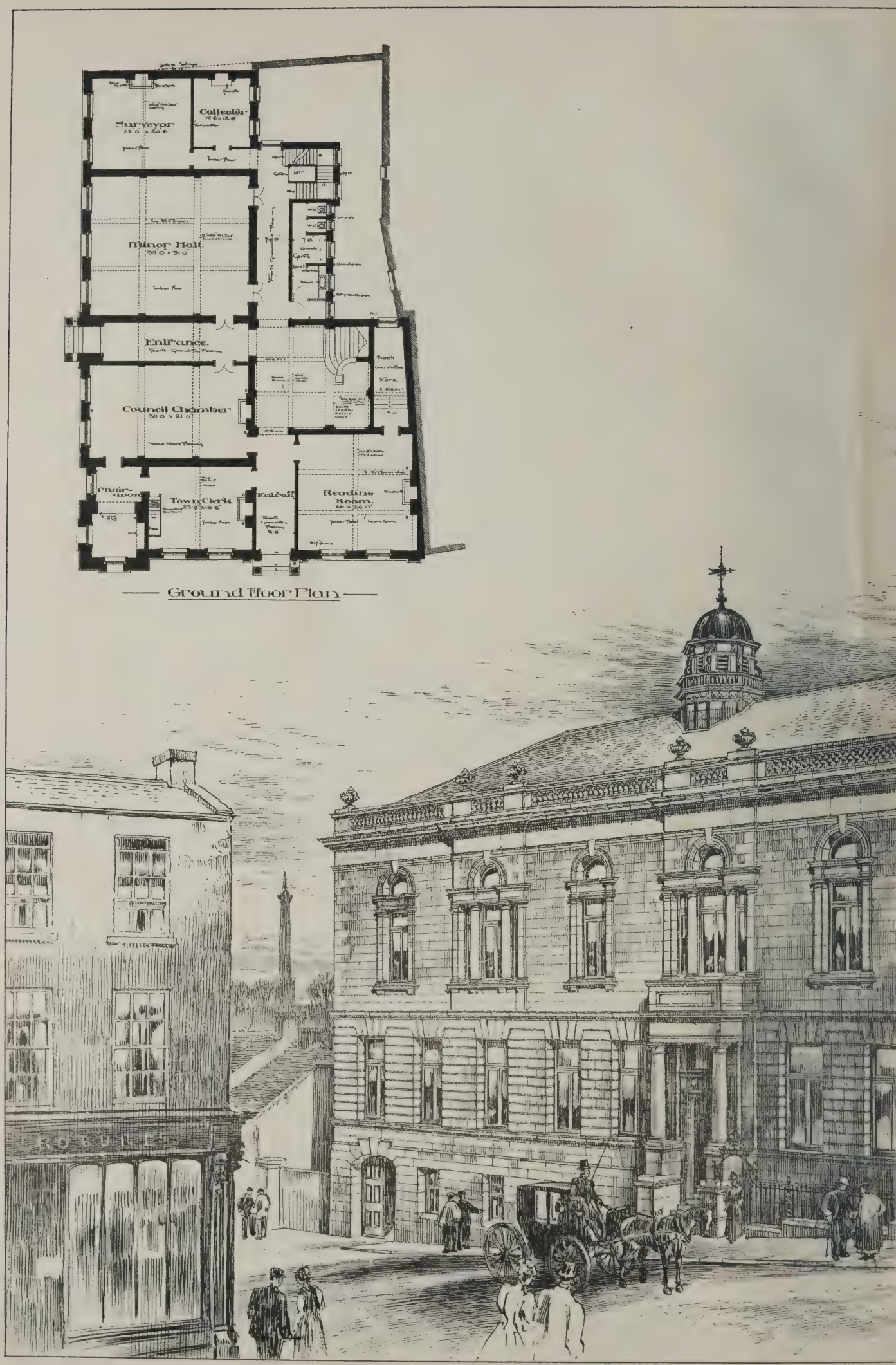
INK-PHOTO. SPRAGUE & Co LONDON

3.—ARCHBISHOP WARHAM.

2.—ARCHBISHOP WARHAM.

1.—ARCHBISHOP CHICHELEY.

CATHEDRAL SERIES, No. 93.—CANTERBURY: EFFIGIES:



NEW·TOWN-HALL· ENNISH

First Floor Plan.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

LONDON SCHOOL OF MEDICINE FOR WOMEN,
HUNTER STREET, LONDON.

J. M. BRYDON F.R.I.B.A. ARCHT.

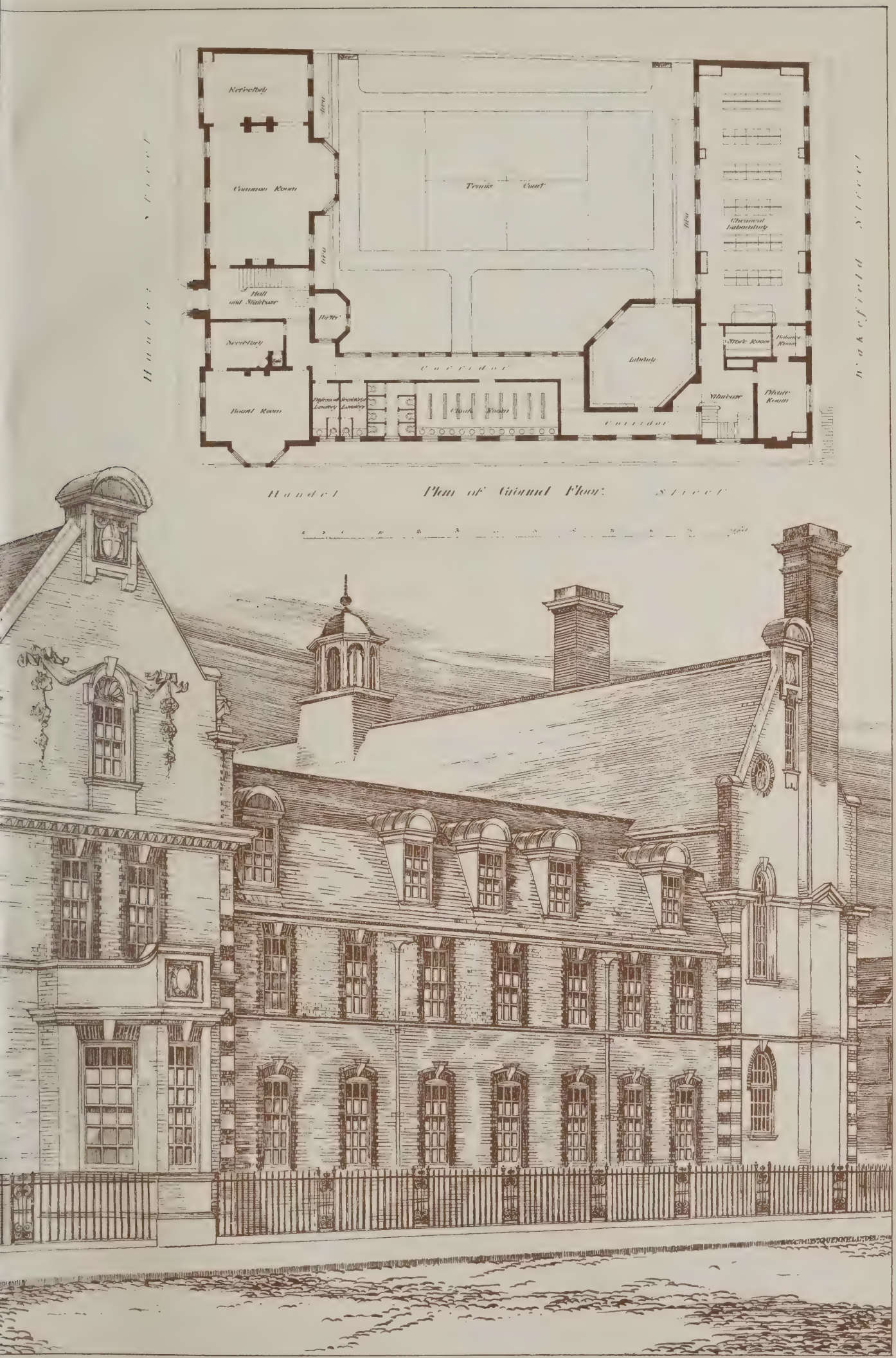
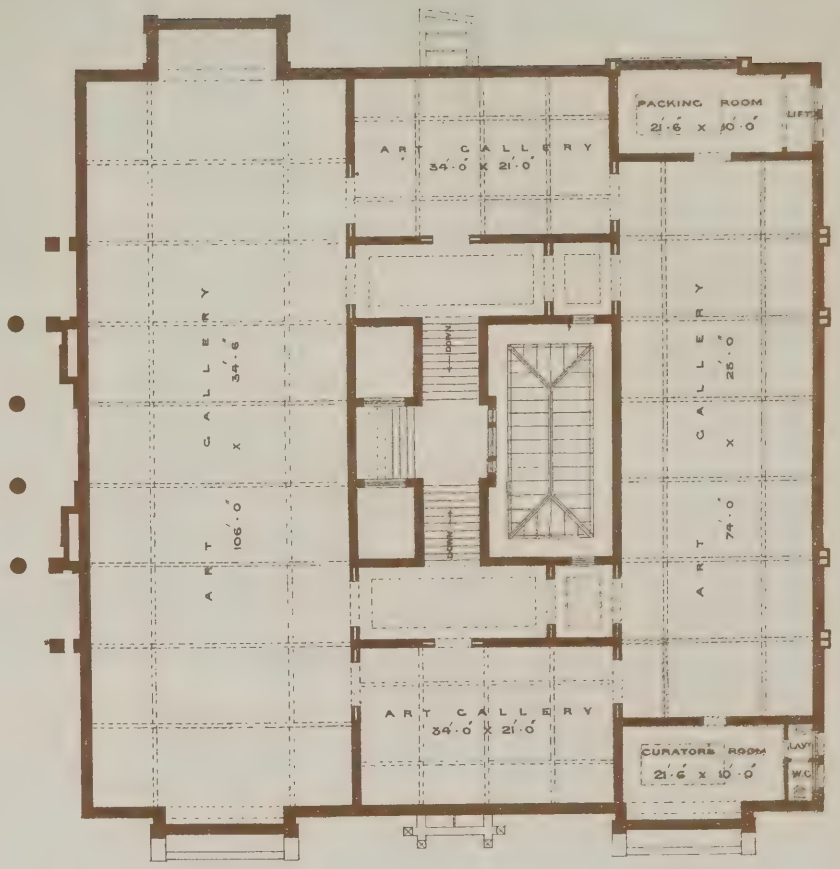


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

THIRD PREMIATED DESIGN BY JOHN JOHNSON ARCHT

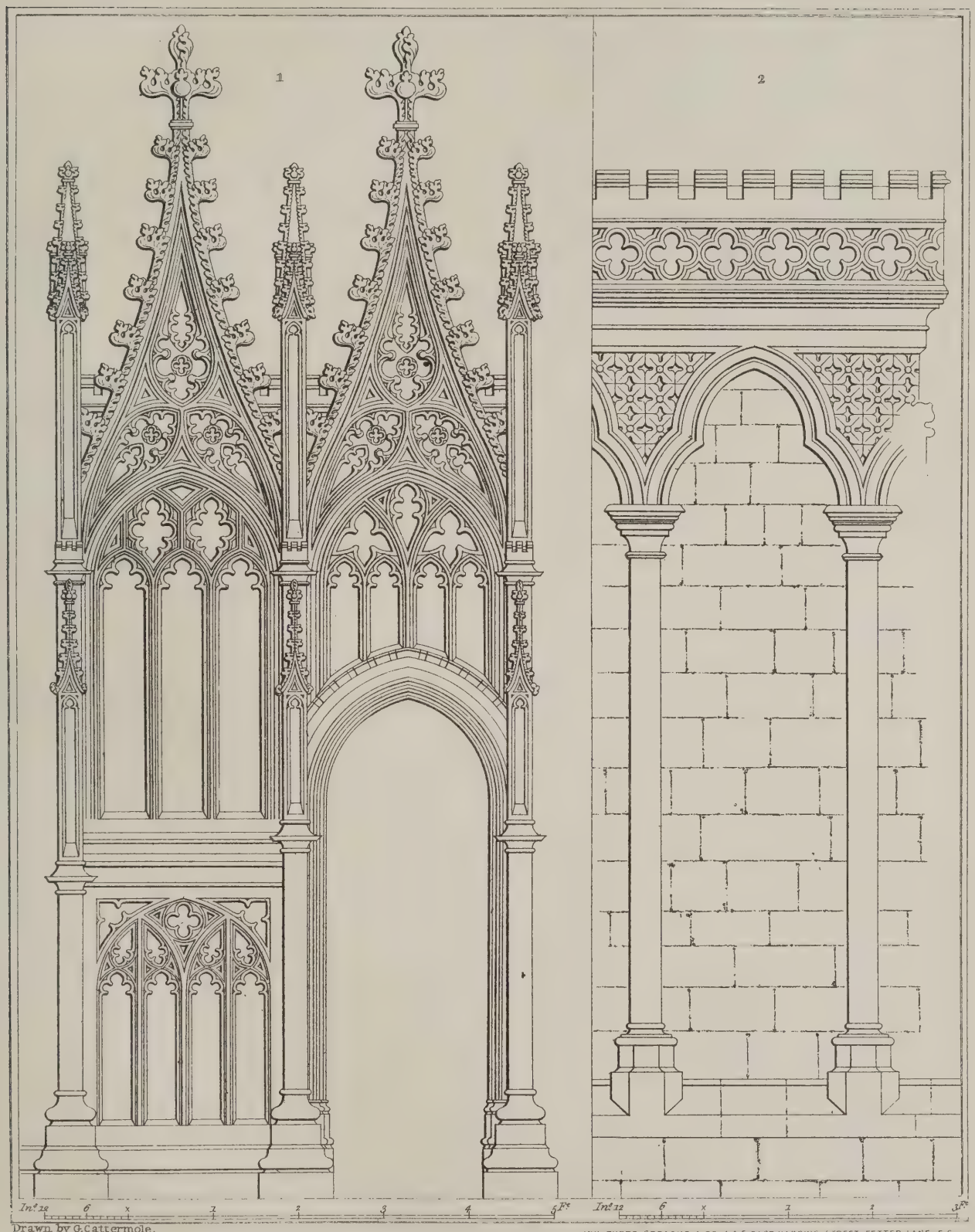
GROUND PLAN



FIRST FLOOR PLAN

SCALE OF FEET

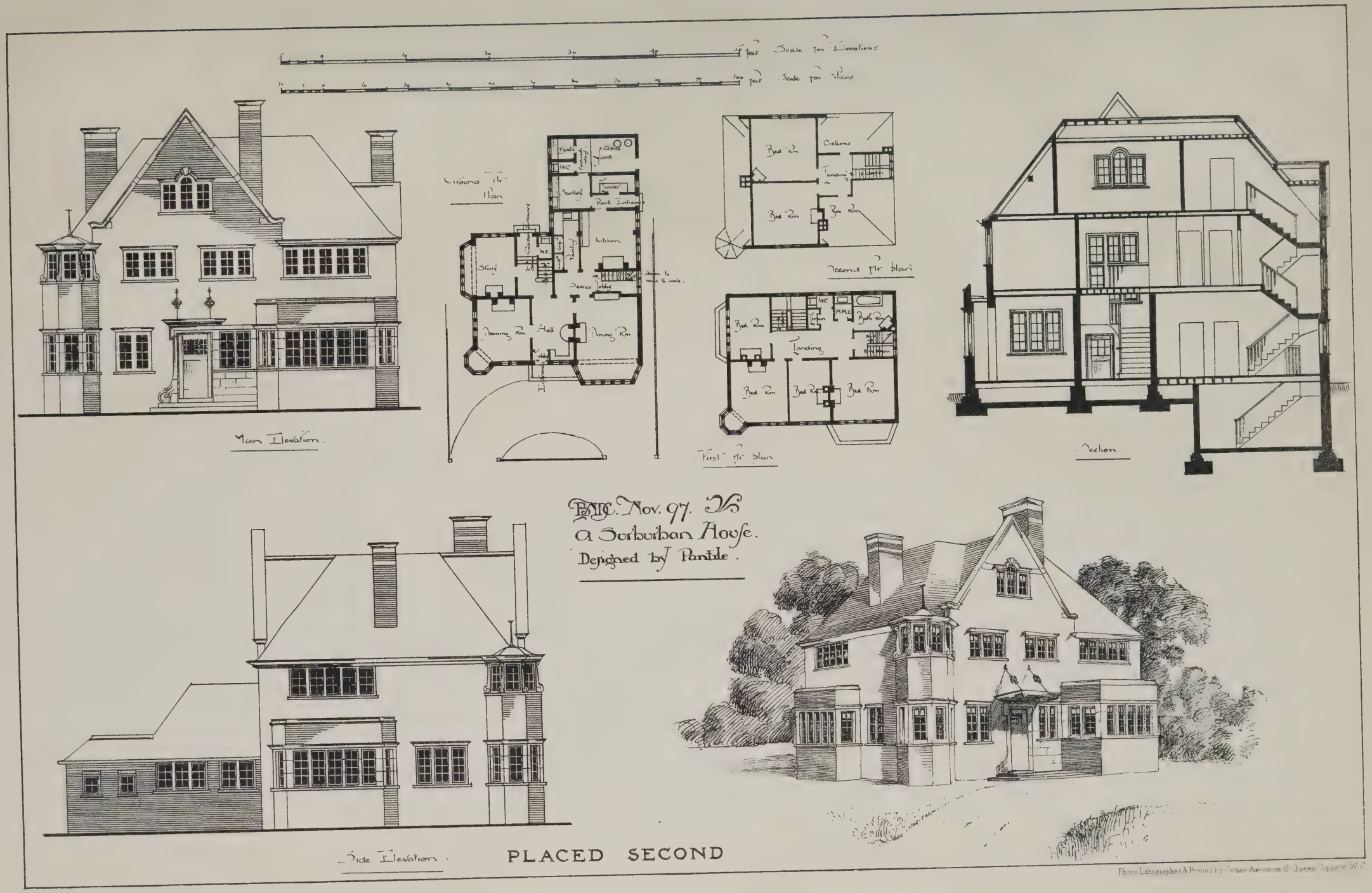
"PHOTO-TINT" by James Akerman, 6, Queen Square, London, W.C.



CATHEDRAL SERIES, No. 93a.—CANTERBURY:

1.—PART OF SCREEN TO DEAN'S CHAPEL.

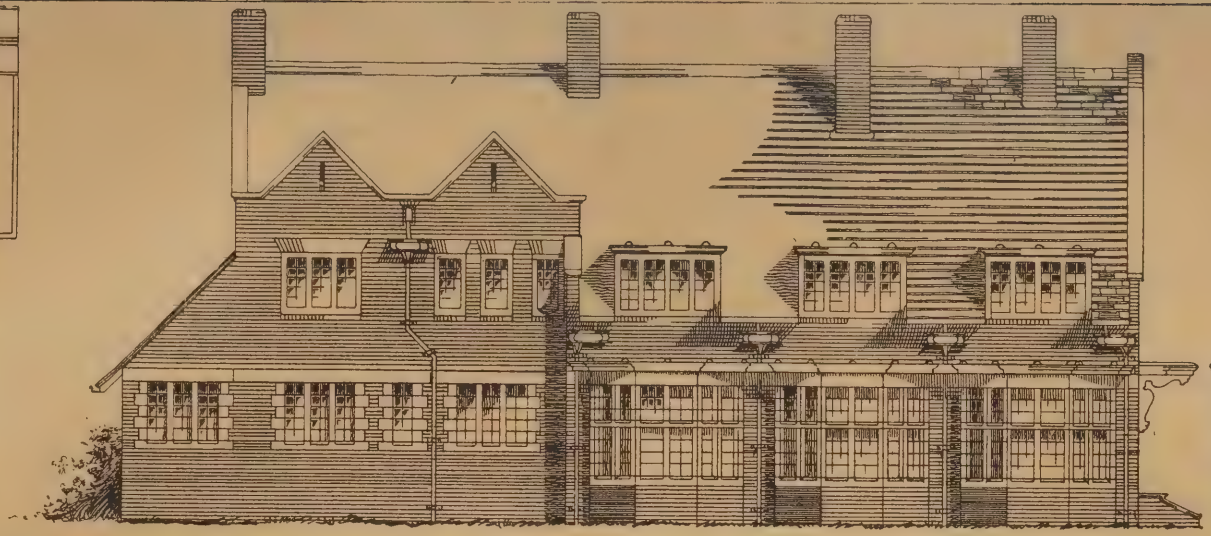
2.—ARCADE IN CHAPTER-HOUSE.



BNC. Nov. 97. 15
A Suburban House.
Designed by Pantile.

Photo Lithographed & Printed by Jones Akerman 6 Queen Square W.C.

UPPER FLOOR PLAN

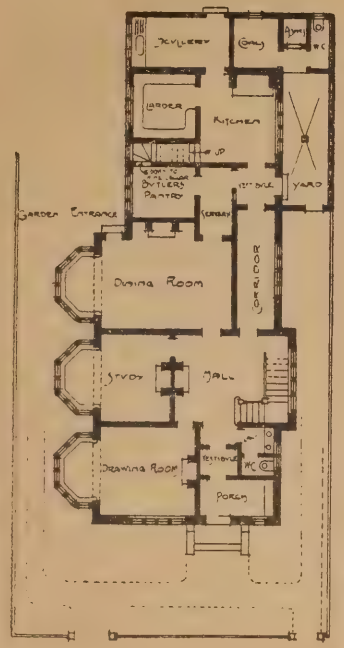


· SIDE ELEVATION ·

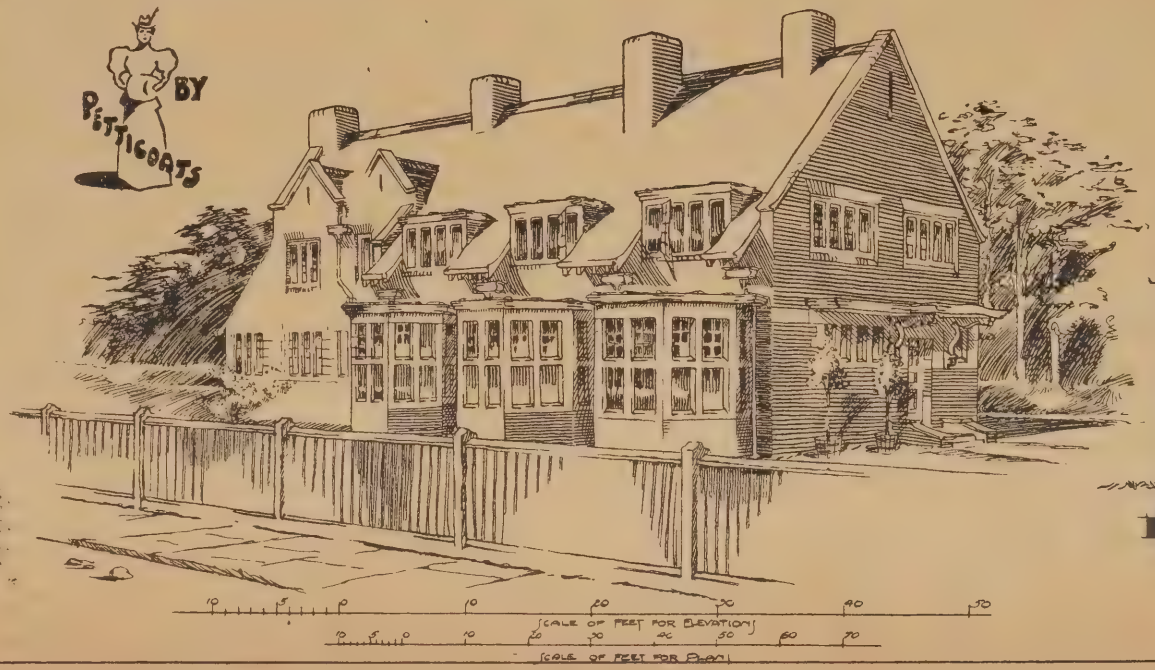
· FRONT ELEVATION ·

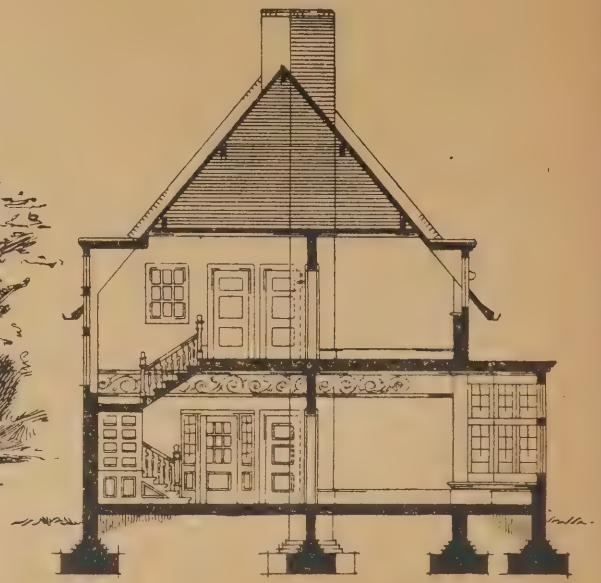
B·N·D·C DESIGN FOR A SUBURBAN HOUSE

PLACED THIRD



· GROUND FLOOR PLAN ·





· SECTION ·

Building Intelligence.

Aston.—A higher-grade school is about to be built at Aston. The general arrangements consist of a school for 280 senior boys and 280 senior girls in separate departments, with two teachers'-rooms to each department. A chemical laboratory for 50 scholars and a physical laboratory, also for 50 scholars, are provided. A gymnasium is also to be built. The style is 17th-century Renaissance. The main hall is carried up two stories, forming the central feature of the design. The materials will be red brick and terracotta, with tiled roofs. The estimated cost (exclusive of site and furnishing) is about £12,000. The architects are Messrs. Crouch and Butler, of Waterloo-street, Birmingham, whose designs were placed first in order of merit by Mr. E. R. Robson, F.S.A. In this competition, just decided, the design by Mr. Edward Holmes was awarded second prize, and that of Mr. John G. Dunn third.

Canterbury.—A sanatorium was opened on Thursday in last week, from plans prepared by the city surveyor, Mr. A. H. Campbell. It is upon the pavilion principle, each separate disease having a distinct block. The blocks number six in all, and consist of scarlet fever pavilion, 12 beds; typhoid fever pavilion, six beds; diphtheria and isolation pavilion, two beds; administration block for matron and nurses, eight beds; giving a total of 28 beds, inclusive of matron's and staff accommodation. Besides these there are the laundry block and discharging block. The heating and ventilation are conjoined, and were executed by Messrs. E. H. Shorland and Bro., of Manchester, so that the fresh air admitted to the wards is warmed on its inflow. The walls are plastered, with distempered finish, while relief is imparted to the plain wall surface by fresco art subjects, executed by the students of the School of Art, under the supervision of the headmaster (Mr. Allen). The floors of the wards are laid with pitch-pine wood blocks by Mr. J. F. Ebner, of London. The building contract has been executed by Messrs. George H. Denne and Son, of Deal.

High Wycombe.—The foundation-stone of a new Conservative club in the High-street of this town was laid on Friday, Dec. 10 last, by the Right Hon. A. J. Balfour, First Lord of the Treasury. The building is to be of Late Gothic style, in brick, stone, and tile, having a frontage of about 26ft. to the main street. On the ground-floor are provided large smoking-lounge and bar, with steward's-room, lavatories, and offices in the rear; on the first floor reading-room, lofty billiard-saloon for two tables, and committee-room, and on the second floor five rooms and offices for steward's residence. The cost of the site and building will be about £1,600, and the contract for the building has been given to Mr. G. H. Gibson, of High Wycombe, at £925. The architect is Mr. Arthur Vernon, of 29, Cockspur-street, London, and Wycombe.

Wakefield.—A meeting of the subscribers to the Walsham How Memorial Fund was held at Wakefield, last week, to consider the proposed enlargement of the cathedral as a memorial to the late Bishop. A report was read from Mr. J. L. Pearson, R.A., that "the chancel, as it is at present, while possibly sufficient for the wants of a parish church, is lacking in the importance and dignity, and also in the accommodation, necessary to a cathedral. Briefly, the design may be described as follows:—The extension of the chancel eastward, besides giving the increased length to the choir which it so much needs, provides also a retro-choir — a characteristic feature of our English cathedrals. Approached from the retro-choir, and forming a continuation of it, a chapel is obtained, which, together with the retro choir, will give ample accommodation for early and occasional services. The total extension eastwards amounts to 60ft. The chancel aisles are extended eastwards to the same extent as the retro-choir, and this extension takes the form of north and south transepts with eastern aisles. By means of these extensions there is ample room beneath for the chapter-house and complete vestry accommodation, which, owing to the natural slope of the ground, will be well lighted. The extension of the chancel admits of the altar being moved one bay eastward. By this means considerable additional space is obtained. Behind the altar, and dividing the choir from the chapel, would be the altar-screen. Under the arch on the north side of the sanctuary I propose to place the canopied tomb, with the recumbent effigy of the late Bishop, where it would occupy the position often filled by the founder's tomb. On the south side, opposite to this, would be the sedilia and crèdence. I propose to take away the existing movable front row of seats and book boards at which the choir sit, and so expose to view the whole of the canons' stalls, a large portion of which are old. The cost of the alterations and additions, and the works consequent on them, may be put down approximately as follows:—structure, £13,500; heating and lighting, £600; bishop's tomb, including recumbent effigy, £2,500; stalls for choir, £400; altar-screen, £1,500; sedilia and side screens, £800; marble floor for sanctuary, £350; bishop's throne, £650; altar, £100; chapel fittings, £300 (£20,700)." The report was adopted, and it was decided to appeal for subscriptions, about £1,200 being subscribed in the room.

CHIPS.

The technical school at Dewsbury is about to be enlarged, from plans prepared by Mr. John Lane Fox, of that town.

Mr. F. A. Winstanley, deputy engineer, Newcastle-under-Lyme, was last night appointed manager of the Rotherham Corporation Gasworks at a commencing salary of £200, rising to £300 a year.

The scaffolding and hoarding have now been removed from the first portion of the new building being reared for the Young Men's Christian Association in Blackett-street, Newcastle-on-Tyne. The architect is Mr. J. W. Taylor, of Westgate-road, Newcastle.

Plans of the new Opera House, shops, warehouses, &c., which are to be erected in Mount Pleasant-road, Monson-road, and Newton-road, Tunbridge Wells, have been passed by the works committee of the corporation. The plans have been prepared by Mr. John P. Briggs, Effingham House, Arundel-street, Strand, and provide seating accommodation for 1,500.

A general meeting of the shareholders of the Sheffield Athenæum was held on the 7th inst., at the Athenæum Club, George-street, Sheffield, for the purpose of considering a proposal to pull down the present premises and rebuild them. The directors of the company some months ago purchased additional land in George-street, adjoining the club premises, and Messrs. Flockton, Gibbs, and Flockton have prepared plans for building on the enlarged site. The plans are for a brick building, with stone dressings, and the building and furnishing will probably cost about £10,000. The plans were approved.

The directors of the Law Life Assurance Company, Fleet-street, in consideration of being allowed to extend their premises—formerly St. Dunstan's Rectory—on the vacant site west of the church, have undertaken to build, at a cost of more than £3,000, a new rectory house on the piece of ground east of the church and in front of the parochial schools.

At Probus Church, Cornwall, a new chancel-screen, incorporating old work, was dedicated on Friday. The work has been carried out from a design by Messrs. St. Aubyn and Wadling. The existing work was constructed by the late Mr. G. E. Street, R.A., when the church was restored in 1851, and is composed mainly of old oak carved bench-ends, with modern circular tracery panels, and moulded capping over, and of the remains of the door and other posts of an ancient screen. The date 1591 is on one of the panels. The addition, to the height of 8ft. above the old work, consists of three bays on each side of the doorway, with heads of tracery and carving of Perpendicular character and varied design, a tracery head, carved cornice, and surmounted by bradishing. The total height of the screen as completed is 12ft. 3in. from the chancel floor.

A proposal of the Fire Brigade Committee of the London County Council that certain work in altering and enlarging the Hampstead fire station be intrusted to the Works Department at the estimated cost of £4,900 was rejected by 47 to 45 votes in favour of an amendment referring back the recommendation with instructions to the committee to advertise for tenders.

At the last meeting of the Edinburgh water trust the works committee reported that they had opened ten estimates for laying the new main from Gillygubdean to Alnwickhill, the work being divided into two sections. That of Messrs. James Young and Sons, amounting to £9,812 12s. 1d. was accepted, and it was resolved that in the mean time only the first section of the work, amounting to £4,779 14s. 9d., should be proceeded with.

Engineering Notes.

Society of Engineers.—The forty-fourth annual general meeting of the Society of Engineers was held on Monday last at the rooms of the Society, 17, Victoria-street, Westminster, S.W. The chair was occupied by Mr. George Maxwell Lawford, President. The following gentlemen were duly elected by ballot as the council and officers for 1898—viz., as President, Mr. Wm. Worby Beaumont; as vice-presidents, Messrs. John Corry Fell, Henry O'Connor, and Charles Mason; as ordinary members of council, Messrs. James Patten Barber, Joseph Bernays, George Burt, David Butler Butler, Percy Griffith Richard St. George Moore, Nicholas James West, and Maurice Wilson; as hon. sec. and treasurer, Mr. Perry Fairfax Nursey; as hon. auditors, Messrs. Alfred Lass, F.C.A., and Samuel Wood, F.C.A. The proceedings were terminated by a vote of thanks to the President, council, and officers for 1897, which was duly acknowledged by the President.

Two men (James Reid and John Wilson) were killed and three injured by the falling of a scaffold at Ayr Town Hall on Tuesday. The hall was gutted by fire on July 1st, and the men were engaged in demolishing the walls. Mr. George Wilkie, the contractor for the work, had a very narrow escape from death.

A syndicate of Newcastle gentlemen have purchased a large estate in the neighbourhood of Abbey-road, Barrow-in-Furness, where they intend to commence building semi-detached villas and a good class of self-contained houses. The architects for the estate are Messrs. Watson and Curry, 18, Grainger-street, Newcastle, who will lay out the land.

One of the large nave windows of Airmyn Church, Goole, has just been filled with stained glass by Mrs. Arthur Speer, in commemoration of her wedding. The window contains figures of Ruth and Naomi, surrounded by suitable ornament, and is from the studio of Messrs. Powell Brothers, of 30, Park-square, Leeds. The Bishop of Hull unveiled the window at a special dedicatory service.

In connection with the additions to the Royal Infirmary, Sheffield, Messrs. Powell Brothers, of Leeds, have just completed stained glass for the large staircase window to the eye-wards. The subjects in the lower panels are "Our Lord Healing the Blind," and "Tobit and the Angel," and the upper panels are filled with foliated ornament, texts, &c.

The new St. John's Mission Church, which has been erected at Tat Bank in connection with the parish of Oldbury, was dedicated by the Bishop of Worcester on the 9th inst. The church will accommodate 250 persons, and the total cost, including furniture, is £1,400. The architect is Mr. H. E. Lavender, and the builder Mr. A. Kendrick, both of Walsall.

By the fire which broke out on Tuesday in the officers' quarters in Dover Castle, one block was destroyed and the flames spread to another block, which was also seriously damaged. Fortunately, the ancient church of St. Mary was uninjured. As usual, the supply of water was insufficient, and the old-time and inadequate expedient of passing buckets from hand to hand had to be resorted to. An official military inquiry was opened on Wednesday into the cause of the fire at the officers' quarters in the Castle. The evidence of Mr. A. Gregory, district surveyor, and Mr. F. Kidd, foreman of works, and others proved that there was a fracture in a chimney, through which, it is presumed, the rafters became ignited; but further investigation is to be made. Large tanks of water were stored at the top of the Castle Keep; but the pipe conveying the water to the burning building was too small to supply all the engines available for work.

The monthly report for November of the Labour Department states that on the whole the state of employment has been well maintained during the month. In the 113 trade unions making returns, with an aggregate membership of 465,630, 22,281 (or 4·79 per cent.) were reported as unemployed at the end of November, compared with 4·70 per cent. at the end of October, and with 3·0 per cent. in the 111 unions, with a membership of 441,259, from which returns were received for November, 1896. The building trades maintain their briskness, and the percentage of unemployed members has decreased from 1·7 at the end of October to 1·6 at the end of November, the figure at the corresponding period of last year being 0·9 per cent. The furnishing trades, though still showing a slight falling off, are yet well employed, the percentage of members out of work being 2·4, compared with 2·2 at the end of October. The figure for November, 1896, was 2·0 per cent.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Sheffield Society of Architects and Surveyors.—The monthly meeting of this society was held at the School of Art, Arundel-street, on Tuesday. The president, Mr. R. W. Fowler, F.S.I., occupied the chair, and Mr. F. R. Farrow, F.R.I.B.A., of London, delivered an elaborate and most useful lecture on "The Warming of Public Buildings."

CHIPS.

The City Commissioners of Sewers agreed on Tuesday to acquire the freehold interest to the ground needed to widen the public way in front of No. 4, Cheapside for £21,230, agreeably to an award by Mr. A. R. Stennings, and to purchase the freehold interest in No. 126, Fenchurch-street, for £14,250.

The first prize of the International Exhibition of Painting, now open at Pittsburg, U.S.A., has been adjudged to Mr. J. J. Shannon, A.R.A. This prize consists of a gold medal with a purse of 1,500dol. added thereto. The picture which obtained this honour is a portrait of the artist's daughter "Kitty" in her riding habit.

At Tuesday's meeting of the London County Council, Earl Rosebery, on behalf of the subscribers, presented Sir John Hutton, the former chairman of that body, with his portrait, painted by Mr. Leonard Watts. The portrait will be added to the collection at Spring Gardens, which it is ultimately proposed to be transferred to the municipal hall hereafter to be built. In making the presentation, Lord Rosebery referred especially to Sir John Hutton's hard work on the Building Act Committee.

A new drill hall has been erected at Lincoln, and special consideration has been given to the ventilation, which is carried out on the Boyle system.

Bournemouth town council have considered in committee different proposals to construct electric tramways through the town, and by a majority of two to one they have rejected all the schemes, not deeming it advisable to introduce tramways into the borough.

The Waterford District Asylum, Waterford, is being warmed and ventilated by means of Shorland's patent Manchester grates and Shorland's patent concealed extract ventilators, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

While a number of workmen were engaged, on Wednesday, erecting a temporary bridge over Canal-street, Nottingham, in connection with an extension of the Great Northern Railway, the structure gave way, and some of the men were precipitated to the ground. Albert Harrison was killed on the spot, and two other men were seriously injured.

Dr. Collingridge, the medical officer of health for the Port of London, has been appointed by the Senate of the University of Cambridge one of the examiners for the diploma in public health.

The Dean and Chapter of Canterbury have approved the revised design prepared by Mr. T. G. Jackson, R.A., for the tomb of the late Archbishop Benson. It will be Early English in character, and has a general resemblance to the tomb of Archbishop Peckham in the Martyrs' Chapel. The construction of the memorial will be at once proceeded with, and when completed it will be erected over the resting-place of the late Primate in the north-west angle of the nave.

A Jubilee stained glass window has been placed in the south aisle of Stranton parish church. It is of three lights, and contains full-length figures of Faith, Hope, and Charity, the style adopted being Perpendicular. Messrs. Wailes and Strang, of Newcastle-on-Tyne, were the artists.

The Calvinistic Methodist chapel which is being erected at Llangefni, Anglesey, in memory of the late Rev. John Elias, is approaching completion. It will have cost £5,500.

New banking premises have been built for Grant and Maddison Union Banking Company in High-street, Southampton. The design of the front is founded on the English Renaissance of the early part of the 17th century, and is executed in Portland stone, the whole work having been carried out by Messrs. Jenkins and Son, of Southampton and Bournemouth, under the direction of Messrs. Marshall and Vicken, architects, of Bedford-square, London.

Mr. Alfred H. Frazer, assistant curator of the Walker Art Gallery, Liverpool, died on Friday at his residence at Tranmere. Mr. Frazer had been in the employ of the Library, Museum, and Arts Committee of Liverpool Corporation since 1873. When 17 years of age he was transferred from the Museum to the Walker Art Gallery, eventually becoming the curator's chief assistant.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the Building News, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to The Strand Newspaper Company, Limited.

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ADVERTISEMENT CHARGES.

The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of Eight words, the first line counting as two, the minimum charge being 5s. for four lines.

The charge for Auctions, Land Sales, and Miscellaneous and Trade Advertisements (except Situation advertisements) is 6d. per line of Eight words (the first line counting as two), the minimum charge being 4s. 6d. for 40 words. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front-page Advertisements 2s. per line, and Paragraph Advertisements 1s. per line. No Front-page or Paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is One Shilling for Twenty-four Words, and Sixpence for every eight words after. *All Situation Advertisements must be prepaid.*

NOTICE.

Bound copies of Vol. LXXII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

CHRISTMAS DAY.

In Christmas week this Journal will be published on THURSDAY, December 23, in time for Christmas Day. All Advertisements must, therefore, reach the Office by THREE p.m. on WEDNESDAY, Dec. 22, to secure insertion.

Received.—T. P. and R.—D. O. A.—J. B. H. M.—A. P.—A. W. G.—E. G. and Son.—F. K. and Co.

"BUILDING NEWS" DESIGNING CLUB.

Drawings Received.—"Nowhere," "The Ant," "Byd," "Stanley," "Cobden," "Crow," "Vim," "Ravenna," "Derige," "Dachs," "Suburb," "Spero," "Don," "Microbe," "Pick-Me-Up," "Bantam," "Hubert," "Rose-Comb," "Eldon," "Gib," "Gossip," "Stone," "Strax," "Bow Bells," "A Man in the Moon," "Ivy," "Sir Galahad," "Turret," "Oak," "Checkmate," "Spectator," "Wun-hi," "Petticoats," "Bull's-eye 5," "Chess," "and Co.," "Solo," "Bernard," "R. W. P.," "E. G.," "Kirby Hall" (very late).

Hotspur and Kirby Hall. (Light can be obtained from the rear for the public library, but not from the right hand side.)

Correspondence.

A PARALLEL TO WALTHAMSTOW.

To the Editor of the Building News.

Sir,—It is the duty of every honest man to aid in letting daylight into the dark and dirty corners of architectural practice. Mr. Dunford, whom a local clique is now trying to deprive of his fairly-earned appointment as architect of the Walthamstow Baths, in order to appoint Messrs. Spalding and Cross, is personally unknown to me; but I have had an experience of my own in which Messrs. Spalding and Cross were prominent figures.

On March 2, 1893, I received from a building committee an invitation to compete with four other architects for some large Sunday-schools (to be used also as a lecture hall) at East Finchley. On the committee's assurance that they intended to put the work into the hands of the successful competitor, I prepared a design, in conjunction with my partner, Mr. Collinson. In our report the probable cost was estimated as being "near to" (not within) the sum of £3,500, which the committee had named.

On April 26 we received a letter from the secretary stating that the committee had awarded the first premium to our design, and asking us to meet them on April 28th. We met the committee on that date, and received instructions for further important works not mentioned or implied in the competition "instructions," costing, at least, £200. We were at the same time directed to prepare the working drawings and specification.

We again met the committee by appointment on June 6. We laid the working drawings before them and had them approved. We were asked to make some further additions to the scheme involving further cost. We were instructed to get the approval of the local board, to advertise for the names of builders willing to tender, and to have everything ready for getting in tenders at short notice. All this we did, and on June 26th we informed the secretary that in spite of all the additions to the cost which the committee had directed, there was every reason to believe that the work would be carried out for £4,000.

We heard no more for five months. What was going on we did not know, and do not know. But on November 7th a deputation from the committee called on us, and stated that "owing to matters connected with the subscriptions, which there was no need to explain more particularly," it was necessary to reduce the cost of the building by £600 or £700. We made various suggestions for this reduction, and illustrated them by plans and sketches in conformity with the committee's views.

We were summoned to another committee meeting on January 25, 1894. Something mysterious had evidently happened. Ten or twelve gentlemen sat round the room in dead silence, while one, to whom the part had been allotted, informed us of their decision. This was, that they refused to pay anything for all we had done by their orders since the competition. Unless we agreed to this arrangement, their spokesman threatened that our appointment would be cancelled, and that "they would have a new competition." The only excuse offered to us for this remarkable threat was, that our estimate for the scheme with the committee's additions exceeded by a few hundred pounds our estimate without them. That the accuracy of our estimate might be proved, we strongly urged the committee to get in tenders at once. But to this proposal they would not listen for a moment, because, their spokesman said, it would lead to a fortnight's delay.

Our relations with the committee had always been friendly. We thought their new decision a mistaken one; but it did not strike us then as simply a device for turning us out to let another firm of architects in. We were prepared, therefore, as a matter of good feeling, to waive some part of our right, and to make every allowance for the difficulty in regard to subscriptions. It soon appeared, however, that this was not what was wanted. The moment we offered to discuss the matter we received a letter abruptly dismissing us.

Some time after this we heard that the building was begun, and that Messrs. Spalding and Cross were carrying out our plans. I am glad to have this opportunity of stating that the elevations they adapted to them were not ours. The schools were opened in due time, with much praise to Messrs. Spalding and Cross for the excellence of the arrangement. The *Builder*, of March 15, 1895, says, "the block *was erected from the designs of Messrs. Spalding and Cross, at a cost of* £4,500." The committee, too, had their own share of laudation, and an eminent speaker gravely exhorted them to "build their characters as they had built their schools!"

The way in which Messrs. Spalding and Cross came to be appointed (it is needless to say, without any effort of their own), is singular and interesting. A firm of builders happened to hear that the committee wanted a low tender. A sudden inspiration came upon them. They felt,—and they let the committee know it—that this low tender they were quite prepared to submit, but only on one remarkable condition. The condition was, that the work should be superintended by Messrs. Spalding and Cross. Thus tempted, the committee gave way, and we were dismissed. This, at any rate, is the story which has

since been told us by persons connected with the scheme, and we give it as their explanation—not our own—of the strange, eventful history. But whether it was by this particular expedient, or by some other, that Messrs. Spalding and Cross were assisted in supplanting us, the fact that they did so after we had gained the competition and prepared the working drawings to the committee's satisfaction is undeniable. And, as if this were not enough, they then set themselves forth, or allowed themselves to be set forth, as the authors of a plan and arrangement which they well knew to be ours. If they deny this, I challenge them to produce a ground plan and gallery plan of the block as built, side by side with our plans, which had previously been issued in a circular by the committee.

If these are fair ways of gaining practice and increasing reputation, the sooner we all adopt them the better. If they are not, is it not time that they were treated as the shameful things they are?—I am, &c., James Cubitt.

2, Broad-street Buildings, E.C.

Sir,—We notice that Mr. Dunford admits the truth of one of our assertions—viz., that we were consulted by the council, and prepared sketch plans for the building long before his name was introduced in connection with the proposed work. This being so, it is unnecessary for us to comment upon his, unfortunately, inaccurate account of our introduction to the Walthamstow Urban District Council.

Some time after our sketch plans had been submitted to this authority we were invited to compete for the work in question against *two other architects experienced in public baths works whose names were mentioned to us* (it is perhaps needless to add that Mr. Dunford's name was *not* included), and we were, therefore, surprised to find subsequently that Mr. Dunford had submitted a design. We have already explained (*vide* our letter which appeared in your issue of the 7th inst.) what took place *after* Mr. Plumbe's report was sent in, and we may here incidentally inform Mr. Dunford, that we have never mentioned Mr. Plumbe's name in connection with a "cocked hat" or with any other form of head-gear, nor have we ever competed against Mr. Plumbe.

We may inform Mr. Dunford that we have the very best authority for saying that Mr. Plumbe considered our design superior to his own.

We have now published the whole of the *facts* so far as they are known to us, relative to this competition in general and to Mr. Dunford in particular, and we cannot continue the correspondence.—We are, &c.,

Spalding and Cross.

RE FIREPROOF CONSTRUCTED BUILDINGS.

Sir,—We have read with much interest the suggestive letter of Mr. H. C. Standage in your last issue. No doubt Mr. Standage is right in considering it an impossibility to "construct any building that shall be absolutely proof against destruction by fire." To say, however, that no building has ever been constructed which is capable of withstanding something approaching furnace-heat for an unlimited time is, after all, a mere truism, and the point to which practical men will not fail to direct their attention is the construction of buildings in such a way as to withstand intense heat and hold a fire in check for a few hours, and thus afford reasonable time for its extinction. Mr. Standage is amply borne out by experience in his denunciation of the strange combination of "concrete and iron," which, oddly enough, is still regarded as "fireproof construction" by many worthy men, notwithstanding the fatal and appalling events of the past. It has been proved over and over again that concrete, like other hard, solid substances, acts as a conductor and conveys the heat to the iron, which consequently expands and bursts the casing of concrete, thus causing results which are unfortunately too familiar to need description; of course, if water is pumped on to the superheated "concrete and iron," the inevitable collapse of the building is accelerated.

A few years ago we caused some practical tests to be made for us by Mr. W. H. Stanger, C.E., F.C.S., of which the following is an abbreviated report:—

"The furnace erected for the trial was in full blast, at 2,000° of temperature, at 11.22 a.m. There were placed over it three similar sets of two rolled iron joists. One was pa cked with 'Silicate Cotton' cased externally with about an inch of cement composed of plaster of Paris and 'Silicate Cotton.'

"Another set of joists was imbedded in 'Concrete' formed of one to five Portland cement and sand.

"The third set was covered by 'Doulton-Peto Tiles,' with the crevices and interspaces—except the air spaces—filled in with, and the floor surface formed of, concrete, composed of half Portland cement and sand.

"Each set was loaded with 30cwt. of pig-iron, distributed over a length of 8ft.

"The joists covered with 'Concrete' were the first to give way, and they dropped down at 1.7 p.m.

"The joists covered with 'Doulton-Peto Tiles' held out well until 3.40, when they finally succumbed.

"The joists covered with 'Fire-Proof Plaster' and 'Silicate Cotton' were practically unscathed after eleven hours' endurance—for the deflection then did not apparently reach to a quarter of an inch—and there being no prospect of their giving way at 6 45 p.m., the fire was withdrawn. *This is the most perfect endurance yet recorded.*"

The foregoing report speaks for itself, and cannot fail to carry conviction to the mind of every practical reader.

The complete fireproofing of rooms can be effected by lining ceilings and walls with our patent combination slabs—i.e., wired plaster slabs, ⅝in. thick, padded on the inner side with silicate cotton. These slabs, when nailed up to the ceiling joists or to sides of walls, and floated over, make a neat finish, and are perfectly soundproof as well as fireproof.—We are, &c.,

Fredk. Jones and Co.

Silicate Cotton Works, Kentish Town,
London, N.W., Dec. 13.

CHIPS.

Mr. Thomas Bush Hardy, the well-known artist, died suddenly on Sunday at his residence in Portsdown-road, Maida-vale, aged 56 years. Mr. Hardy, who was the father of Mr. Dudley Hardy, was a native of Sheffield, and was practically self-taught. He travelled a great deal in Holland and Italy. With Mr. Wyllie, he was one of the foremost marine painters of his day, and was a regular contributor to the exhibitions of the Royal Academy.

In order to commemorate the Queen's Jubilee, it was decided to re-hang the bells and erect a new clock in the tower of the parish church of Audley, Cheshire. The dedication service took place on Wednesday. The bells have been quarter-turned and rehung by Messrs. Barwell, of Birmingham. The clock, which has two 5ft. dials, has been supplied by Messrs. Smith and Sons, of Derby.

Important works are proposed at Cardiff by the Windsor Dock Company, whose plans comprise the building of a sea-wall for reclaiming a portion of the Penarth flats in the construction of a dock situated in the bed or on the banks of the River Ely. The dock will be 192 yards wide at its south-eastern end, and 483 yards wide at the opposite end. One of ths side-walls will be 566 yards long and the other 640 yards. A lock entrance will be provided. Two jetties, one 117 yards and the other 150 yards long, will be run out from the sea-wall before mentioned.

At the monthly meeting of the Bootle Council on Friday, Alderman Johnson, chairman of the Free Library and Museum Committee, secured the sanction of the members to a plan for the erection of a new technical school, and the institution of a district free library in connection with the borough.

The new organ which has just been placed in Coppenhall Church, near Crewe, was dedicated on Thursday evening in last week. The organ has been built by Messrs. Forster and Andrews, of Hull, at a cost of £542.

The London Water Commission sat again on Monday, Lord Llandaff presiding, when further evidence in favour of a policy of purchase was given by Mr. H. L. Cripps, Parliamentary agent of the London County Council.

In the Queen's Bench Division on Saturday, before Mr. Justice Channell, the hearing was resumed in the case of Rishton v. The Mayor, &c., of Haslingden. It raised the question as to whether a narrow street or passage connecting two main street in the borough of Haslingden, and known as Back Pleasant-street, was a public highway or a private street, for the sewering of which, in connection with an improved sewage scheme, the owners of the property in Pleasant-street, fronting the passage, were responsible. Judgment was reserved.

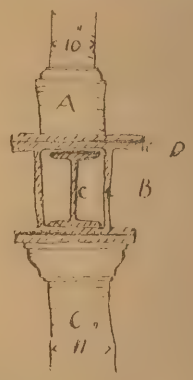
Last week, while digging operations were going on in a garden at Maiden Cross, Hexham, a carved stone was found. This has been examined by Mr. C. C. Hodges, F.S.A., of Hexham, architect, and he thinks it is as early as the 14th or perhaps the 13th century, and that it is the base-stone of the western sanctuary cross which stood on or near the site of the house at Maiden Cross. The base of the eastern sanctuary cross has long been preserved in the yard at the union workhouse, and that of the nothern cross is still on the top of the Cross Bank.

Intercommunication.

QUESTIONS.

[11861.]—**Roof Stresses: Graphics.**—How is the force diagram for the following constructed, with a view to ascertaining the stresses in the members of a truss? The loads are vertical, distributed thus:—12cwt. on the joint at abutment (left side), 6cwt. at the second joint, 3cwt. at the third, and 15cwt. at the vertex. On the other side of the truss there are no loads. The reactions are inclined at 45° to the vertical. Now, the reactions are obviously unequal, and my difficulty is to construct the force diagram (which, I presume, is a triangle), so as to ascertain the value of the reactions. The line of loads will be vertical. How can a triangle, having the other two sides at 45° with vertical, be completed, unless those sides are equal? This, of course, would be the case if the loads and reactions were symmetrical. Again, let the resultant be substituted for the four vertical loads. This would act about midway between the second and third joints. Then three forces (viz., resultant and two reactions at 45°) in equilibrium should meet at a point. This axiom I also fail to apply.—J. H. M.

[11862.]—**Strength of Cast Iron.**—A is a cast-iron column with a base-plate 18in. by 18in. resting on a cast-iron beam-box; the load on A is 100 tons. What ought



to be strengths of the metal for beam-box B? As there would be clearance above the beam, ought the upper plate D to be regarded as in compression or tension; C is a main beam, with supports 18ft. apart.—Bath Stone.

[11863.]—**Waterworks.**—Will some reader kindly inform me of a good book on Waterworks, showing plans of reservoirs, filtering-tanks, and general information requisite for the water supply of a town, say, of 10,000 inhabitants?—Student.

[11864.]—**Textbooks.**—Kindly inform me through your columns of the best textbook, or books, I could use in preparation for the Honours Exam. in Brickwork under the City and Guilds of London Institute, the sum of which must not exceed 10s. 6d., the value allowed out of the Scholarship I hold? I have Mitchell's "Advanced Building Construction," Wilson's ditto, and Walker's "Practical Brickwork."—Kiln.

[11865.]—**Sea-Walls.**—Can any practical reader recommend a good construction for a sea-wall of earth or concrete, also a profile that has been found to give economical results? The wall will be at least 5ft. high on the exposed side. If of concrete, what is a good proportion to use?—Caution.

[11866.]—**Proportions.**—I believe that the section of many of our cathedral churches has been based on geometrical proportions. Milan Cathedral is, according to some writers (Vitruvius, I think, refers to it), designed on a geometrical system, or the vesica. Will any student enlighten me on the subject?—Interested.

[11867.]—**Safe Load on Solid Column.**—The weight on a cast-iron column will be about 1½ ton per square inch. What ought to be the diameter for a safe load?—T. H.

[11868.]—**Disconnecting House Drains.**—A house drain passes under a house. How can it be ventilated so that it will pass Local Government Board by-laws?—House-Owner.

[11869.]—**Metal Casements.**—Which are the most weatherproof, wood or metal casements? As the latter do not shrink, I thought they would be the best form of casement for the side of a house exposed to southerly wind and rain. Can sashes be also made of iron or steel? A reply will be thankfully received by—Novice.

[11870.]—**Heating Warehouse.**—I shall be pleased to be informed how a three-storied warehouse can be warmed efficiently. So many systems are in the market, that it is rather puzzling to know which is considered a good plan of heating. Any particulars of similar warming will be useful. I thought of hot-water heating by means of radiators. Is it costly, and what sizes should the pipes be?—A. S. B.

[11871.]—**Treatment of Sewage.**—I shall be obliged if some of your readers will inform me, or give particulars, of the iron or electric process for treating sewage from Zymotic Hospital wards.—N.

[11872.]—**Limekilns.**—The owner of a small quarry is asked by his tenant to erect for him additional limekilns, and it has been suggested that by some new process by which the kiln shaft is contracted at its extremities, and widened out to its greatest diameter half-way down, a great saving of fuel is effected by reason of the heated mass of stone and coal being retained in the shaft longer, a smaller quantity of coal will suffice. Is there any recognised system that is preferred in the trade, and where are there any plans to be seen, showing how the construction should be done, the cost, &c.? The Hoffman kiln could

not be adopted, there not being any quantity of stone, and only 12ft. of altitude.—G.

REPLIES.

[11859.]—**Retaining Wall.**—The thickness of a concrete wall to bear a bank of earth depends on several factors, height of wall, the nature of the earth or backing, its natural angle of repose, &c. The weight of wall has to be found for a foot in length, also the weight of a prism of earth between wall and natural slope of the material; if these two forces are found, and the point of application of pressure of the earth, the thickness can be determined by drawing a parallelogram of forces. The resultant will determine the thickness of wall at the base by allowing it to fall within the thickness of its foot. Empiric rules are given, according to which the thickness may be put at a third the height of wall. If the wall is 12ft. high, this would give 4ft. at the base; but if the wall is built of good cement concrete, and has a small batter on the face, I should say 3ft. would be ample for ordinary earth backing.—EXPERIENCE.

[11859.]—**Retaining Wall.**—"Concrete" does not say what the concrete walls are to support, whether earth or gravel or loose material of any kind, or whether it is surcharged. The usual way of finding proper thickness of a retaining wall is to find load or pressure of the earth and its point of action on the wall, and then, by a simple application of the resolution of forces, the thickness may be found graphically. For a wall to sustain earth with level top and a batter of 2in. per foot of face may be taken at one-fourth the height of wall. According to one rule, a wall of cut stone of large ranged rubble in mortar to sustain a backing of sand, gravel, or earth should not be less than 35 per cent. of height for the top footing course of a vertical wall. Another authority says 24 per cent. of height is necessary for a batter of one-fifth, 25 per cent. for one-sixth, and 32 per cent. for a vertical wall built of brick. These rules may be approximately used for concrete walls. Theoretically, it is considered the pressure against wall is that of a wedge acting between back of wall and an inclined plane determined by experiment for the nature of the soil, and it is assumed that this wedge acts at two-thirds of the height of wall. The moment of overturning force and resistance are equated for a condition of equilibrum, and the usual formulæ to obtain thickness is—

$$t = h \tan. \tfrac{1}{2} \text{ACD} \sqrt{\frac{w}{3\,\text{W}}}.$$

A C D represents the prism, w the weight per unit of the earth, and h the height of walls. Tables are compiled on this rule for thicknesses in terms of height and angle of repose.—G. H. C.

[11860.]—**Builders' Book-keeping.**—I shall be pleased to supply "Bookie," or any other reader of the BUILDING NEWS, with full-size worked sheets of a good and simple system, both jobbing and contract.—F. J. WEBBER, 19, Leinster-road, Dublin.

CHIPS.

The Passmore Edwards Settlement in Tavistock-place, St. Pancras, which will be ready for occupation by residents after Christmas, will be opened on Saturday, February 12, by Mr. John Morley, M.P. The chair will be taken by Viscount Peel.

The tenth annual dinner in connection with the North-Western and Midland Sanitary Inspectors' Association was held on Saturday evening at the Compton Hotel, Liverpool, when there was a large attendance. The president (Dr. Francis Vacher, medical officer of health, Cheshire County Council) occupied the chair.

The sum of £530,000, voted on Saturday by the Caisse of the Public Debt of Egypt will be devoted to the construction of two subsidiary weirs below the existing barrage—one on the Rosetta branch of the Nile, and the other on the Damietta branch. The object is to diminish the difference in the summer of the water levels below and above the barrage, thus reducing the severe strain yearly thrown on the structure during low Nile. The new dams, by rendering regulation possible during the rising of the flood, will assist in securing the early sowing of a maize crop, while also preserving the rice in Northern Egypt. The weirs are to be commenced next year, and completed in four years.

On Saturday afternoon the Unionist Club in High-street, Galashiels, was occupied for the first time. The front elevation is three stories high, on the ground floor being two shops, with the main entrance to the club between, leading at the rear to the billiard-room, 34ft. by 80ft., and 22ft. in height. On this floor also are lavatories and cloakroom. On the second floor is a reading-room, 27ft. by 16ft., a card-room and secretary's office. On the top story the principal room is 30ft. by 13ft., and is intended for committee meetings. The kitchen and caretaker's rooms occupy the remainder of this floor. The cost of site and building will be £3,000.

A movement, at the head of which is Lord Henniker, has been initiated in Manxland for extensively planting the island with trees, and thus making its arboreal charms more attractive to visitors. On Saturday a meeting was held at Douglas, presided over by Sir John Goldie-Taubman, Speaker of the House of Keys, at which reports favourable to the project were received from various parts of the island. A resolution was adopted for the formation of a tree-planting society, and an influential committee appointed to draw up a constitution and code of rules for the management and development of the same.

WATER SUPPLY AND SANITARY MATTERS.

WATER POLLUTION AND ITS CORRECTION.—At a meeting of the Society of Engineers, held at the Royal United Service Institution, Whitehall, on December 6th, Mr. G. Maxwell Lawford, president, in the chair, a paper was read by Mr. Reginald E. Middleton, M.Inst.C.E., entitled:—"The Pollution of Water and its Correction." The author first referred to the recent disastrous epidemics of typhoid fever in Maidstone and King's Lynn, which have forced upon the attention of the public the necessity for protecting our water supplies from pollution. From time immemorial running water has been used for two separate and antagonistic purposes, namely, those of water supply and removal of refuse, and the earlier sanitary legislation is directed towards the removal of refuse by sewering or otherwise, rather than to the provision of pure water, and that up to the present date the latter is permissive, the former compulsory. It is necessary therefore to enunciate the truism that water is provided in the first place for dietetic and cleansing purposes, and that the removal of refuse by its means must be subordinated to this first and most important requirement. The first element of aggregated health is a pure and sufficient water supply, and we may congratulate ourselves that London is provided with this desideratum, and that the death rate of our Metropolis is only 18·6 per 1,000 against 18·9 for the 33 principal English towns. Nothwithstanding that the importance of pure water is now so well understood, it is by no means easy to secure it; the Rivers Pollution Act, 1876, which up to the year 1893 was its only protection, except in a few isolated cases, is so elastic that it is practically impossible to enforce its provisions within any reasonable time unless the authorities themselves are anxious to comply with its meaning. It must be presumed that there is no such thing as pure water in nature, even rain water collects impurities, harmful or otherwise, from the atmosphere, and has ceased to be pure before it touches the ground, by which it is further contaminated. Water which has percolated through clean soil and has reached its underground reservoir has parted with nearly all but its mineral impurities. Deep well water, though frequently hard, is generally free from the presence of many micro-organisms. This very condition, however, lays it open in a remarkable degree to the attacks of pathogenic germs, if any should find access to it. The same thing may be said of moorland waters drawn from rocky districts. The great polluting element is man, whether considered as an individual, or an aggregation of individuals, or as a manufacturer; animal pollutions hold quite a secondary place. The most serious forms of pollution generally arise from the sewage works of towns or villages, many of which are so situated that the acquisition of land suitable for the satisfactory disposal of sewage, and the production of a relatively pure effluent is difficult; the sewage farms or disposal works are seldom of sufficient extent to deal with more than the dry weather flow, therefore in wet seasons the sewage is only very partially purified, for dry soil is the essence of the purifying process. Moreover, it is generally accepted that most of the cleansing takes place in the first few inches, decreasing with the depth, and ceasing, or nearly so, when the line of saturation is reached. Many shallow wells, and some deep ones, become contaminated from neglect of this knowledge, the ground around them becoming sodden with clear water as well as with slops and manure; or they are polluted by leaking drains or cesspools, which, being below the surface, are only slightly affected by the soil. No chemical treatment of sewage is, by itself, sufficient to produce an effluent of satisfactory purity. The author believes that the solution of the problem is to be found in some form of artificial filtration accompanied and aided by biological action. This system also offers immense advantages in dealing with the sewage of large towns in a cheap and effectual manner, and obviates the necessity for the erection of large sewage farms, as well as of large outfall works. It must, however, be worked as carefully as are the filters of a large water supply, and this is not possible in small villages. For the prevention of pollution, and as protection against it, there may be said to be three lines of defence. First, by the introduction of clauses into an act for the prevention of pollution, something on the lines of clauses 93 and 94 of the Thames Conservancy Act of 1894. Secondly, by sedimentation and oxidation in storage reservoirs, by which means, after some 12 days' storage, from 83 per cent. to 96 per cent. of the micro-organisms are removed; and thirdly, by filtration through sand, which retains an average of 99·6 per cent. of the remaining bacteria. Because, however, two good lines of defence are provided, it is no reason why rivers should be polluted.

The memorial stones of a new infirmary block and a new nurses' home, to cost £17,500, were laid on Friday at the Tranmere Workhouse of the Birkenhead Union.

LEGAL INTELLIGENCE.

THE THIRLMERE ARBITRATION.—The protracted arbitration proceedings between the Manchester Corporation and Messrs. [illegible]tson and Wilson, contractors for seventeen miles of the Thirlmere Waterworks between Chorley and Preston, have now come to an end. On Friday, Mr. Harrison Hayter, the referee, sat to a late hour to conclude the hearing of the case, and it will now rest with him to give his award. There was such an enormous mass of detail gone into on both sides, however, that it will take at least a month, it is expected, to complete the consideration of the whole of the evidence. The claim of the contractors amounts to between £50,000 and £60,000.

APPORTIONMENT APPEALS UNDER PRIVATE STREET WORKS ACT, 1892.—The Bournemouth magistrates heard, on Thursday in last week, appeals brought by owners of property in Westbourne Park-road in respect of works proposed to be carried out by the Bournemouth Corporation in that road. Mr. J. Druitt, jun., town clerk, appeared on behalf of the corporation, and Mr. H. T. Trevanion represented the objectors, whose grounds of objection were that the proposed works were unreasonable and the estimated expenses excessive. Mr. Druitt said the street in respect of which these objections were taken was laid out for building purposes by a syndicate on the Westbourne Park Estate, and in this particular road there were 43 separate frontages. These 43 frontages were divided amongst 31 owners, 17 of whom had given notice of objection. Mr. F. W. Lacey, borough surveyor and engineer, said he prepared the specifications and plans for this road, and was of opinion that the prices set down as the estimated cost of the various works were reasonable. In cross-examination, it was elicited that it was intended to lay tar-paving on both sides of the road, although there were many public roads on the West Cliff which had tar-paving on one side only. These, witness explained, were wider roads. Witness was also cross-examined with respect to the catchpits and channelling contained in the specification. The total cost, he said, would be 6s. por foot. Mr. Druitt said that the cost of making-up the Marlborough-road from Clarendon-road to Chine-road was just under 2s. 6d. per foot; the Grosvenor-road cost between 2s. 9d. and 3s. Appellants called William Humphrey Saunders, retired road and sewer contractor, and also Joseph Francis Jeans, C. H. Mate, and Dr. G. B. Beale, all owners of property on the Westbourne Park-road. William Ely Jones, who has had experience as a roadmaker, was also called. Dr. P. W. G. Nunn, Medical Officer of Health, was called by Mr. Druitt. The Bench said they would allow tar paving on one side of the road only—the western side, which was the most occupied. With regard to the catchpits, they did not think it necessary to interfere with the existing ones. They allowed the amount set down for channelling. Mr. Druitt said the specification would be amended in accordance with their worships' ruling.

IN RE BENJAMIN OWEN, J.P., WREXHAM.—At the Wrexham Bankruptcy Court, on Tuesday, before Mr. Registrar Preston, Benjamin Owen, described as a builder and contractor, of Penybryn, and Bersham-road, Wrexham, came up for his public examination. His statement of accounts showed the gross liabilities to be £12,470 11s., expected to rank £1,312 4s. 10d., assets £1,093 5s. 1d., leaving a deficiency of £218 19s. 9d. The debtor stated that he was a justice of the peace for the borough of Wrexham, and had been for twelve years a member of the Wrexham Town Council. About 30 years ago he commenced business at Penybryn, Wrexham, as a builder and contractor, without any capital; but for many years he carried on a profitable and increasing business. He attributed his failure to losses on quarrying contracts mainly. One of his unfortunate speculations was the purchase of Moelwyn Slate Quarry, at Blaenau Festiniog, which he bought from a slate merchant, John Solomon Jones. He (debtor) spent many hundreds of pounds in the development of the quarry, and relaying two miles of railway. The examination was adjourned to enable the debtor to prepare a cash account for three years.

RE C. J. WESTWOOD.—A first meeting of creditors was held on Wednesday. The debtor is a civil engineer, having offices at 11 and 12, Clement's-lane. He had a contract for the construction of a new railway in the Isle of Wight, and asserts that he is not insolvent, his present position being due to his inability to place shares which have been given to him in respect of the contract. The liabilities were estimated at about £14,000. It was stated that negotiations were pending with a view to an arrangement, and the creditors passed a resolution adjourning the meeting to Jan. 12.

CLAIM AGAINST THE LONDON SCHOOL BOARD.—Mr. Under-Sheriff Burchell and a special jury at Red Lion-square, Holborn, heard, on Wednesday, the case of "Davies v. The School Board for London." This was a claim for £430 as compensation for the leasehold interest in No. 21, Grange-street,

Hoxton, held for 80 years from Christmas, 1856, at a ground-rent of £5 10s. a year. The experts engaged in the case were Mr. E. F. B. Fuller and Mr. George Stockings for the claimant, and Mr. James Green (Messrs. Wetherall and Green) and Mr. G. A. Wilkinson for the Board. The formal offer of the Board was £364. The jury awarded £400.

CHIPS.

Mr. William Danforth, sen., who died at Red Wing, Minn., November 24, was for many years county surveyor and later city engineer. He was engineer of the Duluth, Red Wing, and South-Western Railroad.

It is intended to carry out alterations at St. Giles's Church, Sidbury. These include the repair and re-roofing of the chancel, the provision of heating apparatus, and a new east window. The estimated cost is £1,000.

A meeting of the Edinburgh Architectural Association was held on Wednesday evening at the Royal Institution, Edinburgh, the President, Mr. Thomas Ross, in the chair, when a lecture on "The Evolution of Style in Architecture" was delivered by Mr. Leslie Ower, President of the Dundee Institute of Architecture.

Extensive alterations have just been completed at the Crown Hotel, in the High-street, Southampton, including the provision of new cellars, kitchen, coffee-room, and billiard-room. Messrs. Mitchell, Son, and Gutteridge were the architects, and the contract has been executed by Mr. Sidney Nichols, also of Southampton.

Mr. Cotton, Local Government Board inspector, held an inquiry at Dublin on Wednesday week in connection with the loan of £20,000 requested by the corporation for the purpose of renewing and relaying the cables used in the electric-lighting of the city.

Recently an ancient urn was picked up from a sandy knoll on the farm of West Skichen, Carmyllie, near Arbroath. It was lying near a dyke, and was just protruding from the ground. The urn is of earthenware, hardly larger than a breakfast cup, neatly formed, and quite entire. It was forwarded to Dr. Joseph Anderson, of the National Museum of Antiquities, Edinburgh, who states that it is a sepulchral urn, and the smallest of its shape that he has yet seen. It belongs to the Bronze Age, and is therefore at least a century or two older than the Christian Era—say 2,000 years, or thereby.

At the Manchester City Art Gallery, on Monday, a bust of the late Sir Charles Hallé was presented to the Art Gallery Committee of the City Council by Sir W. H. Houldsworth, Bart., M.P., on behalf of the subscribers. The bust, which is in white marble, is the work of Mr. Onslow Ford, R.A.

The members of the Baptist community of Santa Rosa possess a church which is remarkable by reason of the fact that it has been constructed entirely from the wood furnished by a single tree. This is a specimen of the redwood tree, similar to that which has furnished Mr. Astor at Clevedon House, Bucks, with a section round which more than forty guests can be comfortably seated. The church is built entirely of wood, the interior being panelled and finished with it. Not only were the floors, the sittings, the pulpit, roof, and roofing furnished by the timber obtained from this tree, but there was left over a large quantity for scantlings and joists, as well as for 60,000 shingles.

The Bishop of Newcastle dedicated a new font in St. Thomas's Church, Barras Bridge, Newcastle, on Monday. The font, which was designed by Mr. Hicks, of Newcastle, is of white Caen stone, octagonal in form, and is richly traceried and carved all over. The bowl, of one large block, has its sides slightly concave, and their traceries support shields with symbols and monograms, including the Alpha and Omega, the Fish, the Shell, the Lily, the Sign of the Cross, and the initial of St. Thomas. The font is raised upon a traceried stone platform with a kneeling step round it. The work has been carried out by Mr Robert Beall, of Newcastle-on-Tyne.

A memorial tablet to the late Mr. George Richmond, R.A., which has been placed in the crypt of St. Paul's Cathedral by his sons and daughters at the invitation of the Dean and Chapter, was unveiled on Wednesday afternoon by the Dean, who spoke appreciatively of the venerable painter, alluding to the active part which he played as a member of the first committee for the decoration of St. Paul's. The bronze medallion, with a life-like portrait in low relief within a wreath supported by two amorini with inverted torches, designed by Sir William Richmond, R.A., is mounted in a tablet of rosso antico marble adapted by Mr. John Richmond from an ancient altar figured in Mr. C. H. Tatham's work on classical ornament. Mr. Tatham was Mr. George Richmond's father-in-law. An inscription in Latin, written by Mr. Justice Kennedy, is inscribed upon the marble.

Our Office Table.

Several fresh pictures have just been acquired for the National Gallery. A portrait of Miss Elizabeth Close, by Geo. Romney, which has been purchased, was hung on Wednesday in Room XVIII. By the bequest of Miss Martha Waterhaughs, of Ayrshire—a portrait, said to be of Queen Catherine Parr, by an unknown painter, probably of the English school. This will be placed in the Gallery shortly. By the gift of Mr. C. Knowles, through Mr. A. Legros—the full-sized cartoon of the Prophet Isaiah, done for the mosaic in St. Paul's Cathedral, by Alfred Stevens; and by the gift of Mr. E. Homan—two water-colour drawings, "A Capri Boy" and "The Seaweed Boat," by the late Hamilton Macallum. The two water-colours are placed in the Water-Colour Room in the National Gallery of British Art, Millbank (Mr. Tate's gallery). The cartoon of Isaiah will be placed ultimately in the same room; it is at present in process of being restrained. Mr. A. Legros has also presented for the National Gallery of British Art a plaster cast of Lord Leighton's original study for the bronze group of the Athlete with the Python, now in that gallery.

Mr. W. Murray Guthrie writes to the daily Press from Stratford House, W.:—"I understand that the Corporation of London, as ground landlords of Stratford-place, have recently sanctioned the adding of a story to the house No. 6, on the east side. I should like to call the attention of the public to what I cannot but consider a most deplorable step. Stratford-place and Adelphi-terrace are, I believe, the sole remaining works of the Brothers Adam of any importance, where their architecture can be seen to-day pretty much as they left it. Stratford-place especially is a self-contained street which shows the Adam style on a large scale, and to make such an addition as is proposed would be quite to spoil the symmetry which was such an important feature of that style and of this particular specimen. The proposed alteration is all the more to be regretted in view of the projected new street, which is to run from Oxford-street to Berkeley-square. This street, with Stratford-place as its culmination, will form a most beautiful 'perspective,' which would be greatly marred by the alteration of Adam's sky line. The Corporation have full powers to refuse the permission demanded, and I hope that, upon their attention being called to the matter, they will reconsider their decision."

The directors of the company for building an hotel on the headland at Newquay have for some months stopped building operations owing to a dispute as to the right to inclose the land, which culminated in August last in the pulling down of the office-shed on the site and in a personal assault on the chairman of the company, Mr. Silvanus Trevail, J.P., F.R.I.B.A., for which offences 26 persons were duly convicted and fined. The directors have now reported to the shareholders that they have satisfied themselves, first, that the lessor's title is indefensible against any supposed or alleged rights or easements which could interfere with the company's operations; and, secondly, that in the event of any further action being taken, either by a public authority or by private individuals, to contest the freeholder's rights, the owner, Mr. Treffry, is determined to defend his title, and thereby protect his tenants, the company. They have, therefore, unanimously resolved to recommence building operations and push them forward. So far the urban district council of Newquay, who were supported by the Commons' Preservation Society, have taken no steps in order to protect the alleged public rights, and it remains to be seen whether they will now proceed to contest the right to build over the headland.

Professor Benjamin Ide Wheeler writes to the *New York Tribune* an interesting account of the explorations which have been made by the Germans at Priene, on the coast of Asia Minor, opposite the island of Samos. Many years ago, the temple of Athena, portions of which were then still standing, was studied by an English expedition, and the capitals and bases there found, under the name of "Fragments from the Temple of Minerva Polias at Priene," are familiar to architects as the most beautiful known examples of these features of the Ionic order. Since the English expedition, the local lime-burners and masons have destroyed what was left of the temple, and nothing now marks its site but a heap of stones. Two years ago the German archæologists resolved to begin new investigations, and the excavations so far made have been surprisingly fruitful. Although Priene did not reach the height of its prosperity until the time of Alexander, it seems to have possessed a certain superiority of artistic cultivation, possibly in consequence of the relations which it maintained with Athens, of which it is said to have been a colony; and the substructure of the ancient city has been found in a remarkably perfect state of preservation, so that the streets, with the various buildings on them, the agora, with its porticos, the council-house, the seats in which are still in place, and a small theatre, are plainly to be distinguished. In the private houses, not only is the style and general distribution quite distinguishable, but the remains of the decoration are still visible. Professor Wheeler likens the ruins to those of Pompeii, and the study of them, in comparison with those of the Græco-Roman town of nearly five hundred years later date, will be most instructive.

Slag-wool is undoubtedly a material that, for fireproofing, sound-deadening, and insulation of heat and cold, has no rival. Many whose attention has been aroused by the correspondence in our own pages and elsewhere, induced by the recent disastrous fire in the City, would do well to get a little treatise just issued by Messrs. F. M'Neill and Co., of Bunhill-row, E.C., on the uses of the slag-wool they make, and which has many superior qualities to recommend it. Many readers will be surprised to find how many little difficulties of construction in the case of brewery cellars, ice-houses, tanneries, hospitals, school-houses, theatres, flats, iron buildings, &c., are obviated by an intelligent application of slag-wool.

Every architect and builder who wants a good desk-remembrancer, blotter, or pocket calendar for 1898 should get one of the useful and artistic-looking ones issued by the Sun Insurance Office. As they reach us year by year we always involuntarily recall Scott's lines—

> "The vernal Sun new life bestows
> E'en on the meanest flower that blows"

—and heartily trust the "Sun" is likely to do so for another hundred and eighty-eight years, believing, as we honestly do, that it is the very best office a man can make provision for his family in, or safeguard his property in against disastrous fires, and with our belief fortified by gratifying personal experience of the prompt business-like methods which govern both departments.

Complete plans for the Zoological Gardens in Bronx Park, New York, have been prepared by Messrs. Heins and La Farge, architects, of that city, and have been laid before the Park Commissioners and approved. The arrangement will be such that if the Zoological Gardens should ever be abandoned for any reason, the removal of the animal houses will convert the whole into a well laid out pleasure park. The animal houses are to be designed to fit the landscape features of the park.

The rural district council of Helmsby have instructed Messrs. Fairbank and Sons, of York, to proceed with the preparation of detailed plans for affording a water supply to the villages of Stonegrave and Nunnington.

An electric-lighting scheme for Weston-super-Mare, formulated by Mr. W. C. C. Hawtayne, and recently adopted by the town council, has been reconsidered and modified so as to reduce the estimated cost to £20,000.

The fifth annual dinner of the Bristol Clerks of Works and Builders' Foremen Association was held at the Grand Hotel, Broad-street, on Saturday. There was a very large attendance. The chair was taken by Mr. H. Dare Byron. Mr. W. Woodrow gave "The Architects," and Mr. Frank W. Wills acknowledged the tost in a humorous speech. Mr. James Hart also responded. Mr. T. Godfrey gave "The Builders," and Mr. Krauss (president of the Master Builders' Association), and Mr. F. N. Cowlin responded. The chairman proposed "The Association of Clerks of Works and Builders' Foremen," and Mr. W. Kidwell (secretary) replied.

The corporation of New York has decided to acquire immediately property for the construction of eleven docks on the North River. They will each measure 800ft. long by 200ft. wide.

Mr. W. R. Symonds, of Ipswich, has received a commission to execute a portrait of Mr. Joseph D. Everett, D.C.L., F.R.S., of Natural Philosophy at Queen's College, Belfast. The portrait is to be placed in the hall of the college.

LIST OF COMPETITIONS OPEN.

Bootle—Fire Brigade and Police Stations (£14,000 and £1,500 limits)	50 Guineas, 25 Guineas	J. H. Farmer, Town Clerk, Bootle, Lancs	Dec. 31
Altrincham—U.D.C. Offices	£20, £10	J. Stokes, Clerk, 64, Market-street, Altrincham	,, 31
Crich—Water-Supply Scheme (3,100 population)	15 Guineas, 5 Guineas	Joseph Pym, Clerk, Belper	Jan. 8
Carlton, Victoria—Children's Hospital	£100, £50, £25	J. Nicholson, Hon. Sec., Pelham-street, Carlton, Australia	,, 30
Leicester—Motor Refuse Carts	Corporation	E. G. Mawbey, Borough Engineer, Leicester	,, 31
Port Elizabeth—Free Library (Assessors, Sir F. Blaine and R. H. Hammersley-Hunan—£22,000 limit)	100 Guineas, 50 Guineas	G. Oettle, Librarian, Port Elizabeth, S.A.	Feb. 15
New York—Sun Dial (Plaster Model)	500dol., 250dol.	Sec. National Sculpture Soc., 215, West 57th-street, New York	,, 28
Newcastle-on-Tyne—New Infirmary (local Architects)	(No first) £150, £100, £50	Secretary Building Committee, Newcastle	Mar. 1
Belper—Sewage Disposal Schemes	50 Guineas, 25 Guineas	Joseph Pym, Clerk, Belper	May 1
Lymington—New Forest Hall (limited to Hampshire Architects)	25 Guineas	Clerk to Hall Committee, Lymington	—
Berwick—Police Station (£3,000 to £4,000 limit)	£50, £25	The Town Clerk, Berwick-on-Tweed	—

LIST OF TENDERS OPEN.

BUILDINGS.

Manchester—Alterations to Mortuary Chapels, Philips Park Cemetery	Cemeteries Committee	City Surveyor, Town Hall, Manchester	Dec. 18
Bridlington—New Grammar School		Botterill, Son, and Bilson, Architects, 23, Parliament-street, Hull	,, 18
Grimsby—Alterations to Premises, 242, Cleethorpe-road	Councillor M. Abrahams	Mitchell, Son, and Co., Surveyors, 112, Cleethorpe-road, Grimsby	,, 18
Bradford—Herring-Curing Establishment		Hodgson and Farrar, Architects, Old Bank Chambers, Bradford	,, 18
Tunbridge Wells—Offices, Central Electric Station	Corporation	W. C. Cripps, Town Hall, Tunbridge Wells	,, 18
Morecambe—National Infants' School, Thornton-road		Jas. Marshall, Architect, Back-crescent, Morecambe	,, 18
South Bank—Additions, Police Station	North Riding County Council	Walter Stead, County Surveyor, Northallerton	,, 18
Welwich—Bank Repairs on Humber		H. Lamplugh, Patrington, Hull	,, 18
Whitley—Business Premises, the Staith		J. Caleb Petch, Architect, Scarborough	,, 18
Baltinglass—Rebuilding Workhouse Chimneys	Board of Guardians	J. R. Dagg, Clerk, Baltinglass	,, 18
Wakefield—Five Houses, Harrop-street		Abraham Hart, Architect, 21, Barstow-square, Wakefield	,, 18
Forres, Scotland—Block of Workmens' Cottages, Invererne-rd.		Reid and Wittet, Architects, Elgin	,, 18
Penzance—Three Shops at Daniel-place	John Rowe	Nathl. C. Whear, jun., Architect, Holbein House, Penzance	,, 18
Perth—Craig Public Hall		George P. K. Young, Architect, 42, Tay-street, Perth	,, 18
West Burton—Wesleyan Chapel and School		Wm. Lawson, West Burton	,, 20
Mynyddislyn—Additions, Pontlanffaith School	School Board	C. R. Lyne, Clerk, Westgate Chambers, Newport, Mon.	,, 20
Dewsbury—Long Chimney in Back Webster-street		John H. Brearley, Architect, Hanover-street, Batley	,, 20
Briton Ferry—Villa Residence		H. Alex. Clarke, Architect, Briton Ferry	,, 20
Maidstone—Additions to Council's Offices, Fair Meadow	Baths Committee	H. Monckton, Town Clerk, King-street, Maidstone	,, 20
Shrenwell Cross, Tipperary—Two Schools		Rev. Dr. O'Neill, P.P., Lattin	,, 20
Bradford—Fitting-up Restaurant, Kirkgate		Milnes and France, Architects, 99, Swan Arcade, Bradford	,, 20
Pinged—School	Pembrey School Board	Richard Williams, Architect, Burry Dock, Pinged	,, 20
Redcar—Eleven Houses		Hutchinson Brothers, Grange-road West, Middlesbrough	,, 20
Derrygonnelly—Dispensary	Guardians of Enniskillen Union	Richie Wilson, Clerk, Workhouse, Enniskillen	,, 21
Aberlour—Villa		Read and Wittet, Architects, Elgin	,, 21
Barking—Electric Light Station, East-street	Urban District Council	Edwin H. Lister, Clerk, Public Offices, Barking	,, 21
Belfast—Repairs to Three Dispensaries	Board of Guardians	Jas. C. Neeson, Clerk, Workhouse, Belfast	,, 21
Ilkley—Four Houses, Wilton-road		E. Barton Johnson, Architect, Ilkley	,, 22
Alnmouth—House, Argyle-street	Chas. Nettleship	Geo. Renvell, jun., Architect, Alnwick	,, 22
Morley—Two Houses in Park-parade		T. A. Buttery, Architect, Queen-street, Morley	,, 22
Great Leighs—Pair of Cottages	Samuel Joslin	George E. Clare, Architect, 66, Duke-street, Chelmsford	,, 22
Blondeston—House		Sidney Rivett, M.S.H., 5, South Quay, Great Yarmouth	,, 22
Longframlington—Extension of School Buildings		Rev. Chas. Carr, The Vicarage, Longframlington	,, 23
Milnsbridge—Three Shops and Two Houses in Morley-lane	Huddersfield Industrial Society	J. T. Prentis, Secretary, 31, Buxton-road, Huddersfield	,, 23
Billinghurst—House		Wm. Back, Architect, 60, West-street, Horsham	,, 23
Dewsbury—Through Houses, Greenwood-street		Thos. W. Speight, Architect, 28, Boothroyd-lane, Dewsbury	,, 23
Morley—Stables and Sheds, Corporation-street		M. H. Sykes, Borough Surveyor, Town Hall, Morley	,, 23
Belfast—Fire Brigade Station, Whitlow-street	Police Committee	Sir Samuel Black, Town Clerk, Belfast	,, 23
Ashford—Staining and Polishing Dormitory Floors in School Buildings	West London School Managers	Chas. D. Hume, Clerk, Ashford, Middlesex	,, 24
Keyham Barton—House, Shop, & Dwelling House, Hamilton-st.		R. Dampier, Manor Office, Devonport	,, 24
Keyham—Alterations at St. James's School		Rev. R. J. Bond, St. James's Vicarage, Keyham	,, 24
Ardgour—Manse		L. and J. Falconer, Architects, Fort William	,, 25
Buenos Ayres—Central Railway Station (cost, 4,000,000 piastres)		Legation of Argentine Republic, London	,, 27
Manchester—Thirty-two Two-story Tenements, Cornwall-street, and Eighteen Cottages, George Leigh-street	Sanitary Committee	The City Surveyor, Town Hall, Manchester	,, 28
Woodspring—Two Cottages		Price and Wooler, Architects, Weston-super-Mare	,, 28
Bideford—Alterations and Repairs, Post Office	Bideford Bridge Trustees	Charles W. Hole, Bridge Steward's Office, Bideford	,, 28
Manchester—Thirty-six Two-story Tenements, Chester-street	Sanitary Committee	The City Surveyor, Town Hall, Manchester	,, 28
Burnley—Extension to Electric Lighting Station		G. H. Pickles, Borough Surveyor, Town Hall, Burnley	,, 29
Halifax—Alterations and Additions to Moorside School	School Board	J. F. Walsh, Archt., Lancs. and Yorkshire Bank Chambers, Halifax	,, 31
Mold—School Buildings, Victoria-road	Governors of Alyn County School	G. H. Simon, Solicitor, Mold	,, 31
Halifax—Additions and Alterations to Akroyd-place School	Halifax School Board	J. F. Walsh, Archt., Lancs. and Yorkshire Bank Chambers, Halifax	,, 31
Frinton-on-Sea—School (150 children)	School Board	A. R. Chamberlayne, Clerk, Station-road, Clacton-on-Sea	,, 31
Copenhagen—Repairing Cemented Walls of Thorvaldsen's Museum	Corporation	F. Meldahl, Copenhagen	Jan. 1
Moybane—Classroom at National School		E. R. Crook, Moybane, Letterbreen, Enniskillen	,, 1
Abbeydorney—Manager's House	Co-operative Dairy Society	The Manager, Creamery Offices, Abbeydorney	,, 1
Burley-in-Wharfedale—National School (for 500)		Ed. C. Brooke, Architect, 4, Huddersfield-road, Brighouse	,, 13
Ladywell, S.E.—Workhouse for 800 Persons, Slagrave Farm	St. Olave's Board of Guardians	E. Pitts Fenton, Clerk, 30, Tanner-street, S.E.	,, 13
Epsom—Temporary Structures (for 700 patients and staff), Horton Manor Estate	London County Council	R. W. Partridge, Clerk Asylums Committee, 21, Whitehall-pl., S.W.	,, 24
Llanwrst—School for Girls, and Additions to Boys' School		Peter McIntyre, Clerk to the Governors, Llanwrst	,, 25
Bury—Two Houses and Shops, Elton-road		J. Sellars and Son, Architects, Union Chambers, Bury, Lancs	—
Bodmin—Isolation Hospital at County Asylum	Visiting Committee	Robt. P. Edyvean, Clerk, Bodmin	—
Saltaire—Semi-Detached Villas		Peterson and Lawson, Architects, 1, Bank-street, Bradford	—
Redruth—Alterations to Lanner Board Schools		S. Hills, Architect, Redruth	—
Bingham—Board Room and Offices	Board of Guardians	A. R. Calvert, Architect, Nottingham	—
Scarborough—Fourteen Large Houses on South Cliff		A. Moore, 23, West-bank, Scarborough	—
Lincolnshire—Stanhope Memorial, Horncastle		S. Goe Overton, Secretary, 2, Manor House-street, Horncastle	—
Keighley—Houses, Skipton-road	Robert Feather	Peterson and Lawson, Architects, 1, Bank-street, Bradford	—
Yatton—Additions to Claverham House		A. C. Rowley, Architect, 20, Nicholas-street, Bristol	—
Mallaig—Business Premises		Dun. Cameron, Architect, Inverness	—
Harrogate—Additions to George Hotel	Oliver Barber	A. A. Gibson, Architect, 8, Cambridge-crescent, Harrogate	—
Fleetwood—Shop and Dwelling-House		D. Rankin, Church-street, Fleetwood	—
Dudley—Additions to Conservative Clubhouse		A. Gammage, Architect, High-street, Dudley	—
Colmonell, Ayrshire—Free Church		Alex. Petrie, Architect, 134, Wellington-street, Colchester	—
Castleford—Victoria Hotel	W. Pickerskill	A. Hartley, Architect, Carlton Chambers, Castleford	—
Consett—Fifteen Houses		J. Bloom, 9, High West-street, Sunderland	—
Colchester—Reinstating Two Houses after Fire		C. E. Butcher, Architect, 3, Queen-street, Colchester	—
Blackpool—Four Detached Houses, Lytham-road		Goldsmith and Son, 63, Faulkner-street, Manchester	—
Whitehead—Three Terrace Houses	Whitehead Development Co.	Henry T. Fulton, Architect, 91, Donegall-street, Belfast	—
Astley—House		J. R. Withers, Architect, Shrewsbury	—
Ulverston—Re-erecting part of Furness Paper Mills (burnt down)		Settle and Farmer, Architects, Ulverston	—
Hadleigh—Two Villas		A. Morling, Hadleigh, Suffolk	—
Rugby—Citadel Buildings, Castle-street	Rugby Citadel Co.	Alexr. Gordon, M.S.A., Architect, 101, Queen Victoria-street, E.C.	—
Great Horkesley—Additions to The Cedars		C. E. Butcher, Architect, 3, Queen-street, Colchester	—
Attercliffe—Sixty Houses		W. Frobisher, Shirland-lane, Attercliffe, Sheffield	—
Feltwell Fen—Cottage at Anchor Drove		Bidwell and Sons, Surveyors, 11, Bennett-street, Cambridge	—
Fota—New Room and Other Work	Rt. Hon. A. H. Smith-Barry, M.P.	Arthur Hill, Architect, 22, George-street, Cork	—
Bradford—Offices and Storerooms, Duke-street		C. H. Hargreaves, Architect, New Corridor, Bradford	—
South London—Ten or Twenty Eight-roomed Houses		T. B., care of Street and Co., 30, Cornhill, E.C.	—
Wigan—Rebuilding Clarence Hotel		W. E. V. Crompton, Architect, Moot Hall Chambers, Wigan	—
Harrogate—Rebuilding Crown Villa, West Park	G. Goodrick	Arthur A. Gibson, Architect, 8, Cambridge-crescent, Harrogate	—
Kirkstall—Three Pairs Semi-Detached Villas, Victoria Park Estate		John Jackson, M.S.A., Barry-street, Bradford	—
Holbeck—Rebuilding of the Old Queen Anne Inn		A. D. Kaye, Architect and Surveyor, 71, Albion-street, Leeds	—
Harrogate—Semi-Detached Villas in Park Drive		J. F. Royce, 9, Station-square, Harrogate	—

BUILDINGS—*continued.*

Wetherby—Tall Brick Chimney	Wharfedale Brewery Co.	T. A. Battery, Architect, Queen-street, Morley	—
Middleton-St.-George—Private Asylum		John W. Dyson, Architect, 67, Grey-street, Newcastle	—
Winchester—Six Cottages		J. A. Sawyer, Surveyor, 62, High-street, Winchester	—
Morecambe—Four Dwelling-Houses, Balmoral-road		Harry Eastwood, 19, Regent-road, Morecambe	—
Great Horkesley—Addition to The Cedars	W. Page	Chas. E. Butcher, Architect, 3, Queen-street, Colchester	—
Skegness—Primitive Methodist Chapel (450 sittings) and School		Hy. Harper, Architect, Market-place, Nottingham	—
Islington, N.—Block of Flats		Walter Stair, 9, Queen Victoria-street, E.C.	—
Stratford, E.—Additions to Premises, Martin-street	S. Gulliver and Co.	W. Taylor and Sons, Architects, Aylesbury	—
Fairfield—Pair of Semi-detached Houses and Two Shops		J. H. Burton, Architect, 2, Guide-lane, Hooley Hill	—
Worthing—Post Office		R. Singer Hyde, M.S.A., Worthing	—
Colchester—Business Premises, Long Wyre-street	Shaws, Bryant, and Co.	Chas. E. Butcher, Architect, 3, Queen-street, Colchester	—
Edmonton, N.—Fifty Cottages		Architect, care of Fuller and Jackson, 11, Grocer's Hall-court, E.C.	—
Stretford—Laundry, Chester-road		Johnstone Brothers, Architects, 39, Lowther-street, Carlisle	—
Llandudno—Completion of Duke of Clarence Memorial Church	Rev. Francis G. Jones, Vicar	J. Oldrid Scott, Architect, 35, Spring-gardens, London, S.W.	—
Skegness—Two Boarding Houses		C. Nelson Holloway, Architect, Angel-row, Nottingham	—
Skegness—Primitive Methodist Chapel		H. Harper, Architect, Market-place, Nottingham	—
Bury—Five Dwelling Houses at Littlewood Cross	Bury Brewery Company	Thos. Nuttall, C.E., Architect, &c., 20, Market-street, Bury, Lancs.	—
Nottingham—Workshop and Offices, Pepper-street		C. Nelson Holloway, Architect, Angel-row, Nottingham	—
Oakworth—Warehouse, Providence Mills		Judson and Moore, Architects, York Chambers, Keighley	—
Pontefract—Reconstruction of Inn	Brice, Butler, and Lee	Tennant and Bagley, Architects, Pontefract	—
Padstow—Hotel		Crickmay and Sons, Architects, 13, Victoria-street, Westminster	—
Londonderry—Dwelling House		R. H. M'Elwee and Co., Architects, 9, Carlisle-road, Londonderry	—
Bury—Twelve Houses off Bolton-road, Elton	Jonathan Hamer	D. Hardman, Architect, Silver-street, Bury, Lancs.	—
Newquay—Headland Hotel		Silvanus Trevail, F.R.I.B.A., Architect, Truro	—

ENGINEERING.

Glasgow—Four Cast-Iron Water Tanks, Five Lancashire Steam Boilers, and Cooking Apparatus at Ruchill Hospital	Corporation	John Lindsay, Interim Clerk, City Chambers, Glasgow	Dec. 18
Kirkcaldy—Heating of Memorial Halls		Dunn and Findlay, Architects, 35, Frederick-street, Edinburgh	„ 18
Fletton—Pipe-laying	Norman Cross Rural District Council	Wm. Pettit, Clerk, Union Offices, Peterborough	„ 18
Totnes—Pipe-laying at Diptford	Totnes Rural District Council	Thos. W. Windeatt, Clerk, Totnes	„ 18
Cadiz—Canal (about £55,000)		Direction General of Public Works, Madrid	„ 18
Eastbourne—Widening Promenade	Highways Committee	R. M. Gloyne, Borough Engineer, Town Hall, Eastbourne	„ 20
Canterbury—Electric-Lighting Plant	Corporation	H. Fielding, Town Clerk, 15, Burgate-street, Canterbury	„ 20
Bo'ness—Reservoir, Brunton Burn	Police Commissioners	R. J. Jamieson, Town Clerk, Bo'ness	„ 20
Renwick—Oblique Bridge across the Raven	Penrith Rural District Council	C. N. Arnison, Clerk, Penrith	„ 20
Dundee—Service Fuse Boxes	Gas Commissioners	Sir T. Thornton, Clerk of Commissioners, Town House, Dundee	„ 20
Luxemburg—Railway Construction Works		Administration of Prinz Heinrich Eisenbahn, Luxemburg	„ 20
Atherstone—Extension of Water Mains	Rural District Council	W. A. Hatton, Clerk, Atherstone	„ 20
Swinton—Sinking Well near Thomas-street	Urban District Council	R. Fowler, Engineer, Swinton	„ 21
Hammersmith—Two Vertical Engines and Two Flywheel Alternators	Vestry	W. P. Cockburn, Vestry Clerk, Town Hall, Hammersmith	„ 22
Salford—Stone-Breaker		Samuel Brown, Town Clerk, Town Hall, Salford	„ 22
Workington—Heating the Central Stores	Industrial and Provident Society	W. G. Scott and Co., Architects, Victoria Buildings, Workington	„ 23
St. Anne's-on-Sea—Refuse Destructor	Urban District Council	Thomas Bradley, Clerk, Park-road, St. Anne's-on-the-Sea	„ 24
Carrickfergus—Rebuilding Retort Bench	Gas Company	David Gillespie, Secretary, Carrickfergus	„ 27
Braila—Bridge and Road (about £7,507)		The Prefect, Braila, Roumania	„ 27
London—Arc Lighting Extension	Vestry of St. Pancras	C. H. F. Barrett, Vestry Clerk, Pancras-road, London, N.W.	„ 28
Cults, N.B.—Waterworks and Sewerage Works	Aberdeen District Committee	Alexander Clark, District Clerk, 13, Bridge-street, Aberdeen	„ 28
Port-Glasgow—Waterworks at Parkhill	Commissioners	Leslie and Reid, C.E.'s, 72A, George-street, Edinburgh	„ 28
Wick—Harbour Improvement	Wick & Pulteney Harbours Trustees	D. W. Georgeson, Harbour Secretary, Wick	„ 28
London, E.C.—Bridge Work	Bengal-Nagpur Railway Co., Ltd.	The Company's Office, 132, Gresham House, E.C.	„ 29
Criccieth—Sea-Wall at Maes Abereisteddd	Criccieth Urban District Council	Thomas Jones, Clerk, Town Hall, Criccieth	„ 30
Catauzaro—Electric Tramway from Town to Station		The Municipal Authority, Catauzaro, Italy	„ 30
St. Gilles-lez-Bruxelles—Gasworks	Council	The Secretary, 504, Chaussée de Mons, Anderlecht, Brussels	„ 31
Canterbury—Refuse Destructors	Corporation	Henry Fielding, Town Clerk, Canterbury	„ 31
Bedworth—Waterworks	Foleshill Rural District Council	Alfred P. Oswin, Clerk, Union Buildings, Foleshill	„ 31
Belem—Two Steam Pumps, Three Boilers, Iron Reservoir, &c.		Junta du Tresor de l'Etat de Para, Brazil	„ 31
Brazil—Railway from Novo Hamburgo to Caxies	Government	Central Directorate, Public Works, Porte Alegre	„ 31
Denbigh—Laying 13,200 yards of Cast-Iron Water-Mains	Visitors of N. Wales Counties Asylm.	Wm. Barker, Clerk to the Visiting Committee, Denbigh	„ 31
Helmsley—Waterworks	Helmsley & Kirbymoorside R.D.C.'s	Robert Pearson, Clerk to Helmsley R.D.C., Helmsley, Yorks	„ 31
Ebchester—Siding at Hamsterley Colliery		Owners of Amsterley Colliery, Ebchester, R.S.O., Co. Durham	„ 31
Waterhouses—Brick Bridge over Holburn Beck	Brandon and Byshottles U.D.C.'s	John George Wilson, Clerk, 5, North Bailey, Durham	„ 31
Glantanat-isa—Bridge	Denbighshire County Council	Ll. Adams, Clerk, Ruthin	Jan. 1
Lisbon—Canals in the City		Department of Public Works, Lisbon, Portugal	„ 1
Little Hampton—Storm-water Works	Urban District Council	Arthur Shelley, Clerk, Town Offices, Littlehampton	„ 5
Dunmanway—Supply of Water	Guardians	J. Lane, C.E., Bandon	„ 7
Bundoran—Waterworks	Guardians of Ballyshannon Union	James Perry, M.I.C.E., County Surveyor, Galway	„ 8
Athens—Docks Extensions (about £110,000)		Chancelleno, Monarchie Attique, Athens	„ 9
Bedford—Electric-Lighting Plant	Electric Light Committee	T. S. Porter, Town Clerk, Town Hall, Bedford	„ 10
Bootle—Electric-Lighting Plant	Corporation	J. H. Farmer, Town Clerk, Bootle	„ 10
Gloucester—Plant on Low-Tension System at Electricity Works	Electricity Supply Committee	Geo. Sheffield Blakeway, Town Clerk, Guildhall, Gloucester	„ 18
Kirkcaldy—Reservoirs at Holl, Arnot, and Carberry; and Filters at Holl	Waterworks Commissioners	William D. Sang, C.E., Kirkcaldy	„ 19
Pernambuco—Port Works	Government	Brazilian Ministry of Public Works, Rio de Janeiro	Feb. 28
Madras—Utilisation of Water of Periyar Lake		Chief Engineer for Irrigation, Madras	July 1
Tralee—Three-ton Steam Crane		Harbour Commissioners, Tralee	—
Altham—Septic Tank	Burnley Rural District Council	S. Edmondson, Surveyor, 18, Nicholas-street, Burnley	—
Ynmiden, Holland—Metal Sluice Gates (estimated cost, £19,600)		Provincial Authorities, Harlem	—
Val de Noche, Dulcigno—Quay and Breakwater (about £76,500)	Government of Montenegro	Minister of Foreign Affairs, Cettigne	—
Whitehaven—Driving Tunnel, 12ft. by 8ft. 6in.		William Pitt, Whitehaven	—
Llanwenarth Citra—Laying Water-Pipes		Alfred Edwards, The Steps, Llanwenarth Citra	—
Hull—Low-pressure Water Meters	Waterworks Committee	F. J. Bancroft, Water Engineer, Town Hall, Hull	—

FENCING AND WALLS.

Walmer—Fencing & Levelling Recreation Ground, Campbell-st.	Urban District Council	F. W. Hardman, Clerk, Walmer	Jan. 5
Hunslet—Wall in Pepper-road		W. Broughton, Builder, Jesmond-terrace, Pudsey	—
Lazonby—Wall near Post-Office		E. James, Silloth	—

FURNITURE AND FITTINGS.

Stockwell—Furniture, Bedsteads, and Bedding to South-Western Ambulance Station	Metropolitan Asylums Board	T. Duncombe Mann, Clerk, Norfolk-street, Strand, W.C.	Dec. 18
Croydon—Furniture for Cottage Homes, Mayday-road	Guardians	Harry List, Clerk, Union Offices, Mayday-road, Thornton Heath	„ 24
Liverpool—Extension of Nurses' Home at Workhouse	Select Vestry	H. J. Haggar, Vestry Clerk, Parish Offices, Brownlow Hill, Liverpool	—

PAINTING.

Carlisle—All Schools	School Board	T. Taylor Scott, F.R.I.B.A., Carlisle	Dec. 25
Nottingham—Eight Board Schools	School Board	W. J. Abel, Clerk, Victoria-street, Nottingham	—

PLUMBING AND GLAZING.

Llanerchymedd—Cold Water Supply to Workhouse	Anglesey Board of Guardians	Thomas Hughes, Clerk, Menai Bridge	Dec. 29

ROADS AND STREETS.

London, E.C.—Paving with Jarrah Wood Chiswell-street	St. Luke Vestry	G. W. Preston, Clerk, Vestry Hall, City-road, E.C.	Dec. 18
Cardiff—Paving and Channelling Eldon-street	Corporation	W. Harpur, M.I.C.E., Borough Engineer, Town Hall, Cardiff	„ 20
Barnet—Kerbing, Channelling, and Tar-Paving Roads	East Barnet Valley U.D.C.	Henry York, Surveyor, Station-road, New Barnet	„ 21
Catford, S.E.—Forming Brownhill-road	Lewisham Board of Works	The Surveyor's Offices, Lewisham Town Hall, Catford, S.E.	„ 21
Urmston—Paving and Drainage Works	Urban District Council	T. J. Rowland, Clerk, Council Offices, Urmston	„ 21
Halifax—Completion of Road (44ft. wide)		W. G. Gray and Son, Architects, 28, George-street, Halifax	„ 21
Reading—Paving and Kerbing Thames-avenue	Sanitary Authority	John Bowen, A.M.I.C.E., Borough Engineer, Town Hall, Reading	„ 21
Birkenhead—Making-up Various Streets	Corporation	A. Gill, Town Clerk, Birkenhead	„ 22
Blackpool—Street Works	Corporation	J. Wolstenholme, Borough Engineer, Blackpool	„ 22
Morley—Paving and Flagging Hull-street		M. H. Sykes, Borough Surveyor, Town Hall, Morley	„ 23
Morley—Paving and Flagging Gainsborough-street		M. H. Sykes, Borough Surveyor, Town Hall, Morley	„ 23
Morley—Sewering and Kerbing Wood-street	Corporation	M. H. Sykes, Borough Surveyor, Town Hall, Morley	„ 23
Perth—Causewaying Main-street and Strathmore-street, and Recausewaying Mill-street	Police Commissioners	William Macleish, Clerk to Police Commissioners, Perth	„ 24
St. Anne's-on-Sea—Making-up St. Anne's-road West, Nelson-street, and St. Alban's-road	Urban District Council	Thomas Bradley, Clerk, Park-road, St. Anne's-on-the-Sea	„ 24
Tunbridge Wells—Sewering and Paving Roads, St. James's Park Estate	Corporation	W. C. Cripps, Town Clerk, Tunbridge Wells	„ 29
East Molesey—Making-up Seymour-road and Beauchamp-road.	Urban District Council	John Stevenson, Surveyor, Walton-road, East Molesey	„ 31

THE BUILDING NEWS
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DRIFTING INTO PRACTICE.

A STRANGE variety of circumstances have marked the course and destiny of many men who have become eminent in the profession. After changing about from one thing to another they have settled down, often without any aim, to the vocation of architect as a means of earning a living. Not a few of them have drifted from plodding business pursuits connected with building into art; many have passed from surveying into an architectural practice, while a few have exchanged the carpenter's or mason's tools for the drawing board and pencil. We hear of many who have taken the retrograde course, and have actually left the artistic for the business and mercantile part of the profession. In the case of very many they have not been able to pick and choose a line for themselves; in fact, in a majority of instances some hindrance has prevented them from following the path they had sketched out.

There is the young enthusiast for art who leaves school and enters an office. He soon finds it all drudgery. Business routine is everything. The principal has been brought up in a builder's or surveyor's office, and he discourages all attempts on the part of his pupil to become too fond of art. He sets him on making tracings, specifications, and builders' measurements, and will on no account give his youthful charge any opportunity of reading books like Fergusson's, of copying examples from Street or those from Nesfield, Shaw, or Gotch. That the atmosphere of such an office is anything but congenial to the youthful mind which is looking above mere business qualifications cannot be doubted for a moment, and yet it would not be difficult to prove that a very large proportion of our leading architects who have made a name in the profession have commenced their careers in offices of this description. Barry, Blore, Scott, amongst Gothic revivalists, commenced their lives, or spent a large part of their early pupilage, under conditions that were not favourable to art, and it would be easy to give a long list of those who have made a name as adapters of the Classic, who were articled to men whose acquaintance with the art were limited to a knowledge of the Five Orders or the mode of measuring. This pent-up and restricted discipline of the office with its routine and drudgery has not been without its advantages. It has served to restrain and discipline the youthful mind in the fundamentals of the profession till it could be intrusted to soar on wings of its own. Even a modern revivalist of one of our latest art schools has said that an architect could not do better than "cut his teeth" on the Classic orders. The fact is that the artist, like the musician, is all the better qualified for his work by having practised "on the scales" of his art.

If we take the contrary procedure of stimulating the imagination at the onset, of letting it soar unguided through realms of fancy, the result is generally an early disappointment, and, is it not borne out by actual experience that the student who allows himself too unbridled an imagination is the man whose ardour is easily daunted? And this is why, we believe, much of the academical training of the architectural student is found to be a mistake. His ambition is stirred to do something extraordinary—to design cathedrals and costly fanes, Houses of Legislation, municipal palaces, noblemen's houses, large art galleries, and the like—instead of the more modest buildings of everyday life, and such as he will be called upon to design and carry out. In the effort to accomplish a task which calls for their highest powers, there is the danger of exaggerating the imaginative or ideal qualities, and a reaction follows. Having scaled the grander and more ambitious heights, the student looks with disdain on his everyday work, which is performed in a perfunctory manner. The result is disastrous. The young draughtsman who has been making ideal perspectives and elaborate façades loses heart, and settles down to a commonplace level when he comes to do ordinary building designs. But it seems otherwise with one who begins his profession on the lowest "rung" of the ladder, and who ascends by degrees to a higher class of work, supposing, of course, that he has artistic capabilities which can be developed. His imaginative powers seem to grow as they are called into requisition. Suggestions of material and requirements of building furnish food for the imagination, which is developed more that it has some basis to stimulate it. Is it not true that a practical want has suggested to the architect a feature of value, and some material a new treatment? On the other hand, a grand façade designed without reference to any consideration of fitness or utility, or a copy of some notable building, is like an empty high-sounding phrase expressing no adequate meaning or plan. And it is on this theory that we find the man who has acquired the rudiments of the profession—the man of business habits who has inherited art instincts—the more successful. He is often stronger in plan, more disciplined, and able to understand his client's wants. Competition furnishes many instances of this kind of architect. He may not be a great draughtsman himself; but he knows where to go to, and his taste seldom deserts him. Our Barrys, our Scotts, our municipal hall and school builders—the men who have done the best work in cities, our hotels and commercial buildings—have generally been of this calibre. If not talented, their work is always good. On the other hand, how many we find of those who have won Academy medals and Soane Medallions, who have done brilliant service in their earlier years, falling back in the race simply because of the want of practical qualifications! We do not mean by such questionable business tactics as those we have heard of lately in connection with a competition for baths, where the architect who had been employed to make plans was unceremoniously ousted for others in the same craft. No honest man, however talented, could hold his own against the pushing practitioner, or against business activity like that described by a writer last week in our "Correspondence." But the gifted artist fails for want of being able to marshal his facts; of being unable to cope with practical requirements, and to put them into shape.

The man who confines himself to one kind of work is often one who has drifted into it. He is rarely or seldom nurtured or trained as a specialist; but circumstances over which he has had little control have favoured his position. A successful competition for, say, a town hall or public baths and washhouses, has often been the opportunity. We have our Waterhouses, Collcutts, Mountfords, who have won deserved reputations as designers of municipal buildings. Once the problem has been solved, the inherent difficulties of planning disappear, and every subsequent design of the same kind makes the attainment of the solution more certain. But they would have been equally successful in any other branch, as in the case of those we have named. We are not sure that any architect who has the power of design has a particular predilection of talent for any one class of building in the first instance. The special knowledge comes afterwards. A competition for a municipal building, public baths, a workhouse, or a church may decide his choice. Having once "broken the ice," the fortunate candidate finds it easier to pursue one branch of his profession. Undercurrents of thought or influence may assist him. We know not a few men who entered the profession as students of ecclesiastical architecture, but, through various influences, friendship, and patronage of another kind, have drifted along a quite different path, as designers of hospitals and other buildings of a secular class. A few have become quite experts. Other men who began in a general practice have become church-builders. A versatility of mind has no doubt been a determining influence. Men like Sir Chas. Barry, Sir Gilbert Scott, Mr. Street, the late Mr. Pearson, R.A., who could do justice to any line of study they took up, have more or less drifted into channels they have made their own. Style has also been one of the determining forces. A man brought up in the office of a Gothicist, surrounded by an atmosphere of Mediæval thought and art, must naturally find his particular sphere in church building and restoration, and we have in the great trio of architects, Scott, Street, and the late Mr. Pearson, eminent instances of education in style determining the career. Mr. Pearson early identified himself with the Gothic movement, and his earlier Yorkshire churches show his knowledge of ecclesiastical architecture as it was understood in this country, though his later efforts prove him to have adopted many French and Continental features, as we find in his great churches of St. Augustine, Kilburn; St. John the Evangelist, Red Lion-square; and, later still, in his great work at Truro, still incomplete, in which foreign influence is felt, even through the beautiful Early English detail. And so Scott and Street both drifted into their own favourite expression of style, even when they turned their hands to purely secular buildings like the St. Pancras Hotel and the Law Courts. Others, in whom the influence of style or early art training is less strong, are ready to practise in any style;—they design houses, churches, schools, workhouses, banks, libraries, and any other sort of building that comes into their way. Taking a medium course between the essentially artistic and the purely commercial, they become thoroughly practical and business-like, and often achieve success.

The education and circumstances, social and otherwise, have much to do with the prospect of an architect. In his interesting book of "Experiences," Mr. Darbyshire shows how, under favourable conditions and good patronage, a provincial architect can succeed, and his own achievements are a proof of it. Of course, a great deal depends on the kind of *clientèle*—whether they are commercial or artistic. And, as the author observes, if the architect is commercially-minded, he gets on well, for he can give as many kicks as he receives. Over-sensitiveness is not his weakness. If, on the other hand, he cherishes strong art convictions, the road to success is beset with thorns. He has to fight with clients who pretend to know more about building and art than himself; he has to humour whims and fancies. The utilitarian client, who believes in square houses with centre doorways, plenty of plate glass, and sacrifices all architecture to iron columns and girders and other utilities of commercial life, is one of the hardest men to deal with; though worse than he is the man who has a smattering of what he calls art, and intrudes his views upon his adviser in the most provoking way. Clients of this sort constitute the most unfavourable conditions for the young architect — who cannot select his patrons. Unfortunately, many of those who have the highest aspirations in their profession

are thrown among them; others who are less appreciative and critical enter calmer waters, where conflicts and eddying currents are less known. There is only one remedy—namely, that of training the architect for that particular kind of patronage he is likely to obtain; but as yet it is impossible.

MECHANICAL RESTRAINTS.

THE direct influence of mechanical science and contrivance on the architect's work is one of the distinctive characteristics which separate modern from ancient practice. It is true the ancient Roman, Byzantine, and Mediæval builders were acquainted with mechanical principles; their masons knew how to construct arches, vaults, and domes, and to poise nicely the vault on slender pillars, and transmit imperceptibly its thrust to the ground by a delicate system of buttressing. The Roman engineer or architect was able to supply Rome and great cities of the Empire with water carried by aqueducts of amazing height and cleverness equal to anything the modern engineer can show; but his mechanical skill was based on a few well understood laws, and made to subserve construction. On the contrary, the modern architect and engineer look upon construction as independent of mechanical laws, which they are obliged to learn if they desire to build safely. These principles were in the time of Vitruvius limited to the mechanical powers, and they were applied without all the circumlocution or mathematical formulæ as used now. We have now all kinds of definitions and distinctions to master in learning such a thing as mechanics—"potential energy" and "kinetic energy," each of which must be distinguished as energy stored up or expended in motion, and this applies to air and fluids and various materials; "mechanical advantage" or the ratio of effort to resistance of a machine. These and many other things the modern constructor has to learn from books, which give no idea at all as to how they can be applied to practical problems. Most of us know what the ancients knew of hydraulics, as the invention of the Archimedean screw for raising water. We may see granite and stone inscribed with hieroglyphics, showing armies of slaves dragging or pulling ropes to lift monoliths. A few hundred years ago Fontaine raised an obelisk at Rome by the aid of 40 capstans worked by nearly a thousand men and horses; but the same feat was accomplished on our Embankment with the help of four little 100-ton hydraulic jacks, each worked by one man. We have in this incident a simple illustration of mechanical power as exercised by the ancient builder and by ourselves. Tremendous weights can be lifted or great pressures exerted by the use of water instead of levers and wheels. Anyone who observes the erection of a large building will find how much is done by mechanical means. Huge blocks of stone and iron beams can now be lifted by means of hydraulic cranes, and moved to any position by a few handles. The construction of our great girder and cantilever bridges of iron and steel is rendered comparatively easy by hydraulic forging, and small riveting-machines can now be used close to the girder from a steam-engine and pumps at a distance. The number of hydraulic machines made upon the principle of the press—such as the lifting or crushing-jack, punching-bear, forging and welding machines, hydraulic lifts—shows the multiplication of mechanical industry in one department. More directly connected with the architect's work are the number of labour-saving machines used in stone and wood-working, which have a direct bearing upon design, all of which were unknown to the old builder. The average architect feels less compunction in designing stone and wood mouldings and patterns for walls, since he can have these supplied for him ready-made. He is restrained from exercising his own inventive talent by knowing that the stock pattern is less expensive. He selects moulded bricks, ready-made castings in iron or brass, tile patterns and wall designs in various fabrics, because he knows they can be procured at less cost. All these are the results of mechanical invention. But mechanical principles enter into the design of our construction at every step which our forefathers knew nothing about. Formulæ and rules are applied to such matters as arches, vaults, roofs, girders, and columns. Certain canons of proportion, geometrical and numerical, probably taught the Mediæval architect how to proportion his pillars, arches, and other masses of masonry. They were results derived from experience. Now the same things are regulated by graphic statics or mathematical analysis. If we want to construct an arch of masonry that shall be in equilibrium, we proceed according to rule to find the load which it has to bear, and to equate the moments of thrust with that of abutment, or graphically, by means of a force-polygon, by which we can determine the thrust of every arch-stone or the line of resistance within the thickness of arch. So, too, we have mechanical means of finding out what depth and size beams of iron must be to carry certain weights. If we discard these rules, we do so at the risk of failure. The public expect the architect to understand them, to know what is necessary to insure stability. In such matters as hydraulic apparatus, lifts, hot and cold water supply, laboratory and workshop fitting up, bath and laundry arrangements, &c., mechanical considerations and contrivances enter largely into the design of the architect. They require him to study departments of science which lie outside his particular art. They often interfere with his taste, and rob him of that serenity of thought so necessary to artistic conception. At every turn engineering forces itself upon his attention—he cannot ignore it.

There is one indirect way in which architecture is affected by mechanical invention—namely, the contact of the profession with engineers and inventors, plumbers, and other mechanical trades. The architect rarely writes a specification without referring to these trades more or less directly. He has to specify the sizes of columns, the depth and thicknesses of iron girders, iron roofs, hydraulic lifts, plumbers' fixtures, heating and ventilating details. That these exercise a rather restraining and subduing influence on his design cannot be disputed, nor are they always favourable. They bring him into contact with men who have no sympathy for art, who wish to display their own trade, who make the most of technical difficulties, and who endeavour to make profit out of them. Take ironwork. Patterns for castings of columns, capitals, spandrels, brackets, and other details have to be made from designs supplied by the architect. These have to be made to conform to certain mechanical and physical laws; the contraction of the molten iron in cooling has to be considered in the size of the wooden pattern, so that it should be large enough; internal strains caused by inequalities of contraction have to be taken into account, sharp and re-entrant angles have to be avoided, &c. Then such details as riveting, welding, connections, hinged joints, roller bearings, have to be specified. In New York and Chicago, engineering experts find a new field of labour in co-operating with architects in the erection of lofty buildings in which structural iron and steel are employed. The steel-skeleton building has enlisted the services of these specialists, and in this country it is not uncommon to find the architect co-operating with engineers about many problems of structural ironwork, heating and ventilating, and many other things, so largely do mechanical considerations enter; but the circumstances lead to an important question. Is it easier to import the engineering element into architecture, or the æsthetic element into engineering? On several important grounds, we should be sorry to see the mechanical expert or engineer encroach on the architect's province. He may co-operate in certain cases; but the architect ought never to agree to his dictation or interference in matters of design. Yet we see plenty of this in large buildings. The pattern of an iron column, capital and base, of brackets and spandrel, is left to the engineer, sometimes even more important details, like an iron roof. It is because the average architect knows so little about iron construction that he is compelled to go to the engineer; but is the compliment reciprocated by the engineer? Does he come to the architect for advice or assistance in designing his buildings for railways, bridges, factories, waterworks, viaducts, gas-holders? Very seldom. They are generally left to the draughtsman or assistant of the engineer, and, as a rule, are the most commonplace of structures, haphazard in their arrangements and crude in detail. It ought certainly to be easier for the architect to learn construction than to expect an engineer to feel the influences of art under his present training. Æstheticism is born, not learned, and no amount of instruction can make an engineer an artist if it is not in him. When it is, we find him achieving architecture almost unknowingly. Then the architect is largely influenced by the lesser details of trades. Who has not felt the depressing influence of having to provide for the plumber or the ironmonger, to have to give way to patterns of new grates and gas-fittings? And yet the architect, if he is equal to his task, ought to be able to turn these mechanical contrivances to account, to throw over them the spell of his art; so to arrange and select the most commonplace detail, such as a door-lock or a gas pendant, that it may not mar the character and unity of his design as a whole. No doubt very few can do this. All these things seem to break and disconnect the charmed circle of his inspiration, as if some electric connection had been broken, or as if the electricity of his own nature had been repelled, the flow of his art had been stopped. Hideous and commonplace these contrivances of a commercial age are unquestionably; but even they may be made less awkward and repellent than they are if the architect took them under his care, and tried to do something with them. If the architect threw himself into this part of his task—that of making the most common and mechanical things presentable or appropriate, half the excrescences and monstrosities we see might be avoided. Master the mechanical and turn it to the best advantage, is the maxim to be learned in these days of competitive industries.

And lastly, what should be the meaning of style to us? Are we compelled to conform to this or that style of the past? Certainly not, if we mean by "style" a method or a phase of a particular period—if we mean to have an architecture of our own. We must try to realise all that we have learned of mechanical science in its varied applications to building before we can dare to say we have a style worthy of the traditions of the past. It may be a difficult and arduous task to accommodate ourselves to modern requirements, to modern engineering problems and construction; but it has been done in the past, and can be done again. Ingenuity of plan and construction is a hard problem now, but we have instances of its accomplishment, as in the new McEwan Hall of the Edinburgh University we illustrated last week, with its essentially modern application of scientific

principles, its wood panelled dome of steel, its acoustic arrangement of plan, its lighting by electricity. Though we may not at first produce an architectural result that is harmonious, we may look on such buildings as steps in the evolution of a mode of construction that can be dignified by the name of Architecture.

WHAT IS A FIRE-RESISTING BUILDING?

We continue to receive all kinds of suggestions and remarks having reference to the great City fire. As in the profession of medicine, all sorts of remedies and specifics are propounded, amongst them a good deal of what may not inaptly be termed quack remedies. There are some who lay more stress on extinction of fire than on fire-resisting construction. Various kinds of appliances for extinguishing fires, such as hand-grenades, automatic sprinklers, steam, &c., have been brought forward. There are others who advocate systems of construction and special fire-resisting materials, the belief being that prevention is better than cure. Both classes of exponents have something of value to say. We shall always have buildings stored with inflammable goods, which goods are liable to become ignited, whether the building is fireproof or combustible, and such fires must be extinguished. On the other hand, it is the duty of the architect or builder to use the most fire-resisting methods and materials he can. It is comparatively an easy matter to extinguish a fire confined to one room or department if taken in time, or in a room that can resist intense heat for a certain time; but it is a more difficult thing to render our buildings fire-resisting, or to be able to make every division of a building so resisting as to confine a fire for at least long enough to burn itself out without extending to other parts. This, indeed, is the problem architects and engineers have to accomplish. We have to consider not only materials, but the methods these ought to be employed, the construction no less than the material. There is a tendency among those who write on the subject to separate these two things—to consider one of them only, to the exclusion of the other. The most perfect fire-resisting lining or plaster may be found, but it is of no use if only partially or ineffectually applied—if, for instance, despite its use, well-holes and lifts and openings exist in the walls which will allow flame to enter another floor or department, also stored with inflammable goods. It is the burning mass of combustible matter, like furniture or clothing, that is the danger. If we can surround this mass with fireproof floor, walls, and ceiling without any openings, it will burn out quickly, if there is no air to feed the fire; but if there are openings—a staircase or lift, or other aperture—the conditions of burning become favourable, and, of course, in every room or floor that cannot be closed effectually, there is the risk we most dread. One of our correspondents (Mr. H. C. Standage) affirms, what is known by experience, that an absolutely fireproof building is impossible. Even "fireproof plaster" cracks or peels off the iron and brick surfaces if great heat is evolved, and all that can be done is to so construct our walls and floors that they shall defy heat and fire as long as possible. A well-known firm (Frederick Jones and Co.) last week confirmed also what is generally known: that "concrete and iron" are not fireproof; that the concrete acts as a conductor of heat to the iron imbedded in it, and the latter expands and bursts the concrete—such, at least, has been the usual experience in great fires. The experiments they refer to also appear to be conclusive as to the fact that rolled iron joists packed with "silicate cotton, cased externally with plaster of Paris and silicate cotton," resist fire better than the ordinary concrete covering. The experiments quoted in our last issue deserve notice.

As to the behaviour of iron when once it is exposed to the action of fire, no one for a moment claims for it any great fire-resisting qualities; and the examination of the ironwork at the ruins of the late fire proves how iron joists and T and channel-iron are liable to twist and buckle, with serious consequences to the walls of buildings. The solution of the problem—How to construct a building that will withstand intense heat, and hold a fire in check for some time?—can be attained if a suitable casing for the iron is used, and at the same time the conditions for confining the fire are observed. No other means are available. At the last meeting of the Society of Architects the question was fully discussed, and is reported in our pages, and it is to be hoped that some of the suggestions made will receive the attention they deserve. That brick or clay products are the only safe material for walls and arches, that iron girders and columns should be of the box form and protected with metal lathing and cement; that floors should be solidly constructed and protected; that windows facing streets and light areas should have asbestos cloth blinds, are suggestions all will endorse.

THE SOCIETY OF ARCHITECTS.

A "SOCIAL evening for discussion" was arranged by the council of the Society of Architects to be held on Thursday evening in last week, the theme to be considered being "Lessons to be Learned from the Late Fire in Cripplegate." The announcement proved very attractive, for the meeting-hall of the Society at St. James's Hall, Piccadilly, was filled. Little tables were arranged as in a restaurant, here and there about the room, on which cups of coffee and biscuits were provided, and the permission to smoke was generally availed of by members and visitors. In the absence of the President, Mr. Walter Emden, who sent a telegram regretting his unavoidable detention by business at Southampton, Mr. W. R. Mallett, member of council, occupied the chair.

M. E. J. Soil, of Tournai, Belgium, secretary of the Historical Society of Tournai, was elected as a honorary member, and Messrs. John Millar R. Smetham and John Whitehead, both of Albert Chambers, Albert-street, Harrogate, were elected as members, in all cases unanimously and by ballot.

LESSONS OF THE LATE LONDON FIRE.

Mr. Ellis Marsland, hon. secretary, opened a discussion on this subject by reading the following short paper, which was illustrated by a number of lantern views taken immediately after the fire by the lecturer. Mr. Marsland expressed his thanks for the kind assistance received from his friend, Mr. Edmund Woodthorpe, the district surveyor for the Northern Division of the City of London, and also to his friend Mr. Howard Colls, and his foreman, for conducting him over the various points from which the views were taken. Having shown and explained a series of sixteen views of the ruins, including a plan of the fire area, showing the extent of the conflagration, Mr. Marsland proceeded: You will have gathered from the views the effect of fire upon tall buildings, situated in a crowded area, abutting upon narrow streets, constructed in the ordinary manner with brick party-walls, stone fronts with a large area of glass, looking into light courts in the rear, the floors of wooden joists supported on iron girders; the roofs of timber covered with slates, the interiors lined with match-boarding, and divided up with wooden partitions, the communication by wooden staircases, and the buildings filled with wooden fittings and inflammable goods; and one is not surprised at the result. From my own observation, and from inquiries, none of the destroyed buildings laid any claim to be fireproof, or even fire-resisting. I am dealing with the subject this evening upon the supposition that the whole area destroyed will be reinstated. It will be needless to discuss this matter on the basis of rearranging the area and constructing wider streets, as, were this done, an Act of Parliament would be necessary, and the question would at once arise: Why deal with this comparatively small area, when there are others in the immediate vicinity equally as bad, if not worse?—and so the question would widen out till half the City might be included in the area to be dealt with. The lines upon which I should like this discussion to run to-night are these: accepting the confined area, narrow streets, and tall buildings, can we offer any practical suggestions to prevent or minimise the rapid spreading of fire under these conditions? The point to be aimed at is to confine the fire to the premises in which it originated, and if we can do this till the firemen have arrived and can surround the fire, we have attained our object. Vertically, this is now done by brick party-walls, but horizontally the floors, roofs, and open fronts, back and rear, are the points upon which amendment and alteration are required.

PRACTICAL SUGGESTIONS.

The suggestions I have to offer are these:—

1. That all buildings of this class be constructed of brick, without iron or stone lintels, and that openings have brick arches. When I say brick, I, of course, include all clay products. If a bressummer is necessary over the ground story, let it be of some hard wood, with the lower edges rounded. A box girder might be permissible if protected with fire-resisting material, and so fixed as to allow of expansion.

2. That all warehouse floors be of concrete, and any iron girders, joists, or columns carrying the same be protected with metal lathing coated with fire-resisting cement, and the hollow space between run in with fine dry sand, and that the floor boards be laid directly upon the concrete.

3. That all roofs be flat, and of concrete covered with cement or asphalte, with a parapet 2ft. 6in. high all round, and that all staircases and lifts be inclosed with a brick wall, and any openings closed with teak doors. The staircase should be of teak or oak, and carried up to the flat roof; this would be a safe exit in case of fire, and enable the fire brigade, without so much risk to life and limb and loss of valuable time, to cope with an outbreak, and utilise the flat roofs as "quoins of 'vantage" to localise the fire.

4. That all windows looking into streets or light courts have an asbestos cloth roller blind, or some other non-conducting flexible material, fixed on the outside, running in a groove of iron fixed in the reveals and manipulated from the inside, and which could be readily drawn over the glass window in case of a fire opposite. It would also be a desirable practice that these blinds were drawn at the close of business each day, so that it could be ascertained they were always in working order. This, I suggest, would protect the glass from a great deal of heat, and thus prevent the fire from spreading across streets and light courts in several directions at the same time, as is so often the case now, through the breaking of the glass.

These are the suggestions I have to offer. Fires, like the poor, will be ever present with us while warehouses exist, stored with inflammable materials. But, occurring in moderation, they are perhaps, so far as architects are concerned, not altogether to be deplored, and if we construct our buildings of the fire-resisting materials I have ventured to suggest, fires may be kept within reasonable limits, and a repetition of such a disaster as we are met here to discuss will be obviated.

DISCUSSION.

Mr. G. A. T. Middleton asked if any difference was noted between the behaviour of iron and steel in the fire.

Mr. Marsland replied that the buildings were erected a few years since, before steel was generally employed for construction, and, as a matter of fact, all the metal work he inspected was of iron. There was a marked difference between the effect of fire on box girders and rolled joists, as would have been seen by the photographs. Where two or more channel-section irons were riveted together, they were twisted and disturbed, in some cases into a corkscrew form; but where they were built up into a box girder, the shape was preserved.

Mr. J. R. Manning said they were greatly indebted to Mr. Marsland for his suggestions. He thought wooden beams were preferable to iron girders, and that plaster might be used more freely as a covering material for ironwork than at present. In Paris a much greater use was made of plaster than in London, and he had noticed in inspecting the ruins of fires in the

former capital that flames generally stopped on the plasterwork against steel framing. He thought that they might wisely imbed their rafters, timbers, and joists in plaster; that partition-walls might be constructed very roughly of brickwork and then plastered; and that iron girders might be case in lathing, and then similarly treated. An asbestos blind to windows, if worked from inside, would do much to check the leaping of fires across narrow openings.

Mr. Edwin O. Sachs said the illustrations were most instructive, as they gave bull's-eye views of the results of a fierce fire in a narrow thoroughfare. As to the lessons, he feared there were not many to be learned from this Cripplegate fire. They had long been aware that channel-iron twisted into corkscrew forms, that party-walls with doors and other openings in them would not check the progress of fire, and that flames would jump across narrow spaces to combustible materials beyond. It was, indeed, an old, old story; but what they wanted to know was how to check the spread of fires in such localities? It was to a considerable extent a question of the amendment of the London Building Act, because if a building owner did not wish to improve his property and render it more nearly fire-resisting, neither the architect nor the district surveyor had any power to make him protect his own property and that of his neighbours; they could not make him incase his ironwork or adopt more modern means of construction. The question was also one of planning. In many of the houses involved in the Cripplegate fire, four or five suites of buildings shared in the same risks, owing to the connection by doors and narrow wells. It could not be expected that the streets could be widened to any great extent owing to the immense value of land in this business locality, so that architects must try to make a practicable job of existing circumstances. As to the proposal to adopt flat cement roofs, these would be very valuable for a fireman to operate on from next door to a fire, but they had the great disadvantage when themselves attacked by the flames that, as the fire was unable to break through, a mass of smoke was accumulated in the building, which made the task of firemen more difficult. The use of asbestos curtains would certainly prevent the spread of fire if drawn over the windows; but if these were let down at night it would give a fire, should it break out, an excellent chance of obtaining a hold that it was impossible to cope with when at length discovered. It would, he feared, be difficult to increase the stringency of the Building Act; when the present measure was before the House of Commons, grave objection was made to the raised parapets over party-walls, on the ground that they were unnecessary and unsightly. The protection of iron columns ought to be threshed out by a series of official tests. One of the weaknesses of such a discussion was there had been no independent tests of fireproofing materials, but that they relied for their facts on the experiments made on their own inventions by interested parties. These were cleverly carried out, but were regarded by the profession with a certain amount of prejudice, and obviously more confidence would be felt in the tests made by unbiassed persons.

Mr. Robins referred to some fireproofing materials he had invented many years since, and claimed that he had taken out a patent for petrifite under the name of manganese as far back as 1873.

A TRIBUTE TO THE FIREMEN.

Mr. William Cooper, of Hastings, suggested that single joists of iron or steel should be protected by a flitch of wood placed on either side. Whatever they might think of the evidence given at the present inquest into the Cripplegate fire, members could, he urged, have but one feeling, that of admiration, for the plucky conduct and endurance of the firemen. He concluded by moving a resolution congratulating Commander Wells on the heroic fight of his men with the flames, and asking that that expression of opinion be made known to the officers and men of the brigade that took part in the work.

The resolution was received with applause.

The Chairman said it had not been intended to propose any motion that evening; but so strongly did he feel in the matter, that he would beg to formally second the resolution from the chair. The motion was carried unanimously.

Commander Wells, R.N., who was among those present, returned thanks, and said he could assure them that the compliment was well deserved by his officers and men. If there had been any failures, it was through the way they were led, and he accepted all responsibility for that. The very first remark he had heard coming into the room was that all the firemen were old sailors, and could not be taught anything. He affirmed, however, that they were willing to learn anything they could, and that was why he was present. He pointed out that, whereas architects could take photographs after the fire, the firemen could take observations while it was in progress, and he thought the question of construction might be discussed with greater advantage if the Fire Brigade were consulted. He was about to report to the London County Council as to the circumstances of the fire, and till then must reserve any observations he had to make. As to the width of the streets, he thought the man to be considered was the owner of the premises. The width of the street was given them, and they had to make their houses to suit the owner. He did not know how, except by Act of Parliament, the width of the streets could be improved. In conclusion, he observed that as far as his experience, after spending seven years in the United States, went, firemen in London had to work in very narrow thoroughfares under conditions different from those in any other city in the world.

Mr. M. Marsland suggested that large asbestos curtains should be stored by the Metropolitan Fire Brigade, which could be taken to the scene of a fire and let down from the roofs of adjacent buildings in front of walls and windows liable to be attacked. If such sheets had been available at the outbreak of the Cripplegate fire, its limits could have been considerably restricted.

Mr. Alexander J. Smith suggested that a concrete layer in the centre of party-walls would prove an excellent barrier to the extension of fire. The comparative stability of box and compound over sample joists was very suggestive of the lines on which they should go in construction. The floors of warehouses should be of concrete, crushed brick, or breeze, and the joist should be imbedded in the floor, and the surface and ceiling protected by a thick coat of plaster, and, as prescribed by the new Building Act, care should be taken to allow for expansion of girders at the ends, so that the walls were not forced out. The great difficulty of imbedding wooden strips in the concrete floors, as suggested by Mr. Marsland, was that as they would be put in wet, they would afterwards shrink, and so tend to divide the floor into separate sections, and, further, would be very liable to dry-rot. The best finish for a floor would be a cementic or granitic surface. If flat cement roofs were provided, they should be approached by good concrete staircases with cement treads. If warehouses were thus built, there would be little for the flames to seize upon, and they could be rendered still less inflammable by making the window-frames of wrought-iron, with small panes of glass. The chief risk, then, would be of flames extending to neighbouring properties. He fancied the asbestos blinds, although a good suggestion, would not be drawn down when the alarm of fire was given. The great obstacle to all these suggestions was that of cost. A district surveyor had recently stated publicly that iron and plaster instead of timber construction would mean an outlay of an additional 50 per cent.; but he joined issue with that assertion, basing his views on actual estimates. In an outlay of £3,250, the difference for making floors fireproof was, in one case, £125, after allowing for the lessened weight owing to the thinner floors and ceilings. In the instance of a single floor of 250 yards super., the difference in tender was £25; and in a third case of a four-floor warehouse on the Thames side having a floor area of 667 yards, the variation of lowest tenders were £260 against the fireproofed construction on an outlay of over £10,000. An outside estimate would give 10 per cent. as the additional cost of providing fire-resisting materials. A more pressing point was that of insurance. At present the fire companies would not reduce their premiums on insurance on the ground of better protection from fire, which was obviously inequitable to the building owner who spent capital in making his property more secure. The committee of the fire companies was about to meet, and, in view of the late fire, were expected to raise their rates considerably—it was rumoured as much as 100 per cent.—and he would suggest that Mr. Sachs' committee should urge this point upon them.

Mr. Sachs said his committee now numbered 250 gentlemen, about 100 of whom were architects. The question of insurance would not be overlooked; but, of course, fire insurance companies regarded the matter from a business point, and if there were no fires their occupation would be gone.

Mr. Harold E. Ivatts suggested that the plan now universal in packing iron safes might with advantage be applied to warehouse party-walls. These walls might be built hollow, and filled in with sulphate or silicate of aluminium. The cost of the material would not be great—not more than £2 to £3 per ton.

The Chairman proposed a vote of thanks to Mr. Ellis Marsden for his suggestive paper, which had provoked an excellent and powerful discussion. This was carried by acclamation, and suitably acknowledged by Mr. Marsland.

THE ARCHITECTURAL ASSOCIATION.

The fifth ordinary meeting of the Association for the present session was held on Friday evening at 9, Conduit-street, W., the President, Mr. Hampden W. Pratt, F.R.I.B.A., in the chair. The following five new members were elected: C. M. C. Armstrong, J. F. Ball, C. H. R. Henman, A. C. Notley, and C. Newborne. The President referred in feeling terms to the death of Mr. J. L. Pearson, R.A., and it was decided to send a vote of condolence to the family. He also announced that an A.A. Lyric Club Cinderella Dance would be held at the King's Hall, Holborn Restaurant, on Friday, Jan. 7, at 7.30 p.m., and that the following classes were about to commence: "General History" (Division II.), to open on Dec. 23; "Stresses and Strains" (Division II.), Jan. 3; "Quantity Surveying," Jan. 7, and "Elementary Construction" (Division I.), Jan. 10.

HOUSE DECORATION.

Mr. L. A. Shuffrey read the following paper on this subject: I shall endeavour to treat the subject from the prac ical rather than the theoretic side, confining myself mainly to the skin, or surface, which appears to the eye, and the preparation of the ground to receive it. The trade "painter" hardly gets its share of attention in many specifications, and the description, "clearcole and distemper ceilings, hand paper at so much per piece, and paint all work usually painted four coats of good oil-colour," will not insure a good result in the hands of the ordinary contracting builder. For many years the tendency has been towards depending upon manufactured wall and ceiling coverings rather than upon hand-painted decoration, panel, and pilaster treatment, and arabesques until the practical painter who can carry out work of this kind has become a rarity. A difficulty in the painting trade is that fluctuations of work at the different seasons of the year have a demoralising effect upon the men. When work is slack many are thrown out of employment, and when busy others are taken on who can just handle a brush, but who have served no proper apprenticeship to the trade. It is absolutely necessary to the successful carrying-out of a job that a skilful and experienced foreman painter should have charge of it, whose duty it should be to control the execution of the work, mix all materials, see that proper tools and plant are used and taken care of, and that the rubbish is cleared away from time to time, and the rooms kept clean. I do not propose to go into the proportions of the mixtures of materials to be used, as I could not give information on this subject from actual experience: it is a part that an architect can hardly be expected to remember, and must leave to the foreman painter. It is, however, a great convenience, and commands respect from the workman, to be able to take palette and palette-knife in hand and mix the tint required on the job. In so doing it is very desirable never to use a colour or vehicle without knowing its name and qualities, as the experience gained thereby will be very serviceable. It is difficult to gauge the amount of time this mixing of tints will take, and it is desirable not to make a following appointment too soon after. In the progress of a new building you have no doubt, when visiting the works, been suddenly confronted with the question from the foreman of the job? "What colour are we to paint the outside woodwork and the down-pipes and gutters?" and in making the design you will very likely have mentally disposed of the questions whether the frames and sashes should be white, the down-pipes green, whether the iron gutter running along the extreme projection of

the heavy overhanging main cornice should be treated as a member of it, at great inconvenience on account of its falls, or to a quite different colour on its own account; whether the outside timber-framing, if any, shall be coated with Stockholm tar, in strong contrast to the white plaster panels treated with a coating of boiled tallow and lime; and whether the barge-boards or verge mouldings shall be light, like the sashes, or dark, like the framing; whether the front door shall be dark, and, if so, shall the solid frame which surrounds it be the same. The raising of these questions should be a hint that the inside colouring will be coming on shortly for determination, and a scheme of colour for the various rooms should be thought out. Painting has two objects in view—either to change the colour of the surfaces of the various articles painted, or to protect them from rust, rain, or wear. When applied it must become hard, and must adhere firmly to the substance painted. It is desirable, if not absolutely essential, that it should retain its colour, as, although many beautiful effects come through change and exposure, they are generally due to the disintegration of the surface, or decay, which can only go on for a limited time. Many of you may have admired the greenish blue colour, originally a common green, of an old garden gate; but if you examine it for the purpose of imitation, you will find that the colour eludes you, being made up of different-coloured particles which you cannot match. The pleasant pinky red of old cart-wheels, which looks so nice in a farmyard, is a cheap vermilion which has faded. Tints should be made stronger in outside painting than at first desired, to allow for some diminution from exposure, which will most certainly occur, and for the reason that colours are softened by the atmosphere. In this respect colours vary very much, losing less as they increase in warmth. A soldier's coat will appear its reddest on a foggy morning.

EXTERIOR.

The earliest opportunity of a fine day should be taken advantage of to paint all the external wood and ironwork, the priming having been done before fixing. The woodwork, if it be a light colour, will require four coats of white-lead, mixed with linseed-oil and driers; if to be finished a dark colour, boiled oil, which is a better drier, should be used. For external ironwork, paint composed of oxide of iron and linseed-oil is the best protection. I am informed that in cases of engineering works which have been sent abroad, ironwork which has been painted with oxide paint has stood much longer than similar work painted with red-lead. A drawback to the use of oxide paint is that the range of colour is limited, being principally red, which, in the case of a red brick house, is the last colour one would desire. Other colours can be obtained by mixing, but the protecting qualities of the paint are reduced thereby. All gutters should be painted inside as well as out. A painted front door to a house, if exposed to a sunny aspect, is a constant source of trouble, as the paint soon cracks and blisters, and has to be burnt off down to the wood each time it is repainted. A practical painter has told me, speaking from actual experience, that if zinc-white is used instead of white-lead this will not happen. In the case of town houses, cemented or stuccoed fronts often have to be treated, and this is generally done with oil paint; it is a heritage left to us by a former generation, and we must make the best of it. The only satisfactory feature about painted cement work is that it keeps the wet out. The money spent on the painting of cement fronts in London would have paid for the use, in many cases, of Portland stone or rubbed brick—the two materials which, in my opinion, are pre-eminently suited to the London atmosphere. When cement is left from the float with a granular surface, it has a pleasant enough appearance; but it gets so grimy in time, painting in oil is resorted to, and this looks very well until successive coats have filled up the grain, which then has an unsatisfactory reflecting surface. Cracks appear which have to be stopped, and a Portland cement cannot be painted with safety until it has stood about two years; these cracks have to be stopped with Roman cement. A distemper which would stand the weather would be the solution of the problem. The conclusion which I come to is, that Portland cement facing is not suitable for London. For reasons of economy, outside painting should be limited in extent as much as possible. Woodwork should be painted every three years with good white-lead and linseed or boiled oil, special care being taken to see that the surface should be dry and free from dust when it is applied.

INTERIOR.

In dealing with the interior of the house, I propose to take the parts of the rooms in the order in which they are usually finished—ceilings, woodwork, walls, and floors. Ceilings give the decorator more trouble than any other part of the room, for various reasons, the principal being the cracking of the plaster. I have no doubt you are all familiar with the maps of rivers which present themselves when you look at the ceiling on a bright morning a year or two after a house has been built, caused partly by the shrinkage of timbers or vibration from persons walking on the floor above, defective sand, lime, or hair, or by the floating and setting coats following too quickly after the rendering, before it had time to get thoroughly dry. To prevent this, ceilings should be lathed on cross battens or ceiling joists fixed beneath floor joists. If ornamented, the most convenient plan is to form them of fibrous plaster, the method being to make models of the various parts, and then from plaster, wax, or gelatine moulds make their casts of plaster of Paris which have imbedded in their thickness canvas and sawn laths of pine, in places where required for strength or fixing. These slabs are then fixed to the battens with screws, and the joints made good with plaster and canvas. Existing ceilings can be covered up by fibrous plaster screwed to the lath and plaster, provided, of course, that the latter is sound. Brass screws should be used, as iron ones rust and stain the plaster. Ceilings on the underside of floors composed of iron and concrete can be plastered right on to the concrete, if the boarding on to which the concrete is thrown is kept down low enough beneath the joists for the concrete to pass under. Cracking sometimes occurs through the iron joists being run into flues, and the expansion and contraction of the metal caused thereby. In fixing ornamental ceilings of fibrous plaster, battens should be used nailed to the concrete. The most usual method of finishing ceilings is in distemper or tempera. In the case of new work the surface should be clearcoled, i.e., washed over with a coat of thin size and whiting, having previously removed excrescences, if any. The distemper is made by dissolving the best whiting in clean water until it is of the consistency of thick cream, and perfectly smooth to the touch, to which should be added prepared size, previously warmed, the colour being separately rubbed up with some of this distemper; the whole should then be gently mixed together, and strained through a coarse cloth or metal strainer. When allowed to set it should be of the consistency of jelly, in which condition it should be applied to the ceiling. As distemper changes its colour very much in drying, it should be tried on a piece of white paper and allowed to dry. The drying may be assisted by holding it against the face or back of the hand, but not by holding it to the fire, which would prevent its drying its natural colour. Having procured the right tint, the distemper should be applied quickly to the ceiling with large brushes, preferably by two pairs of hands, and then stippled with large, flat brushes, taking care not to go over the same part twice. There should be no draught in the room whilst this is in progress; but when completed the sooner it is dried the better. If this operation is successfully carried out, a very pleasing effect is obtained. If the first coat does not dry out satisfactorily, the operation may be repeated. Even with experienced hands distempering is not always successful, particularly if done during foggy weather. If dealing with old ceilings, the distemper must be washed off right down to the plaster face, all cracks raked out and stopped with putty (plaster of Paris and distemper mixed), and the whole rubbed smooth with pumice-stone and water; stained parts should be painted with oil-colour, and the whole clearcoled and distempered as before described. If old ceilings are in very bad condition, it is desirable that they should be lined with paper, which should have a coat of weak size before being distempered. Distemper is superior to oil-colour in the clearness and delicacy of its tints, and in that it does not discolour in the same way with age. Its demerits are that it will not bear washing, and, being thick, it soon chokes up delicate mouldings or ornament; it is, therefore, the custom, where there is a considerable amount of elaboration or ornament, to execute the work in oil-colours, either flatted or flat varnished. This in a country house, or where no gas is used, will last a great many years, and bear washing and touching up. If dealing with ornament in relief, it is a good plan to paint the work twice with oil-colour, and then distemper it. The distemper coat rather pleasantly softens the ornament, and can be washed off down to the oil-colour, when the work has to be redecorated. Some of the coarsely-modelled ornament of the Jacobean period may owe its charm to the indistinct suggestiveness caused by successive coats of distemper, but it is hardly desirable to aim at an effect of this kind. The style or ornament which we understand as "Adam's" is often executed of composition fixed with tacks and glue in small repeats on a plain ceiling previously lined with paper. This is a very refined style of ornamentation, and is often pleasantly relieved with painted medallions, in which case a parti-coloured treatment is desirable to hold up the medallions and prevent them spotting too much. The electric light being frequently placed near the ceiling, very slight relief is sufficient, the light coming almost horizontally, and throwing long shadows. Covering a ceiling with a pattern paper is a simple and satisfactory way of treating it. The pattern should be centred with the room, and the joints carefully butted. Stamped materials for ceiling coverings are numerous, and by their use an exceedingly elaborate effect can be obtained at a very moderate cost. The best are they which do not imitate plaster-work. They are very useful for strengthening and hiding the defects of old ceilings in a bad condition, but have not the individuality which can be procured by even a little plaster ornamentation designed for its special position, and I look upon them as suitable rather for old than new buildings. The plan of hanging a heavily-flocked paper on the flat of a ceiling and painting it is a good one, and the effect is much improved if a flat band forming a frame to it next the cornice can be arranged so that the ornamented portion has a recessed appearance. This flat band was much affected during the Greek revival period in England, and often had pateræ fixed on it at intervals. In applying to an old ceiling either ribs, or any relief ornament which has strongly pronounced straight lines, it is necessary to apply a straight-edge to the surface to ascertain whether it sags or undulates: otherwise you may find that what appeared level before becomes like the waves of the sea.

WOODWORK.

If it is desired that the woodwork of a house should be painted, and not stained and varnished—a process which has almost died out—any knots should be covered with patent knotting, to prevent the resin discolouring the succeeding coats of paint; or, if very bad, they should be cut out or covered with silver leaf. Before the work leaves the carpenter's shop it should be primed with red or white lead, mixed with linseed-oil and turps, to prevent its being affected by a damp atmosphere. Backs of panelling, or any woodwork which has to be fixed against a wall, should have a thick coat of oil-colour before fixing. Before the next coat is applied, the surface should be lightly rubbed down with glasspaper, and the brad-holes, open joints, or cracks filled with hard stopping, and the dust removed. The second coat, mainly of linseed-oil and white lead, should then be applied. The third coat, which is the ground for the finished colour, composed of white lead and linseed-oil and turps in equal proportions, and with an approach to the finishing colour, should be evenly laid on, the direction of the brush following the direction of the grain of the wood. This should dry out uniformly; and if it does not do so, should be repeated before the finishing coat is applied. By mixing varnish with the finishing coat, an egg-shell gloss is obtained, and this is the finish which appears to me most suitable for work generally. It does not require so much preparation as varnished work, does not show up slight unevennesses, and will bear washing. It is sometimes called a bastard flat. If it is desired that the surface shall not shine at all, it will require a flatting coat of the required colour mixed with white lead and turpentine only. Flatting should follow the previous coat about twenty-four hours after, before it has had time to get hard, so that it may be incorporated with it, and the more shiny the previous coat the more dead will be the flat. Old work should be gone over with the stopping knife, then rubbed with pumice-stone and water; greasy parts should be washed with turpentine,

and, where the paint is rubbed away, primed; cracks or holes should be stopped and hollows filled up, being left full to allow the stopping to shrink, and levelled off afterwards. The first coat should be mixed with turps, and the succeeding ones as before described. Woodwork intended for varnishing requires extra care bestowed upon it from the beginning to secure an absolutely smooth surface, and, after the fourth coat, should be applied one or more coats of French oil, varnish, or pale copal for delicate tints, being rubbed down between each coat with pumice-stone, powder and water, and a felt float to remove all inequalities. This can be repeated until the work has the finish of a coach-panel or Japanese-lacquer tray. Work of this kind is expensive, but very durable, and should be designed with this finish in view with very simple moulding and large plain surfaces. It is, in my opinion, only under these conditions that internal varnished work is tolerable. It would be unwise to treat the work of a new house in this way before it had got over its infantile diseases. If it can be so arranged, a good plan is to leave a house with three coats of paint and lining papers on the walls for a season or two, when the finishing decorations can be carried out with the satisfaction that they are being executed on a good basis. Often the contractor who builds the house is not the best man to employ for the decoration, and one set of men is conveniently got rid of before the other commences. Some of the most beautiful colours can only be obtained by "glazing," the term given to painting with a semitransparent colour mixed thin over an opaque colour. This is generally done with tube colours. In treating of house-painting, the subject of graining should not be omitted, although out of favour at the present. Personally, I dislike it, mainly for the reason that I never meet with any that is pleasant in colour. The merits justly claimed for it are that it wears well on account of its broken colour and varnished surface, and can be easily touched up without repainting. I see no reason why combed work, in colours not necessarily resembling wood, should not have a good appearance; also the merits claimed for grained work. I have some specimens for you to see which have been grounded in one colour; then a second colour has been applied and combed whilst wet, and afterwards varnished. Another plan is to stipple the second colour, and then varnish.

WALLS.

New walls, if intended to be painted, should be plastered with Parian or Keene's cement, and should have two coats of white-lead and linseed oil and litharge mixed rather thin, to soak into the plaster and stop absorption; the third coat should be thicker and mixed with spirits of turpentine and colour, and the fourth thicker still, and mixed with equal parts of linseed oil and turpentine, with sugar of lead as a drier; the colour should be darker than intended to be finished. Each coat should be allowed to dry thoroughly before the succeeding one is applied, and should be well rubbed down with glass-paper. The finishing coat is best stippled with large flat brushes, as a granular surface is obtained, the wearing properties are not impaired, and the unpleasant reflecting surface is broken up. Any appearance of damp must have the cause removed, as no tinkering with the face of the wall will be a lasting remedy. Any patching or chases should be made good with Parian or Keene's cement, which can be painted soon after, provided that the bed or backing has been first painted with oil-colour to prevent the damp from the cement soaking into it. It is claimed for adamant plaster that it can be painted in twenty-four hours, but my experience of it is that this cannot be done with safety if cement has been used in the wall or floor, as the salt from the Portland will continue to come through for weeks after the plastering is done. The manufacturers recommend a wash of barium chloride, but this I have not tried. Another trouble which affects the finishing of walls is discolouration in patches where Fletton bricks have been used. I have spoken to the manufacturers about it, and I am informed that it is caused be using overburnt bricks, and that a bricklayer experienced in the use of these bricks would not make use of these overburnt ones for inside work. Considering the very large quantities now being used in London in place of stocks, it is very important that the matter should be understood, the only remedy being to cut the brick out.

WALL-PAPERS.

The most convenient way of finishing walls, and that most largely adopted, is covering them with printed wall-papers. It is a simple process, and may be quite inexpensive, and they are easily cleaned off and renewed. Skilful paperhangers are not difficult to find, so a badly-hung wall-paper should not be tolerated. The surface of the wall should be rubbed over with glasspaper to remove all excrescences, and it should then be clearcoled, and the papers hung without joint from top to bottom, having their joints carefully trimmed and butted. On new walls it is a good plan to hang white lining paper preparatory to hanging a more expensive paper: this gives the latter a much better chance as far as discoloration from the fresh walls is concerned. Walls should be lined with brown paper before hanging embossed or strong papers, as otherwise they are liable to slide in shrinking, and open at the joints. It is a good plan also to line and clearcole preparatory to distempering walls; it has an advantage over using a tinted paper ground, as the joints need not show, which they would do in the case of the latter. The varieties of wall coverings which may be suitably used for the space usually called the filling are numerous. Immense talent has of late years been employed in the designing of wall-papers until we almost have more than enough, and there is a temptation, when choosing from a number of ambitious designs, to forget that in most cases the wall on which they are to be hung should be looked upon as a background—a purpose for which many of them are eminently unsuitable, and if there could be more connection between the designing and the using of them, the designs and colourings would be very much modified. I am not now referring to the large flowered designs in natural colours which are exhibited in drapers' windows, accompanied by the notification that they can supply the chintz for hangings to match them. A less interesting arrangement I cannot conceive. A piece of English wallpaper is twelve yards long by 21in. wide, containing 63sq.ft. French paper is nine yards long and 18in. wide, containing 40½sq.ft., so in estimating the quantity required, half must be added to the measure for English papers, and the price considered in relation thereto. The simplest wall-paper consists of a pattern printed from a wood block, in repeats, with distemper colour on previously distempered roll of white paper, and in this form is suitable for use from the servants' bedroom to the principal reception-room, the dignity required depending upon the form of the design and colouring, and if we had nothing more than this we should still be very well off. The varieties of embossed coverings for walls now available in decoration are numerous. They have the merit, when hung on an ordinary plaster wall, of presenting a wearable surface, and one that is capable of decoration after hanging in various ways, either by painting all over, parti-colouring, rubbed out or stippled effects. The skill displayed in the Japanese leather papers in design, modelling, and treatment of the surface with metal and colours, made them very popular, and they have been used in place and out of place until we are rather overdone with them. A luxurious finish to a wall is covering it with silk damask or brocade, and this plan can be adopted with more propriety now the electric light is more general, and the dirt and discoloration from gas are got rid of. It may be treated as a continuous band round the room, or introduced in the form of panels. In either case it should be so arranged as to have a solid back to prevent the accumulation of dust behind it. Lastly, I may refer to the hanging of real tapestry, which has a value beyond any other wall covering, either as covering the entire wall, suspended from the top, or in panels. No other decoration is required, and a tinted white for the woodwork appears to give the best value to the tapestry colours.

FLOORS.

Following the order which I first laid down, we come to floors. The ordinary deal floor, by the process of building, gets so stained and disfigured, it is necessary, if any part is intended to show, to stain it a dark colour and varnish it. A border around the room enables a reversible square of carpet to be used, which is easily taken up and shaken. The reception-rooms should be laid with ¼in. oak parquet over the ordinary floor, which makes a very good job, provided the floor has got to its normal condition. It is best deferred for a season, as the best flooring will sometimes swell and buckle, when, if laid, the parquet will follow it and present a series of corrugations. The usual plan for finishing the oak is to give it a "stiffener" of French polish, and then brush over with beeswax and turpentine. Plain linoleum of its natural reddish-brown colour will be found serviceable and pleasant for many of the secondary rooms of the house: it is very durable, and although I have heard something said about its rotting the boards through excluding the air, I have never found this to be the case.

PROCESSES OF PAINTING.

Before going on to the subject of colour, I may sum up in a few words the processes which I have been describing, omitting descriptions in detail of the materials, pigments, and vehicles used. Surfaces which have to stand wear should be painted with oil-paint composed of white lead, linseed oil, and driers. Zinc white is a purer white than white lead, but has not the covering capacity; it may be used with advantage for the finishing coats of light colours. Surfaces which do not come in contact with any bodies may be treated with less labour, and as good an effect, with distemper composed of whiting and size. Oil surfaces may be made more durable by varnishing, the degree of finish being a question of labour and expense. It is important for the stability of painted decoration that pigments of a fugitive nature should be avoided, also that their chemical action when mixed with another should be understood, and this subject has been treated of by W. J. Muckley in one of the handbooks of the Science and Art Department at South Kensington Museum. He therein gives a list of permanent, semi-permanent, and fugitive colours, and practice might very well be confined to the use of the first two classes, if not of the first. As house-painting must necessarily be renewed, there is not quite the same necessity for permanence as in a painted picture. The simpler the mixture of colours to produce the required tint the more likely it is to be satisfactory, and to keep its colour. I have read somewhere that the "quickest way to good colouring is through a short palette." The theory of colour is treated exhaustively in the work of M. Chevreul. "The Principles of Harmony and Contrast of Colours," and the works of Owen Jones on the same subject, with his series of propositions on the principles which should govern the decorative arts may also be recommended for study; but the best study for colour is the book of Nature, and to an enthusiastic student her instruction is infinite. Suggested schemes of colour are all around us. Clouds, the spring and autumn tints of trees, with their leaves back and front for colour or texture, the plumage of birds, vegetation on buildings, oxidising of metals, marbles—all present beautiful combinations which may be made use of, and an enthusiastic study of colour in the ordinary walks of life will well repay the time and attention given to it; in fact, my advice is. Train the colour-sense simultaneously with that of form and proportion. When an impression has been received, take the earliest opportunity of registering your recollection of it with your colour-box: it will then be ready for use when the opportunity occurs. In a

SATISFACTORY SCHEME OF DECORATION

the three primary colours, yellow, red, and blue should be in some degree represented, not necessarily on the walls of the room, but supplied by the hangings and furniture. They need not, however, be represented in their primary condition, but in the form of secondaries and tertiaries. The most useful colour for the background or walls is green, contrasting with the furniture of yellow or red browns, with blue introduced in the hangings. Yellow, being a primary colour, cannot be produced by mixture of other colours; it is an advancing colour, has great power of reflecting light, and, compounded with red, gives a range of warm colours, orange and brown. It diminishes in power by artificial light, and for that reason is difficult to make satisfactory for both day and night effects. It is a delicate colour as a pigment, and is easily killed by admixture with other colours. It contrasts powerfully with black, and may be represented by gold in a colour scheme. Red is the intermediate primary coming between yellow and blue, and in like intermediate relation also as to light and shade, white and black. It is a most positive colour, forming, in combination with yellow, the

secondary orange tints; and with blue, the secondaries purple, crimson, &c. It gives warmth to all colours, especially to yellow. In combination with yellow it becomes advancing, and with blue retiring. It is very much affected by the quality of the light in which it is viewed. Reds easily spoil one another side by side, and great skill is required to print one red on another satisfactorily. Red lights up by artificial illumination better than any other colour. Vermilion is the pigment which most nearly represents this primary. Blue is the third primary, and is best represented by the genuine ultramarine, which is said to be a true colour, neither inclining to yellow nor to red. Blue is a retiring colour. The blues most used, on account of the high price of genuine ultramarine, are cobalt and Prussian blue; but the former inclines to purple by artificial light, and the latter to green. These colours are very useful and pleasant in light tints for making greens, and in distemper, but as blue lights up so badly, it may well be represented in the colour scheme by curtains or carpet. Having gone through the usual processes in the decorating of a house, I will proceed to consider the points which should influence us in

SETTLING ON A DECORATIVE TREATMENT,

and will commence with the entrance-hall. If the house is sufficiently large, this often becomes a room, with its entrance lobby screened off and the staircase recessed from it or leading off from one side. It may contain an open fireplace, and the doors to the principal rooms open immediately out of it: it is therefore desirable that the colour should be considered in reference to the adjoining rooms. As the sunniest aspects are required for the living rooms, that of the hall is likely to be a northern one, and consequently a warm colouring would be best—a high wall panelling, or dark wall treatment to about the level of the top of the door architrave, with deep frieze of stencilled ornament in red tones, with an olive cornice and the ceiling a lighter tint of the same. There would be very little blue or cold colour in this arrangement, and the fireplace might supply this in form of blue tiles on a white ground and the grey metal of the stove. The old-fashioned crimson, blue, and green Turkey carpet would complete the colouring, with a surrounding of parquet floor, yellow stain being introduced in the window-glass. The red colouring could be carried up the staircase above a wall panelling, repeating the handrail on the wall side, or in the absence of this a wood moulding at this level, with the space below painted a greenish brown on a simple pattern of embossed paper. This gives a durable surface where the wall gets most wear, and the papering above may reasonably be left unvarnished, as, except on the score of durability, varnished papers have nothing to recommend them. The varnish changes colour, and becomes in most cases very unpleasant, and is more susceptible to changes of temperature than an unvarnished paper, a sudden change from a cold day to a hot one covering the walls with moisture. An oil-printed paper on an oil ground is a good substitute; it is pleasant in appearance, and can be sponged without harm. We seldom see the walls of a staircase panelled out in plaster or wood. It has a good architectural character, and it is astonishing what can be done with a few hundreds of feet of wood moulding judiciously disposed on the walls. It is tedious making a drawing of the four sides of the stairs, so the best plan is to set out the panels on the walls with a piece of chalk. Everything above dado level can then be distempered. Duresco is a good material for the purpose, using the petrifying solution supplied with it. It is more expensive than ordinary distemper, coming between that and oil-paint, but has the merit when hardened of being to some extent washable, and it is much less liable to discolouration from defects in the walls than ordinary distemper. It is also pleasant in appearance. The treatment of the walls of stairs suggested applies rather to old than new buildings.

WALLS.

In considering the horizontal divisions of the walls of a room, I have in mind the ordinary house, with rooms from 10ft. to 12ft. from floor to ceiling. The necessary skirting, if with about 6in. of plain face, is generally sufficient if of good thickness, with simple mould receding to the wall, thickness rather than height being required; this will keep the furniture away from the walls without considering what is called the chair-rail, which should in most cases be lower than the back of a chair—from 2ft. 6in. to 2ft. 9in. to the top of it. The space between these two is best of wood, the face of it projected somewhat from the face of the upper wall. The skirting, plain or panelled face and rail, should either be of one colour or harmonising colours of the same depth of tone; to cut it up into thin lines is a mistake. Above this the wall may be plain and uninterrupted up to the frieze-rail. This, with the frieze and cornice, about one-seventh the height of the room, should all be designed together and kept to about the same tone of colour, of sufficient weight to look like part of the wall. In designing these mouldings, mould the top of surfaces below the eye, and the bottoms of those above the eye. Another division as to height is to increase the frieze with rail and cornice to about one-fifth of the height of the room, giving the extra space to the frieze, and if the room is very low, sacrificing or squeezing the dado. In a drawing-room this plan will be found convenient, as pictures being generally small will not look well if skied, and the ornamental frieze furnishes and gives interest to the upper part of the wall. If there is height enough, the cornice mouldings can be moderate in size to form the starting of a cove or hollow, connecting this cove with other mouldings to form the frame of the ceiling. The cove, so very general in the French work of the last century, is much out of fashion, but is undoubtedly serviceable in softening the connection between the decoration and walls and ceiling If there is not height enough for a cove, the cornice kept down a few inches from the flat of the ceiling will give an opportunity, adding recessed mouldings, and preventing the sagging appearance of an absolutely flat ceiling. For bedrooms, the deep frieze arrangement is very suitable, either with or without the dado, according to the height of the room. It is a good plan, when arranging window-casings and architraves, to break the cornice out so as to form a boxing for the top of the curtains. The breaks have a good appearance, give good shadows falling on the curved surface of the curtains, and preventing the accumulation of dust. Wall surfaces should be squared up; a narrow slip of paper over door or window architraves is best got rid of, also the long spandrel piece over an arch. It is better to break it forward with a vertical line and break the cornice over it. Soffits of arches should not be left plain as ceiling, but should be treated same as arched mould. These are points which cannot well be carried out unless done at the time of building. I have often had to ornament a ceiling where all the mouldings have had to be suspended, as it were, on account of the fixed position of the cornice. In low rooms the plan of treating the whole chimney-breast as a feature instead of applying the chimneypiece is a good one.

DINING-ROOM.

The division of the wall space in this room might conveniently be by a wood skirting, plain face and rail, to a height of about 2ft. 9in. (pictures could then, if of large size, occupy the space up to the frieze rail), the cornice, frieze, and rail, grooved for picture hooks, being one composition. The heavy, Early Georgian type of cornice and dado always appears to suit a dining-room. If it gets the morning sun the main filling of the walls might be a wall-paper two tones of deep green, the ground being warm in tone, with a lighter and colder print. The paint a golden green, and the flat of dado a deep, rich red, inclining to crimson; cornice and frieze tones of citrine, and the ceiling a still lighter tone. If the owner of the house has any oil-paintings they are likely to be hung in this room, and the question of the best background colour has to be considered; this may very well be studied in the public galleries which we have access to, and that used in the entrance-hall of the National Gallery appears to me the most satisfactory. It is a flock paper printed in two tones of a mellow, dark green, inclining to olive. It is there very pleasantly contrasted with dull red marble columns. Both the colour and texture contrast well with the oil-paintings, and give the very greatest value to them. There are other colours adopted, including red, which is generally considered a good oil-picture background; but none appear to me so satisfactory as this. At South Kensington a dark, neutral green wall-paper of Morris's is very much used; but it appears to me too cold or grey for the purpose. The question whether the cornice of a room should be treated dark like the paint or light like the ceiling is always cropping up, and although it is rather trying to darken some nice plaster work, which looks so fair in its natural white, I consider it should be treated with the walls, not necessarily so dark; but sufficiently so to prevent the sudden contrast from dark to light just below the cornice.

THE DRAWING-ROOM.

The decoration of this room should be bright and cheerful, and should light up well. (Here light or white paint is in place.) For this room the mistress of the house must be consulted, and the various parts thought out with furniture, hangings, and carpets to make the picture complete when furnished and occupied. Should the lady be a brunette, a cream paint and walls of a yellow tone may be suitable. If a blonde, a bluish grey or grey-green. The architectural panelling out of the walls of a room is but little practised now, although nothing gives such size and dignity to an apartment, whether by framing with large panels or by painted styles and rails. The tendency of late has been to ignore symmetry and to indulge in corners and recesses, and small windows in odd places, by which a certain picturesqueness is obtained, but unbecoming cross-lights are developed, and a mere prettiness without dignity is the result. There is little fear of stiffness in the drawing-room, and when the furniture and upholstery come, the severe lines of an architectural treatment of the walls will be pleasantly contrasted.

LIBRARY.

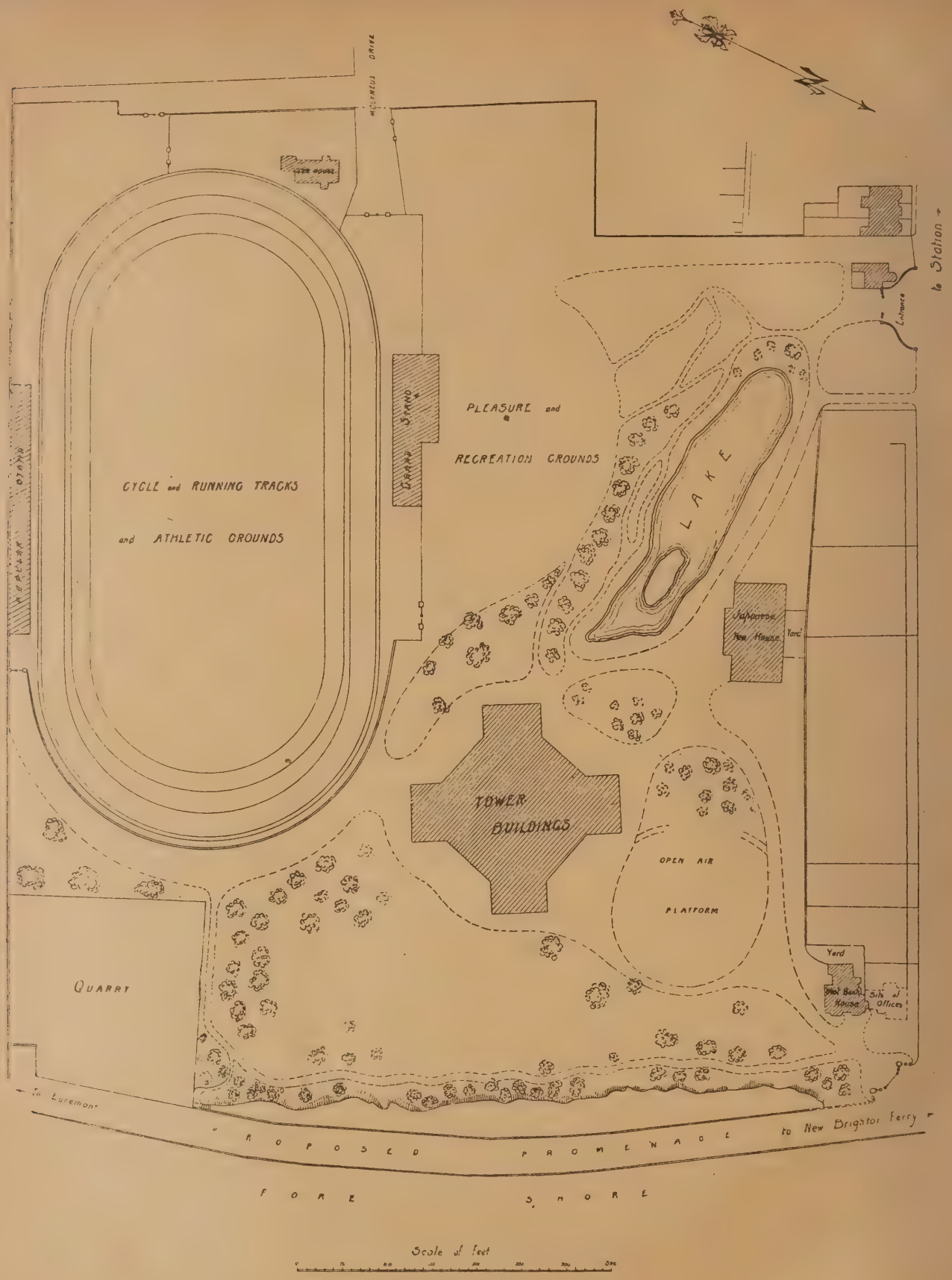
In this room a quiet, restful tone of colour should be aimed at, bearing in mind that books are the best ornamentation of the room, and choosing colours which will give value to their bindings. The fittings should be of hardwood, and as it is inconvenient to reach books higher than about 7ft. 6in., a rail at this level (grooved for picture hooks) may be conveniently carried round the room where the book-cases do not occur. A fairly strong green is the best to show off bindings, and this may cover the space above the bookcases with a deep vellum-coloured cornice and ceiling. The floor should be felted all over.

BEDROOMS.

The deep frieze treatment for these is generally most convenient, and the chief characteristic of the colouring should be freshness. Here white paint, which in sitting-rooms makes the furniture, hangings, and carpets look dirty, is in place, and should be the standard of cleanliness and freshness generally in the room. The space above the picture-rail looks quite well in plain distemper, but may have a running frieze in colours with good effect, and in the ceiling I would plead for a little ornamentation to relieve the absolute blankness, which is so very general. Colour is too subtle and indefinite to talk about with advantage. Colour is relative; there is no such thing as a bad colour when regarded alone, as there may be a situation where that particular colour would be the best in combination with others for its position. A parti-coloured suit will keep fresh longer than a suit of one colour, and the same holds good in decoration. Contrasting colours enhance the value of one another, and it is quite possible by altering one colour in a decorated wall or ceiling to give freshness to the whole which before may have looked dirty and worn out. The coloured decoration of a room should be the conception of one mind, and the plan I advise is to make your scale sketch and stick to it as you would to your $\frac{1}{8}$ scale drawings in a building. In practice this cannot always be carried out, and it comes to doing the best you can under the circumstances. What I should like to impress upon all who are not in the habit of doing so is that a constant study of colour brings great enjoyment with it. The critical faculty can be used everywhere. As you study old buildings to improve your sense of form and proportion, study natural objects for improving your colour sense. The most unlovely object, if left alone, will be covered by nature with the most beautiful colours, and the book is open for our delight.

At the close of the paper a vote of thanks was accorded to Mr. Shuffrey, on the motion of Mr. Walter J. N. Millard, seconded by Mr. Cole A. Adams, and supported by Mr. Maurice Hulbert and the President.

The restoration of the tower and spire of the parish church at Lenton, South Lincs, has now been completed, and a lightning conductor has been affixed.



NOTES ON SURVEYING AND LEVELLING.—X.

By Walter Tester.

THESE notes will now be brought to a conclusion with a few general remarks on the drives and walks, lake, &c., not already mentioned. The accompanying plan shows the main features of the scheme for the New Brighton Tower and Recreation Grounds, and if it is compared with the plan published in the article on the survey of the site, it will be noticed that several additional pieces of ground have been obtained, the boundaries of which the surveyor has no difficulty in tying on to the original site, with measurements.

There are two approach roads to the Tower buildings, one from the river front and the other from Egerton-street near the old entrance gateway, and their routes are chosen so as to necessitate as little destruction as possible of the trees standing on the ground, and with this object they are joined into the existing drives to the old stables and house. Any excavation for forming the roads to the required gradients can be arrived at by taking short sections across the route of the proposed roads, the ground in places being very uneven.

So far as the positions of the section-lines are concerned, it would be impracticable to make them square off the bends of the roads, on account of the setting-out, and also it would be more difficult to take out the quantity of excavation as the width between the lines would be variable, and the easiest way that suggests itself is to make the sections parallel to each other, and square off longitudinal straight lines made to follow the direction of the roads, the angles which the longitudinal lines make with each being taken with the theodolite.

Pegs are left in at each end of the lines, which re run out a sufficient distance to be clear of the

cutting. The sections being plotted down, and the position of the road and formation-level being shown on, an estimate of the quantity of excavation can be obtained.

After the roads are cut, the position of the top and bottom edges of the side-slopes can be measured from the pegs left in at the ends of the sections, and the cubical contents of the cutting as actually carried out can be arrived at.

There will be a slight variation at the junctions of the longitudinal lines, two adjacent sections not being parallel, and it will be necessary for the quantities to take the width between the centres of gravity of the areas of excavation of the two sections, as the strip to which the lines apply, as explained for the Tower site. The road around the Tower buildings has already been dealt with, and the positions of the walks in various portions of the site are chosen on the ground. They do not require any sectioning, and they can be surveyed after they are made in the manner described in the article on the survey of the site.

The old pond existing on the ground is extended to form a small lake as an ornamental feature, the outline of which is determined on the site, being adapted to the natural features, the surveyor marking it out with pegs and afterwards making a survey of the line of pegs, and as the ground is very irregular at the point where the extension lies, and the excavations could not be easily measured otherwise, the surveyor has to take sections, making them square off a line along the approach road to the main buildings, which also serves for the survey and sections of the new road where it coincides with the old drive. These lines fulfil the necessary requirements, being parallel to each other, and about square off the longitudinal axis of the lake, and give typical sections of the ground. The surveyor runs his lines out a sufficient distance, and leaves a peg in at each end, and plots his sections, puts on the position of the cutting and level of the excavation for the bottom of the lake, forms an estimate of the quantity of excavation, and adjusts any variation in carrying out by measuring the position of top and bottom edges of the slopes, after the cutting is done, from the pegs left in at the ends of the lines, which are not disturbed by the excavation.

As the positions of the walks around and in the immediate neighbourhood of the lake are settled on the site after they are fixed, the surveyor can run lines along the walk around the lake, joining in to the line along the approach road used for the sections, to form a closed figure, and can take the angles with the theodolite and check them by adding up, making a survey of the path and edge of the lake by offsets in the ordinary way. The lines for the other walks can be tied on to those already fixed by angles taken with the theodolite, and can be surveyed in the same manner. So far as the other blocks of buildings are concerned, they present no difficulty, as they can be set out by ordinary methods, and anything further in connection with the surveying operations can easily be performed on the principles already explained.

ELECTRIC LIGHTING NOTES FOR ARCHITECTS.—XIII.

By AN ASSOC. INST. ELECT. ENGS.

ARRANGEMENTS OF CIRCUITS—(*continued*).

ALTHOUGH the reversed parallel and loop systems do much to equalise the fall of potential throughout a circuit, it is necessary to point out that such arrangements for enabling the current supplying each lamp to traverse the whole circuit is not effective in preventing an unequal fall of pressure, unless the lamps are distributed uniformly throughout the circuit. Thus, in Fig. 23 a case is represented where the pressures are not equalised if a larger current is taken off at one point than another.

As in the figure, let us suppose that at a point A, 500 lamps are supplied by current from the mains, and only 10 lamps at B, a point 200 yards from A. Then, if the 500 lamps require C ampères, whilst c ampères are sufficient to supply the lamps at B, and if R be the resistance of A B or A′ B′, the fall of pressure from A to B will be c R, whilst the fall of pressure from A′ to B′ will be C R; therefore, the pressure at B will be greater than at B′ by an amount equal to $(C - c)$ R. To take a numerical example, suppose each lamp takes 0·75 ampères, and that R = 0·0032 ohm, then the difference in the falls of pressure is $(500 \times 0{\cdot}75 - 10 \times 0{\cdot}75) \times 0{\cdot}0032 = (375 - 7{\cdot}5) \times 0{\cdot}0032 = 1{\cdot}176$ volts. It will be observed from the figure that the case just considered is part of a reversed parallel arrangement, and it is obvious that to have an equal fall of pressure on both mains, the sections of the mains must be made proportional to the currents,

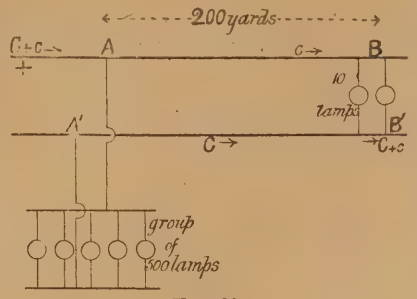


FIG. 23.

such that C R′ = c R where R′ and R are the resistances of A′ B′ and A B respectively to give equal falls of pressure.

Modification of the Multiple-Series System.—In the multiple-series system described in Article XII. it is obvious that both the lamps in series forming any one group must be in use at the same time, unless an idle resistance be introduced as a shunt to the lamp not required. Independence of each lamp is, therefore, not secured, since each group possesses the disadvantages and limitations of an ordinary plain-series circuit. In small installations, however, where the load is a fairly constant one, a simple modification of the multiple-series may readily be introduced. The

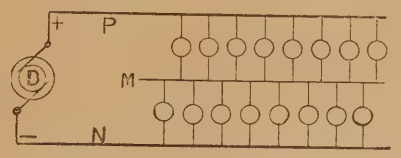


FIG. 24.

modification is indicated in Fig. 24, from which it will be seen that a third wire is introduced without being connected to the generator. As before, the generator must give twice the pressure required by each lamp, and the advantages of using a third wire are as follows:—(1) It enables less copper to be used, (2) it enables a high voltage to be used, and (3) it secures the independence of each lamp.

By remembering that the dynamo gives a constant pressure, it is easy to trace the function of the middle wire. If one lamp be taken out, the others are not affected. Suppose, for instance, that there is one more lamp in use between M

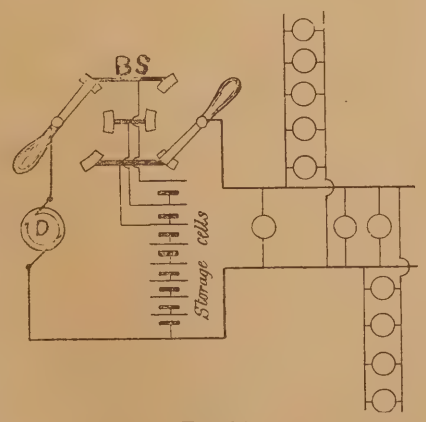


FIG. 25.

and N than between P and M, then the joint resistance of the lamps between P and M will be greater than between M and N, and the fall in pressure between P and M will be greater than between M and N, the pressure between P and N remaining constant, so that the actual potential of the middle wire M is not precisely midway between those of the mains P and N. With the same number of lamps on the two sides of M, however, the potential of M is exactly midway between those of the outer mains. It is, therefore, evident that the pressures required by the two sets of lamps are automatically regulated to the number of lamps in use, and for factories and private installations with fairly constant loads, the arrangement is both economical and serviceable.

Probably the best arrangement for giving constant pressure with a plain parallel system, however, is to use a battery of accumulators in conjunction with a shunt-wound dynamo, as shown in Fig. 25, in which D is the dynamo. It will be observed that the battery is connected in parallel with the generator, and that means exist for increasing or decreasing the number of cells in use, B S being a battery regulator-switch, which will be described when dealing with switchboard appliances. The chief function of the battery is to regulate the voltage and maintain a constant pressure between the mains. In this respect they are used as flywheels to smooth down irregularities in the pressure of supply. In addition to this, however, they supply the energy for the lamps during periods of light loads; they are also able for a short time to take the place of the generator should any breakdown occur, or when it is desired to use lamps without running

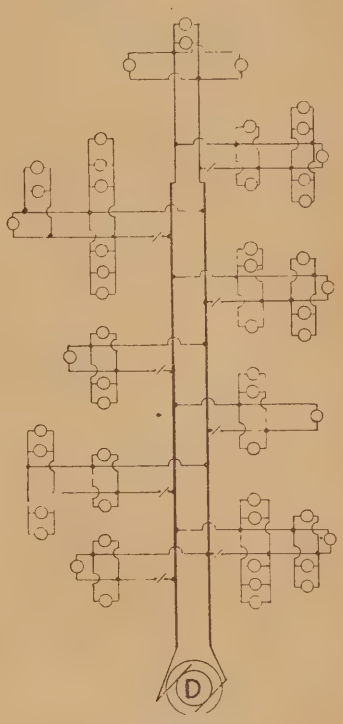


FIG. 26.

the generator. This is a decided advantage when the dynamo is installed in the cellar, or in such places where the vibration and noise may be objectionable. Then, again, the cells may be charged at convenient times, and are always ready for use. When used in conjunction with a dynamo they act as reservoirs, since they store energy when there is an excess, and give the same out again when required. The working of the arrangement is simple. It is obvious that if the E.M.F. of the battery is less than the voltage of the generator, the cells are charged at the same time that the lamps receive the necessary current. When the two pressures are equal, both the generator and battery feed the lamps. In the extreme case, when the battery pressure is greater than the voltage of the generator, the battery reacts on the generator, and at the same time feeds the lamps. To understand this reaction, we must remember that the generator is a shunt-wound dynamo; consequently, in this case the tendency is to increase the excitation of the field-magnets, and so produce a stronger magnetic field, the effect of which is to increase the voltage of the generator.

We are now in a position to refer to the methods of house-wiring with parallel circuits. There are, broadly speaking, two systems—(1) the *tree system*, and (2) the *distributing-board system*. The former, which is shown diagrammatically in Fig. 26, is probably the most common, and certainly is the method adopted in all the earlier installations. The origin of the name is

evident, since the main cables in the system correspond to the trunk of a tree, being placed in the most central position of the house. From this the branch circuits are taken off as required, after the fashion of the branches of a tree, into the different rooms of the house. The lamps are then placed between smaller mains taken from the branch mains, and these correspond to the twigs and leaves of the tree. From the figure

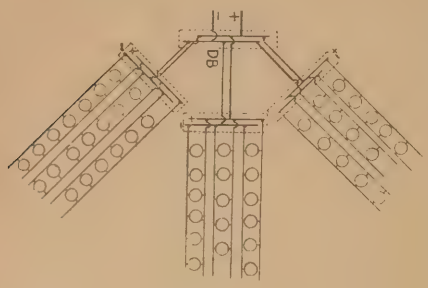


Fig. 27.

it is clear that there is only one set of mains through which the main current passes, and since the various rooms are at different distances from the source or point at which the current is received from the supply company's mains, it is obvious that the different groups of lamps are not fed at the same voltage. The fall of pressure is, of course, increased with the length of the main cable, and since it is objectionable to allow one circuit—the trunk of the system—to carry too large a current, this method of house-wiring is defective. It must also be observed that each branch circuit is controlled by a switch, as is also each lamp.

For installations containing a large number of

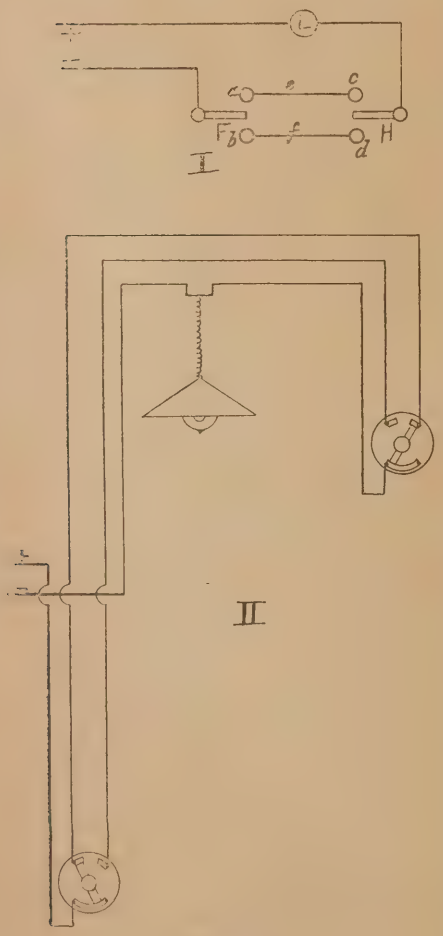


Fig. 28.

lamps the second system is undoubtedly the better one to use. It is termed the distributing-board system, because the source of supply is connected directly with a distributing-board, from which separate and distinct distributing mains are taken to each room. The lamps are thus divided into groups, each with its own sub-mains. If the groups consist of a large number of lamps, each group is subdivided into subcircuits, and has its own distributing-board. In America this system is known as the *closet* or *panel* system, because the secondary switchboards are often placed in closets or behind panels. In special cases where it is essential to use one or more high candle-power lamps (say 100c.p. lamps), it is obvious that it should have its own branch connected to the secondary switch-board, so as to be distinct from the other circuits. And in cases where the lamps are distributed throughout a building with a number of floors, it is clear that a separate distributing board on each floor, if not in each room, will be advantageous. In many cases, also, it is necessary to control the lighting of sections, and this can best be done with the distributing-board system, for then each section is independent of all others. The ring method of arranging the leads is particularly adapted to this system of wiring, which will be readily understood from Fig. 27. The following advantage of the distributing-board system over that of the tree are apparent.

1. The junctions with the main cables are more accessible.
2. The insulation is vastly superior.
3. The distribution of electrical energy is more under control.
4. The fall of pressure is more readily equalised, since the distances from the distributing centres are reduced.
5. The ease with which each group may be tested is much greater.
6. There is less possibility of increase of temperature at the junction of the branches, and therefore less danger of fire.

(7) And although more wire is required and the first cost is greater, the convenience, control, and independence of each group which are secured, more than repay the additional outlay.

Whilst we are dealing with house or interior wiring it will be well to refer to a special arrangement for turning a lamp on and off at two places. Fig. 28 II, for instance, gives an ingenious and simple arrangement of wires and switches that would enable a staircase lamp to be turned on or turned off from either the foot of the stairs or from the head of the stairs. The principle employed will be understood from Fig. 28 I, and the following description :—F and H are two-way switches placed at the foot and head of the stairs, *a*, *b*, *c*, and *d* are contact studs; *a* and *c* being joined by the cable *e*, *b* and *d* by the cable *f*. If the two lever arms are on *a* and *c*, the circuit is closed and the lamp will be lit. On moving the switch arm from *a* to *b* the circuit is broken. It may, however, be closed again from either side by moving one or other of the switch arms, so that the lamp may be turned off or on either at the foot or head of the stairs.

STABLE CONSTRUCTION.*

THE sanitary construction of stables is a question that should receive greater attention than it has done. We are often astonished at the condition of many London stables where omnibus and other horses are housed. Local authorities have done something to remove the reproach of some of the disgraceful structures that once served the purpose of stables and cowhouses. Any dilapidated shed once sufficed, and as for the sanitary stall, the less said the better for our humanity. Mr. T. E. Coleman, F.S.I., M.S.A., whose series of articles on this subject recently appeared in the Building News, has published them in a book form, with necessary modifications. Those of our readers who have read the articles as they have appeared will be glad to have them in a compact form for handy reference, while others who have not read them, or have only casually glanced at them, will highly appreciate the author's work. Mr. Coleman has studied this particular branch of his profession. His work on "Sanitary House Drainage" is well known, and he here describes and illustrates the most approved types of stable plans and fittings. Considerable space is given to the subject of ventilation, natural and artificial. The volume of air required by a horse when at rest is put at 2½c.ft. per hour, and the author gives Dr. de Chaumont's formula to find the necessary amount of fresh air to be supplied per hour for each horse, and he observes that for general purposes an allowance of 10,000c.ft. of fresh air per horse per hour will be sufficient as a minimum quantity for healthy horses. We should like to know how many stables provide even this minimum in our towns. This allowance, divided by six, the required number of changes of air per hour, gives 1,666c.ft. as the minimum cubic space per horse. Those interested in stables and stable construction will find many examples of plans of stalls and loose boxes, sections, details of inlet and outlet ventilators, stable fittings, paving, and drainage, and we highly recommend Mr. Coleman's treatise to architects, estate agents, and others.

* Stable Sanitation and Construction. By T. E. Coleman, F.S.I., M.S.A., &c. With illustrations. London: E. and F. N. Spon, Ltd.

"THE HOUSE COMFORTABLE AND THE HOUSE BEAUTIFUL."

WE have received a new album of photographs under the above title from Messrs. Graham and Banks, of 445, Oxford-street, W., in which the architectural fittings and furniture of the house have been illustrated by the aid of pen and camera. Messrs. Graham and Banks are designers and manufacturers of high-class furniture and interior fittings, and their photographic illustrations show a superior kind of treatment to that we often see. As specialists they cater for houses of the simplest as well as the most costly kind, and the system they work upon ought to be productive of the best results. One of the interiors shows a room in the François I. style, which is on view at the firm's Oxford-street premises. We notice a certain refinement in the detail and furniture. The drawing-rooms, in the Louis Seize style, have also this quality, and a pleasing breadth and quietness. Following is an oak-panelled room with tapestry frieze; also a bedroom with white furniture, inexpensive and quiet. The French furniture, of which the manufacturers have a large stock, comprise old and modern examples from Louis XIV. to Louis XVI. These include many choice and elegant specimens of tables and chairs, cabinets, writing-tables, all designed upon good models in satinwood, mahogany, &c., inlaid and carved furniture designed after Sheraton, Chippendale, and others. Some very simple and inexpensive designs are shown for sideboards, hall-tables, and stands in oak or walnut, also in chairs, bedroom suites, wood chimney-pieces, parquet floors, wall and ceiling panellings in joinery. These moulded rib panellings for ceilings and walls can be fixed on existing ceilings at from 1s. to 2s. 3d. per foot super. The system adopted by this firm of inspecting the house before furnishing designs or estimates, is the only right one. Messrs. Graham and Banks will be pleased to send a copy of their album to any readers of the Building News who may apply for one, and they are prepared to carry out architects' designs. Every design illustrated is marked with the price—a consideration of moment to many.

BRICKWORK TESTS.

THE report of the third series of experiments on brickwork conducted by the Science Standing Committee of the R.I.B.A. is published in the *Transactions* of that body. The experiments were made on twenty short lengths of brick walls, each about 6ft. high, 27in. long, and 18in. thick. The tables, illustrated by photo-blocks of the different samples, have been prepared by Mr. William C. Street, F.R.I.B.A., and Mr. Max Clarke, A.R.I.B.A., and the appendices by Professor Unwin, F.R.S. A careful analysis of these tests would be of value. Till some rules are formulated from a generalisation of the results, the practical architect will have to exercise his own judgment as to safe limits of pressure. From a general study of the tables it would appear that the crushing resistance of piers of brick in lime mortar varies from one-sixth to one-eighth of the resistance of the brick itself; in cement mortar the resistance varies from one-half to one-fifth of the brick strength. From this it is concluded that "while cement mortar must very materially aid the weaker bricks in their combined strength, it cannot materially affect the ultimate power of resistance in brickwork made of a harder variety." The diagram showing compression of walls shows how the mortar is compressed. The bricks averaged in thickness 2¾in., and the total thickness of mortar beds was 6in. The compression

of lime mortar beds averaged 1in., that of the cement mortar beds about $\frac{1}{3}$in.; thus it is concluded the mortar was well crushed and disintegrated long before the final collapse. The photographs taken show the mortar flowing out at the moment of collapse. It is noticed also, as to the working load that may be calculated upon, at one-fifth of the crushing load the compression in lime mortar averaged $\frac{1}{32}$in. in 6ft. of brickwork, in cement mortar it averaged $\frac{5}{32}$in. The report further states: "If we take a safe load, or one that would not materially damage the structure, as one-fifth of the crushing load, it may be assumed from the results that in lime mortar 1 to 2, stock brickwork is equal to about $3\frac{1}{3}$ tons, Gault 6 tons, Fletton 6 tons, Leicester red 9 tons, and Staffordshire blue 23 tons per square foot. In Portland cement mortar 1 to 4, stocks would be equal to about 8 tons; gaults, 10 tons; Flettons, 11 tons; Leicester red, 17 tons; and Staffordshise blue, 24 tons per square foot. This is only a general assumption." The influence of form upon strength appears to be slight, the height in practice being divided by each floor. The effect of age is also not very marked. The tables show that the piers built three months gave similar results to those of five months old. The tables are interesting as studies, and the photographic illustrations give some idea of the behaviour. To take a few general results. A wall 6ft. $1\frac{1}{2}$in. high, 28in. by $18\frac{5}{8}$in., built 23rd Oct., 1896, crushed 30th March, 1897, split badly and face flaked at 142lb. per sq.in., or 63·19 tons total pressure with a compression in inches of $\frac{28}{32}$. A wall of same height and size, of stock bricks from Sittingbourne in lime mortar, cracked at 162lb. per sq.in., the compression $\frac{27}{32}$in. Another example of gaults in mortar failed at 235lb. per square inch. A wall of Leicester reds in mortar failed at 320lb., another of the same bricks failed at 330lb. A Fletton brick wall in mortar failed at 230lb. One Portland cement mortar (1 to 4) example of stock bricks (Sittingbourne) failed by shearing at 310lb., another at 315lb. It cracked near centre. Another of Ellistown red bricks collapsed at 600lb.

CHIPS.

Sir William Richmond delivered a lecture on "The Mosaics of St. Paul's Cathedral" at the Hammersmith Town-hall on Thursday in last week. There was a large attendance, Prebendary Snowden presiding. In the course of his address, the lecturer traced the history of St. Paul's from its inception, dealing in detail with its associations, artistic and other. He dealt at length with his works of art in St. Paul's, giving explanations of the various subjects depicted.

The Earl of Rosebery, with a deputation of the subscribers, attended at the Court of Common Council in the Guildhall on Thursday night, to present to the Corporation a portrait of the late Rev. Prebendary William Rogers, rector of St. Botolph, Bishopsgate, to be hung in the art gallery of the hall. The artist was Mr. A. S. Cope.

At the village of Norwood Green on Saturday the opening took place of the Ellis clock tower that has been erected in the village. The tower has been raised by members of the Ellis family to serve the double purpose of a Queen's Diamond Jubilee memorial and also to perpetuate the name of the late Mr. Ephraim Ellis. The tower rises to a height of 55ft., and contains a valuable four-dial clock.

At the Municipal Art Gallery, Oldham, on Friday night, the Right Hon. Sir J. T. Hibbert, K.C.B., was presented with his portrait. The painting has been provided by public subscription to commemorate the services rendered by Sir John to the town, of which he is a native, and which he represented in Parliament for many years. The work was intrusted to Mr. J. J. Shannon, and Sir Hibbert is in official uniform.

The engagement is announced of Mr. Leonard Stokes, F.R.I.B.A., President of the Architectural Association 1889-90-91, third surviving son of the late Mr. Scott Nasmyth Stokes, for many years one of her Majesty's Chief Inspectors of Schools, to Miss Edith Gaine, elder daughter of Mr. W. E. F. Gaine, of 100, St. George's-square, S.W.

Mr. Joseph Howard, M.P., opened the Tottenham Polytechnic at Grove House, High-road, Tottenham, on Friday night. The building, which has been acquired at a cost of about £6,000, is the joint property of the Technical Education Committee of the Middlesex County Council and the committee of magistrates, and will serve as a polytechnic and a magistrates' court-house. The polytechnic will accommodate at least 1,200 students. The whole cost has been provided out of the money derived from the Customs and Excise Act of 1890.

Building Intelligence.

Barry.—A block of buildings, situate near Court-road, Barry Dock, was opened on Monday as public abattoirs. It supersedes an old wooden building, erected in 1889, in order to obviate the necessity of the Barry and Cadoxton local board granting licenses for private slaughter-houses. The surveyor to the urban district council (Mr. J. C. Pardoe) visited nearly two years ago the most important towns in the kingdom, and ultimately recommended the erection of public abattoirs on the slaughter-hall principle. The surveyor prepared plans of the present buildings, which have cost about £6,500. The buildings comprise slaughter-hall, cooling-room, and lairs for cattle, sheep, and calves in one block, and similar buildings for pigs, together with caretaker's office, drying-room, gut-cleaning room, latrine and urinal, and also a caretaker's house. Rails are provided through the building with travelling pulleys, so that carcases can be conveyed from one building to the other, and thence to a weighing machine. The contractor for the building was Mr. George Rutter, Barry; the ironwork was provided by Messrs. W. A. Baker and Co., Newport, Mon.; and asphalte roadways were constructed by the Val de Travers Asphalte Company. The slaughter-halls and cooling-rooms have dadoes 4ft. or 5ft. high of white glazed bricks.

Brampton, Cumberland.—Considerable additions and improvements have been made to the Presbyterian Church at Brampton, under the supervision of Mr. T. Taylor Scott, F.R.I.B.A., architect, of Carlisle, and on Sunday in last week reopening services took place. The exterior has been restored and new sanitary arrangements executed. A large number of internal improvements have been made, the most conspicuous being an oak pulpit of Gothic design with oak stairs and balustrade at either side, continued to form the rails at the sides of the Communion table on the raised floor above the church. The Communion table and minister's seat are also of moulded and carved oakwork. The choir-seats have been constructed in front of the pulpit slightly raised above the congregation. The internal decoration has been carried out in light warm tints to harmonise with the surroundings. New floors have been laid and the seats renovated and varnished, also new gas-fittings provided and the lighting improved.

Cardiff.—The completion of the work of restoring the tower of St. John's Church was celebrated on Wednesday in last week. In 1473 the foundation-stone of this fine tower was laid. It was designed by one Hart, the architect who designed the towers of Wrexham and St. Stephen's, Bristol. These three towers are all of the Perpendicular style, but St. John's is not so rich as the other two, possibly owing to a lack of funds. However, Hart placed his ornamental and expensive work where it can be seen from most parts of the town. The embattled parapet with its pinnacles has since been a landmark in Cardiff. The S.W. angle turret was struck by lightning in 1860, and was rebuilt by Mr. Shepton's father. The tower before the recent restoration was in a bad condition, the top portion being dangerous. The restoration included the taking down of about half of the embattled parapets and rebuilding the same, and also the taking down of about 25ft. from the top of the north-west and south-west buttresses, which had broken away from the walls entirely. While these buttresses were being rebuilt the lofty angle pinnacle was held up with chains from the opposite angles. The windows were all restored where perished, and the whole of the tower from top to bottom was pointed down. The walling was made good, a new lead flat was laid, copper stays being fixed in in place of iron; the floors over entrance and under ringing-loft were groined in stone on the old corbels, which were built in when the tower was erected, the tower floor was carried down to the original level, inside and out, and an area formed in the street inclosed with a wrought-iron railing to show the original level. The walls which blocked up the north and south archways have been removed and the arches restored, with gates inserted, and new swing-doors have been constructed in the entrance to the nave, and so arranged as to exclude draught. The west window has also been restored and reglazed. The work has been carried out by Mr. Shepton under the superintendence of Mr. C. B. Fowler, F.R.I.B.A., of Cardiff. The glass was supplied by Messrs. Savell and Co., of London; the wrought-iron gates and railings by Messrs. Letheren and Son, of Cheltenham (who are also making the whole of the gates and railings for inclosing the graveyard); and the carving was executed by Mr. W. Clark, of Llandaff. The tower has been lit by electricity throughout by Messrs. Lewis and Fletcher, Cardiff.

Charing Cross Road, W.—Mr. W. G. R. Sprague has planned the new theatre which is to be erected for Mr. Charles Wyndham in Charing Cross-road. It will have a frontage on the thoroughfare of 85ft., and the decorations will be of Italian Renaissance character. On the pit level there will be nine rows of stalls, numbering altogether 220, and 160 dress-circle seats will be provided. The holding capacity of the building is estimated at over 1,200 persons, and the width of the auditorium will be 54ft., and the depth the same. There will be eight private boxes, and a special retiring-room will be provided for royalty, with a private entrance leading direct from Charing Cross-road. The vestibule will lead into a crush-room, in size 30ft. by 20ft., and saloons will be provided throughout the building, and a lounge on the balcony level. On the second tier is arranged a balcony, and slightly set up over this, but forming part of the same tier, will be the gallery. The stage is over 30ft. deep and 60ft. in width. The main entrance will be at the topmost corner of Charing Cross-road. The new theatre will be opened next autumn. The total cost is estimated at £30,000.

Deptford.—The new Broadway Theatre at Deptford will be opened by Miss Cissy Grahame on Boxing Day afternoon. The building is Classic in type, and is executed entirely in white Portland stone. The main corner is treated in the form of a tower, and is surmounted by a copper dome. Above this rises a miniature cupola, in which revolves a search-light. The heads of Shakespeare, Mozart, and Beethoven are carved in medallions above the doors leading from the grand saloon to the first gallery level. A carved frieze, 4ft. 6in. deep, is carried right round the building, on the second floor level. The entrances to the better parts of the theatre are from the main corner into a semicircular vestibule, and thence direct into a crush-room, the walls of which are partly lined with marble. From the crush-room the private boxes, stalls, dress-circle, and balcony are reached direct by short flights of steps. The auditorium has a depth of 80ft. on the pit level from the curtain line to the back wall, with a clear width of 60ft. The stage is 80ft. wide, with a depth of 40ft. The dressing-rooms are a separate block, about eighteen in number, and they are fitted with hot and cold water, bath-rooms, &c. Saloons and retiring rooms are provided for each section of the audience, the grand saloon being specially treated. Its size is 30ft. by 30ft., with circular ends. From this saloon visitors will have access to a balcony projecting over the main entrance. The decorations are throughout in the Italian Renaissance style, and in lieu of the usual gold, different tints of bronze and silver are used. The electric light has been made a special feature in the decorations, extra lighting power being so arranged that many novel effects can be obtained in the case of pantomime and other spectacular productions. The electric apparatus is in a separate building in the rear of the theatre. The furnishing and draperies throughout are of old rose gold. An asbestos fireproof curtain has been provided, and hydrants are fixed throughout the building, which is heated by a low-pressure hot-water apparatus. The building has been designed by Mr. William G. R. Sprague, and erected under his personal superintendence. The site has frontages on New Cross-road and Tanner's-hill, directly facing the Broadway. The erection of the theatre has cost £35,000, and its holding capacity is over 3,000 persons. The act-drop is from the well-known picture by Seymour Lucas, A.R.A., of Peter the Great working out his apprenticeship in the dockyard at Deptford.

Edinburgh. — East Preston Street Public School was formally opened last week. It occupies a site at the corner of East Preston-street and Dalkeith-road. Designed with Flemish features, the building is devoid of external ornamentation, but is constructed of red stone with grey horizontal bands at different levels, and showing gables, dormers, and a central belfry on the edge of the roof. It is three stories in height,

and will accommodate 900 children—488 juveniles and 412 infants. Internally it is divided into two equal halves by a central corridor. On the street floor are five infant classrooms, accommodating from 63 to 75 children each. The site cost £3,538, and the expense of building and furnishing the school is put down at about £12,000; total £15,538, which works out at £15 per child accommodated. Mr. R. Wilson was the architect.

Leeds.—The south avenue, the first completed section of the Grand Arcade, was opened on Saturday last, and the other sections will be finished in about a month. The grand arcade unites New Briggate and North-street. Lower Merrion-street forms the boundary on the north, and on the south the arcade is separated from the Grand Theatre by a cartway. There are two main avenues, and a transverse avenue entered from Lower Merrion-street. Of the two parallel avenue, one is 286ft. and the other 263ft., and both are 18ft. wide. The cross-arcade is 105ft. long by 15ft. wide. The façades to New Briggate and North-street are carried on wrought-iron boxed girders resting on polished red granite piers placed between the shop windows. Over the shop windows are mullioned bay windows. The upper portion of each façade is divided into three gables, which are broken up by moulded strings and cornices, and surmounted by pediments. There are two entrances from New Briggate and North-street under semicircular arches, each being 16ft. span and 24ft. high. These arches, together with the arcades, are faced with faïence of varied tints. The bay windows over the shops, the gables, and the general walling of the Briggate and North-street front are faced with red and buff terracotta. The front walls over the shops are set back 1ft. 9in. on either side, thus making the span of the glazed iron roof 21ft. 6in., which is 3ft. 6in. wider than the floor of the arcade. The floors of the arcades are laid with marble mosaics of light tints, with bold border lines. The roofs over the shops are covered with sea-green Westmoreland slates. The entrances will be closed at night by wrought-iron gates, which can be lowered into the basement or raised up into the arcades themselves to form grills therein. Altogether, there are 56 shops, 24 of which are in the arcade opened on Saturday. Electricity is the illuminant. Messrs. Smith and Tweedale, South-parade, Leeds, are the architects.

London.—The new Metropolitan Music-Hall, which has been built on the site of the old hall, and designed by Mr. Frank Matcham, was opened on Monday last. The exterior is imposing, from the granite plinth to the lofty minarets. For the front elevation, Mansfield stone has been chiefly employed. The principal entrance leads into a marble vestibule, paved with ceramic mosaic, with a lofty dome-shaped Moresque ceiling, with Moorish decorations. The decoration of the interior, which includes that of the fireproof curtain, has been carried out in the Flemish Renaissance style, the painting being almost entirely in various tints of ivory liberally embellished with gold, the most striking feature being a quartette of pictures in the four coves of the ceiling containing between 50 and 60 life-size figures, and illustrative of "Old English Merry-making," "An Italian Festival," "French Carnival," and "Spanish Revelry."

Metropolitan Asylums Board.—At Saturday's meeting of this authority Mr. Elliott moved the adoption of a report of the children's committee recommending the purchase of a site comprising 49 acres at Swanley, for the erection thereon of a school for children suffering from ophthalmia, at a cost of £5,050. The land had, he said, been valued by a competent surveyor, who had endorsed the opinion of a sub-committee that it was the best of the sites which had been offered in response to the committee's advertisement. The recommendation was agreed to. The works committee presented plans prepared by Mr. Edwin T. Hall, F.R.I.B.A., of the chief office buildings to be erected on the Embankment site, and the architect's descriptive report. The architect's rough estimate of the cost of the new chief office buildings, including foundations and detached ventilating tower for the railway tunnel opposite, was £49,543. The committee recommended that the plans be approved and adopted, and forwarded to the Local Government Board for their formal sanction under seal. Mr. Purchese remarked that the original estimate for the buildings was £30,000. In the case of the Brook Hospital the original estimate was exceeded by £50,000. He trusted that there would not be a similar excess in this case. The Chairman said the increase had been brought about by the fact that since the original estimate was given other important work had been intrusted to the board. The recommendation was agreed to, and it was resolved to apply to the Local Government Board for a provisional order authorising the expenditure of £40,000 in respect of the erection of the new chief office buildings, and empowering the managers to raise the amount on loan.

CHIPS.

The urban district council of Rugeley have adopted plans by Mr. E. Pritchard, C.E., of Birmingham, for sewering the town, at an estimated cost of £12,000.

Mr. Forest A. Coburn, senior member of the firm of Coburn and Barnum, architects, of Cleveland, Ohio, died in that city on December 1. He was a native of Lowell, Mass., but removed to Cleveland in infancy. He studied his profession in Cleveland offices and in New York City with the late Richard M. Hunt. He had been secretary of the Civil Engineers' Club of Cleveland for the past three years.

On Thursday, the 16th inst., in the Tunbridge Wells County-court, before his honour Judge Emden, was heard the case of "Hannah Worrell v. The Mayor and Corporation of Tunbridge Wells," a claim for £210 damages in respect to the death of the husband of the plaintiff, a labourer in the employ of the Tunbridge Wells Corporation, who met his death by the sudden collapse of a trench on the Southern Sewage Farm. A verdict was given for the plaintiff with costs, on the ground that the work was proceeding in made ground, and should have been protected by timber shoring.

It is a curious coincidence, says the *City Press*, that on the walls of the old Council Chamber, where the inquiry in the great fire in Cripplegate has been held, are displayed the portraits of many of the judges who carried out the irksome duty of deciding claims to lands devastated by the historic Fire of London in 1666. The likenesses, it will be remembered, were painted at the expense of the corporation to mark the City's appreciation of the services rendered to the one square mile by these legal luminaries.

At a public meeting, held at Cardiff, on Saturday, under the Presidency of Lord Windsor, it was resolved to place a memorial of the late Dean Vaughan in Llandaff Cathedral, and that it should take the form of a recumbent effigy of the late Dean.

At the town-hall, Barnsley, on Friday, Mr. R. Deane Sweeting, an inspector of the Local Government Board, held an inquiry into an application of the Barnsley Town Council to borrow £6,416 for the purchase of a site and the erection of a small-pox hospital. Five acres of land at Lund-lane, Monk Bretton, have been bought from Colonel Wombwell's trustees for £1,000; the remainder of the money is required for the building, which will contain 14 beds.

An appliance invented by Mr. W. Freer, superintendent of the Glasgow Corporation Public Halls, for the automatic locking of doors of public halls and theatres, was shown at the City Hall, Glasgow, on Friday, to a number of people interested. The invention can be fitted on to any door, and while it prevents entrance from the outside, it opens with a slight pressure from the inside.

By the will of the late Rev. Charles Sale, rector of Holt, Worcestershire, his collection of water-colour drawings of the English school, one of the finest of the kind in the kingdom, is bequeathed to the British Museum, subject to Mrs. Sale's life interest. The will also empowers the executors to offer any portion of the collection not required for the national institution to the corporation of the city of Worcester. The Sale collection is particularly rich in examples of David Cox, Samuel Prout, and Cattermole, while it also contains two or three valuable Turners and several De Wints.

Mr. Walter A. Ducat, on behalf of the Local Government Board, held an inquiry at Llandudno Junction, on Friday, touching an application by this authority for powers to negotiate a loan of £750 for the constitution of an outfall sewer at Llangystenyn. Evidence was given by Mr. T. B. Farrington, C.E., the engineer in charge of the scheme.

Mr. Shiress Will, Q.C., the umpire in the recent arbitration to fix the price to be paid by the Cowes Urban District Council for the compulsory acquisition of the undertaking of the Cowes Gas Company has just issued his award, the amount being £52,150. The profits of the company for the year 1896 were £1,951. The price claimed by the company was £62,000, while the value as calculated by the council's representatives was only £32,000.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Edinburgh Architectural Association.—A meeting of this association was held on Wednesday in last week in the Royal Institution, Princes-street, Mr. Thomas Ross, the president, in the chair, at which Mr. Leslie Ower, president of the Dundee Institute of Architecture, read a paper on "The Evolution of Style in Architecture." The thought had been expressed by many, Why was there no new style of architecture invented? And they lamented the inartistic spirit of our time, which seemed to them to fall behind past ages in this respect. These people forgot that no architectural style had ever been invented, but had been the slow growth of centuries, and a little reflection would show that it was not to be expected even in an age like ours, unsurpassed for progress in science and invention, that either new materials or inventions would quickly work such a radical change in building design and construction, as to create anything that could be called by the honoured name of a style. The world moved slowly in such matters, and it might even be that, all unknown to ourselves, as it had always been to those who were the busy agents in producing it, a style might be developing under our hands and eyes which, in the estimation of following generations, would be fit to take rank alongside the great architectural styles of the world. The lecture was illustrated by lantern views of ancient and modern buildings.

Glasgow Cathedral Lower Church.—Mr. T. L. Watson, F.R.I.B.A., read a paper on Friday evening to the members of the Glasgow Archæological Society, in their rooms, 207, Bath-street, on "Glasgow Cathedral: the Vaulting of the Lower Church." Mr. Watson submitted that the design of the lower vaulting of the cathedral was not of one period, but of several, and in particular he contended that the middle compartment was later than the aisles. There was evidence that this part was delayed in order to facilitate the operations of building the cathedral; and that when it came to be carried out, as the cathedral approached completion, the original design was abandoned, and a modified or new plan adopted. The evidence of these facts was to be found in the mouldings, which indicated a considerable advance in the style of architecture. It was also to be found in the general design of the vaulting, which was decidedly later than the aisles; and the last evidence of it was in the springer stones of the vaulting, where it could be distinctly seen than the old plan was abandoned and a new design engrafted on the old pillars. He assigned the different portions and the periods of their construction as follows:—South-west compartment, 1190 to 1220: lower aisles, 1230 to 1240; upper aisles, 1240 to 1250; middle compartment, 1250 to 1260; and the vaulting over the stairs and the east end, 1260 to 1300.

Mr. Bakewell, architect, has formally stated to the Leeds Corporate Property Committee that the City-square will be thrown open early in February. The statues, however, are not expected to be in their position for a couple of years.

An inquiry was held on Friday by Mr. W. O. E. Meade King, Local Government Board inspector, at the Public Offices, Old Hill, with respect to an application made by the Rowley Urban District Council for sanction to a loan of £15,000 for the purpose of connecting the 6,211 houses in the district with the sewers. There was also present Messrs. E. B. Martin and W. Fiddian, joint engineers to the Upper Stour Valley Main Drainage Board; W. H. Brettle, surveyor to the urban district council; and J. Whitworth, assistant engineer.

A stained-glass window, replacing the remaining plain-glass window in the Trafford aisle of Byfield parish church, has just been put in. The window is the gift of the Farebrother family, and consists of three lights. The left-hand light contains the figure of the Apostle St. Thomas; the centre light represents St. Ann, attended by the Virgin Mary; the right-hand light is a figure of St. George and the Dragon; while the small figure filling the top portion of the window is emblematical of the Lord in Glory. The work has been executed by Mr. C. E. Kempe.

The Wellingborough Urban District Council having applied to the Local Government Board for sanction to a further loan of £3,000 for works of sewage disposal, Colonel Durnford, R.E., one of the inspectors of the Local Government Board, attended at the old board-room on Friday morning to hold a public inquiry.

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ILLUSTRATIONS.

NATIONAL SILVER MEDAL DRAWINGS OF FAIRY TALES.—NEW SCHOOLS FOR THE LOUGHBOROUGH SCHOOL BOARD.—"THE CEDARS," FARNHAM.—HUNTING STABLES AND KENNELS, "WOODLANDS," SURREY.—HOUSE AT COLWYN BAY.—VILLA AT SURBITON.—METHODIST FREE CHURCH, CARDIFF.—THE CLOISTERS, LINCOLN CATHEDRAL.—GRAND HOTEL, SHERINGHAM, NORFOLK.

Our Illustrations.

NATIONAL SILVER MEDAL DRAWINGS FOR BOOK ILLUSTRATION.

These spirited designs from "Jack the Giant Killer," by Mr. Sunderland Rollinson, obtained a national Silver Medal in the Science and Art Department students' competitions this year. The drawings are thoroughly decorative in their treatment, and display a freshness of idea in the handling of a well-worn history, to which a distinct addition is made by their introduction as illustrations of the story. The third picture, designed as a frontispiece to "Reaping," by George Thorne, is here reproduced to complete the proportions of our plate. The design is by the same hand, and the subject is certainly very prettily managed, with breadth, as well as a charming sense of the harvest-field, the scene being conventionally suggested.

ROSEBERY STREET SCHOOLS, LOUGHBOROUGH.

This building has just been completed for the Loughborough School Board, and designed upon the central hall system, with accommodation for 66 children, to which is shortly to be added an infants' department for a further 350 children. The building is heated throughout with hot water by Messrs. Messenger and Co., of Loughborough. The walls are tiled to the height of 4ft., except central hall, which has a pitch-pine dado, and the floors are in wood block. The total cost of the scheme, when completed, and including land, will be £10,000. Mr. George H. Barrowcliff, of Loughborough, is the architect, and the builder is Mr. W. F. Harding, of the same town.

"THE CEDARS," FARNHAM.

Advantage was taken by the architect of this house, Mr. Alfred Burr, F.R.I.B.A., to adapt his design to the sloping character of the site, and a feature is made of the external stairway leading from the drawing-room and library into the garden. The kitchen and offices are located on the other side of the building. The plan accompanying the view herewith illustrated shows the arrangement of the house on the principal floor.

STABLES AND KENNELS, "WOODLANDS," NEAR LEATHERHEAD.

These buildings have just been completed on Mr. Martin D. Rucker's estate. The elevations are of red brick and tile. The interior of the stables is finished with pitch-pine open roofs, with lead light windows; there is accommodation for 33 horses, one wing being used for steeple-chasers and the other for hunters. The kennels contain accommodation for about 60 couples of hounds. The whole is lighted by electricity, and large underground tanks are provided for collecting rain-water, which is forced by pumps to convenient positions. The necessary rooms are provided for the men engaged. Messrs. Colls and Sons, of London and Dorking, are the contractors, and the whole of the stable fittings were supplied by the St. Pancras Ironwork Co. The designs were prepared and the works carried out under the supervision of Mr. E. Keynes Purchase, architect, 11, Queen Victoria-street, E.C.

HOUSE AT COLWYN BAY, N. WALES.

This seaside home is situate on the West Promenade at Colwyn Bay, on a site which commands extensive views of marine and woodland scenery. The proprietor is Mr. R. Stanley. The outside walls are built of buff brick with red brick and terracotta string-courses. The main feature of the interior is a large staircase hall with gallery and balustrade on the first floor, lighted by means of a top light glazed with stained and decorated glass. The architects are Messrs. Booth, Chadwick, and Porter, of Manchester and Colwyn Bay.

RESIDENCE AT SURBITON.

This detached residence has been built upon a large plot of ground situate in the Lovelace-gardens. It is faced generally with red bricks, with St. Aldhelm's Bath stone dressings and cement rough-cast in parts. All windows except to offices are casements opening outwards, and chiefly glazed with clear lead glazing with wide lead bars. The roof is covered throughout with "Sovereign" tiles. Internally the house contains, on the top floor, two half-attics 14ft. by 11ft. and 18ft. 6in. by 13ft. respectively, boxes and cistern space, and laundry. On the first floor, bedroom No. 1, 17ft. 9in. by 14ft. 6in., with dressing-room therefrom 9ft. 6in. by 7ft.; bedroom No. 2, 14ft. by 12ft. 6in.; bedroom No. 3, 18ft. 6ft. by 12ft.; boudoir, 15ft. 6in. by 9ft.; bathroom and lavatory (hot and cold), w.c., and linen cupboard. On the ground floor, dining-room, 17ft. by 14ft., with serving hatch; drawing-room, 17ft. by 13ft. 6in., with two bays and ingle-nook fireplace in addition; morning-room, 14ft. by 13ft. 6in.; inner hall, 13ft. 3in. by 10ft.; outer hall, 14ft. by 5ft. 6in.; kitchen and offices, with cellar in basement. The contractor is Mr. George Burrage, of Sutton, Surrey. The cost of the house, without decorations, was £1,192. The architect is Mr. R. Lano Pearce, M.S.A., &c., of Queen Victoria-street, E.C., and Surbiton, Surrey.

UNITED METHODIST FREE CHURCH, CARDIFF.

The church and buildings herewith illustrated are being erected at the junction of Newport-road and Pearcefield-place, Roath, for the United Methodist Free Church. The church is approached from an entrance in the centre, fronting to Newport-road, and also from a tower entrance to Pearcefield-place. The porch and inner lobbies will be paved with Ruabon red tiles. The church is so planned that from the nave and transepts all the worshippers will have a good view of preacher, the floor of the nave being laid at an incline from the front entrance to the pulpit. The choir is arranged in an apsed end, which has an organ chamber on one side and choir vestry opening out from the other. The minister's vestry is also placed with convenient access to the church and rostrum. The schoolrooms, while being a distinct block of buildings with classrooms, infants' room, lavatories, &c., are connected by a wide corridor to the front porch of church, and by another corridor to one transept. The lecture-room or schoolroom is 50ft. by 30ft., with a gallery over front end, and is lighted by clerestory windows over the flat roofs of classrooms. Between the lecture-room and church, a church parlour on ladies' room, with separate lavatory and a kitchen, are also provided. The arrangement of the school-room has been such that either the assembly room, the infants' room, or church parlour can be used independently, or in conjunction with each other. The windows are fitted with plain geometrical lead-lights, which are being supplied by Messrs. Swaine Bourne and Sons, of Birmingham, who are also executing three stained-glass memorial windows, which are to be fixed in the apse at back of choir. The entire block of buildings is being warmed on the low-pressure system, from a boiler placed in vault, in a central position. The buildings are lighted throughout by electricity, the church and schoolroom being fitted with pendants from the ends of the hammer-beams to principals, and the class-rooms, vestries, &c., having brackets in suitable places. The buildings are carried out in a free treatment of Gothic architecture, the external work all being faced with hammer-dressed blue Pontypridd stone, with Bath freestone dressings. The stone carving work has been executed by Mr. W. Clarke, of Llandaff. The contractors, Messrs. W. Thomas and Co., of Cardiff, are erecting the buildings from designs by, and under the superintendence of, Messrs. Ingall and Sons, architects, 3, Temple-row West, Birmingham.

THE CLOISTERS, LINCOLN.

This drawing was made by Mr. Chas. H. Holden. The north wall of the cloisters, having been built without foundations (at least, so the story goes), fell in consequence, and Sir Christopher Wren was commissioned to rebuild the same. This he did, fortunately in his happiest style, without endeavouring in the least to Gothicise the design. The new building took the form of a Doric colonnade, with a library over. The comparison, as seen through the tracery window, is decidedly interesting, and it was this that suggested the sketch.

THE GRAND HOTEL, SHERINGHAM, NORFOLK.

For the purpose of accommodating the ever-increasing number of visitors to this popular sea-side resort, the erection of this hotel is now being rapidly proceeded with, and is intended to be fully completed by the opening of the ensuing season. It consists of basement and five upper floors. The elevations are in red brick, with Bath stone and white brick dressings. Slates will be used for the roofs, and the turrets covered with copper. A sheltered garden, with verandahs and terraces, is also provided for use during the winter months and inclement weather. The building will be lighted throughout by electricity. The estimated cost of the work is about £30,000. Mr. Herbert J. Green, of Norwich and King's Lynn, is the architect, the contractors being Messrs. J. Youngs and Son, of Norwich.

CHIPS.

Plans of new buildings to the value of £14,000 were sanctioned by the plans committee of the town council of Aberdeen on Friday.

Colonel A. G. Durnford, R.E., one of the inspectors of the Local Government Board, sat at the Council House, Birmingham, on Friday, for the purpose of inquiring into several applications made by the city council for loans to carry out works of public improvement. There were five loans applied for, making in the aggregate £63,105. The town clerk (Mr. E. O. Smith) presented the case for the corporation.

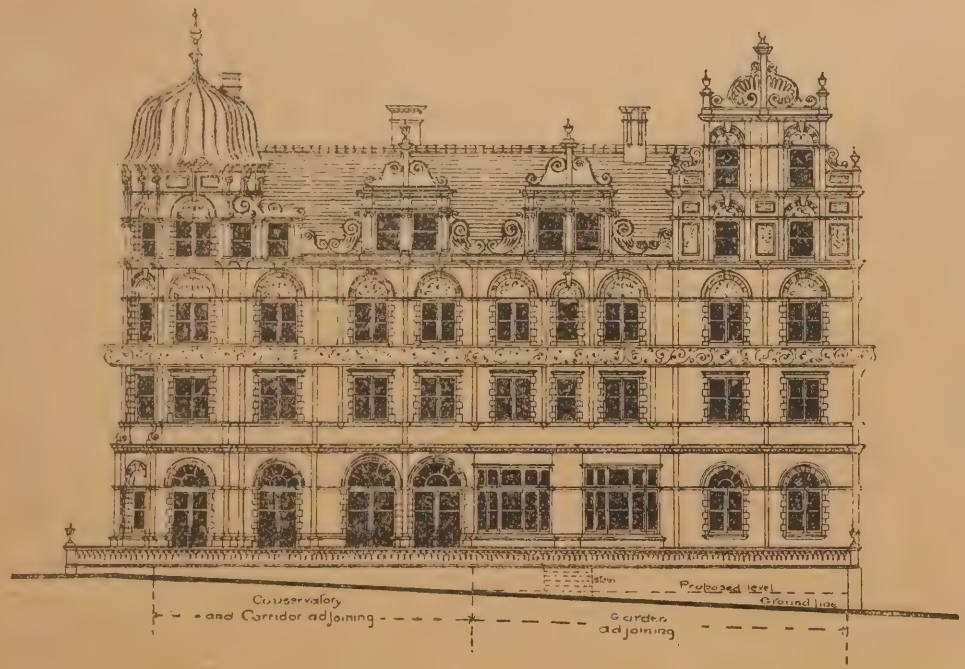
At a vestry meeting held at St. George's, Redditch, on Saturday, it was decided to enlarge the church by adding an aisle, at an estimated cost of £500. Mr. Herbert R. Lloyd, of Birmingham, was appointed architect.

On Wednesday week a new mission church at Marland, near Rochdale, was formally dedicated. The new church is situated a short distance from the main road. It is cruciform in shape, of brick on a stone base, and it has a short lantern tower. The nave has an open-timbered roof. Seating accommodation is provided for about 120 worshippers. About £500 has been expended on the new building itself. Mr. Edgar Wood, of Manchester, was the architect. The contracts for the building work were divided amongst local tradesmen.

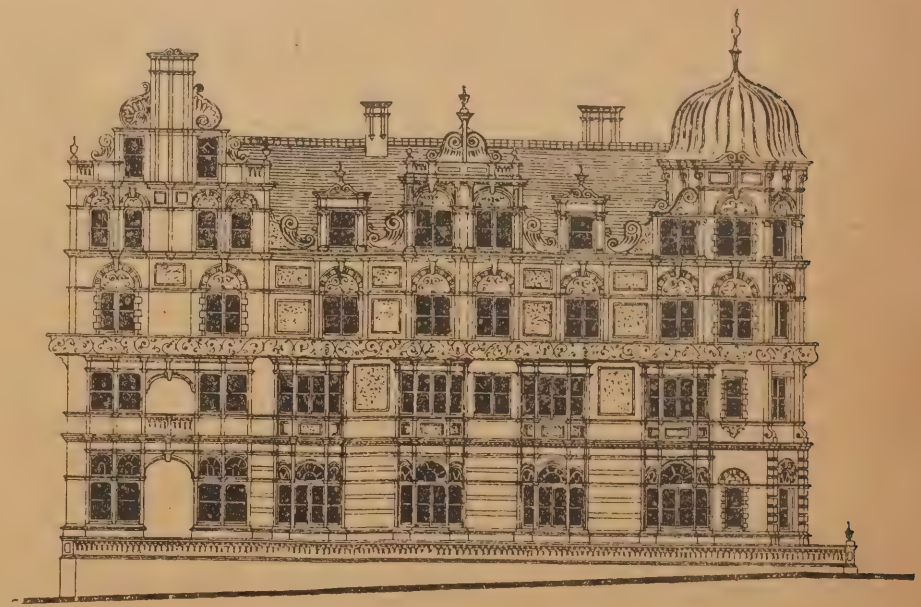
The Torquay Town Council have decided to purchase the whole of the 2,000 acres of land on Dartmoor from which it draws its water supply. All the habitations are to be removed, and the land restricted to pasturage. The cost is estimated at £40,000.

At Monday's meeting of the Croydon Town Council the sanitary committee recommended the extension of the borough isolation hospital at a cost of £12,000. A memorial was received from the Surrey Archæological Society protesting against the demolition of the Whitgift Hospital in North-end, Croydon, a splendid example of Elizabethan domestic architecture, for local improvements.

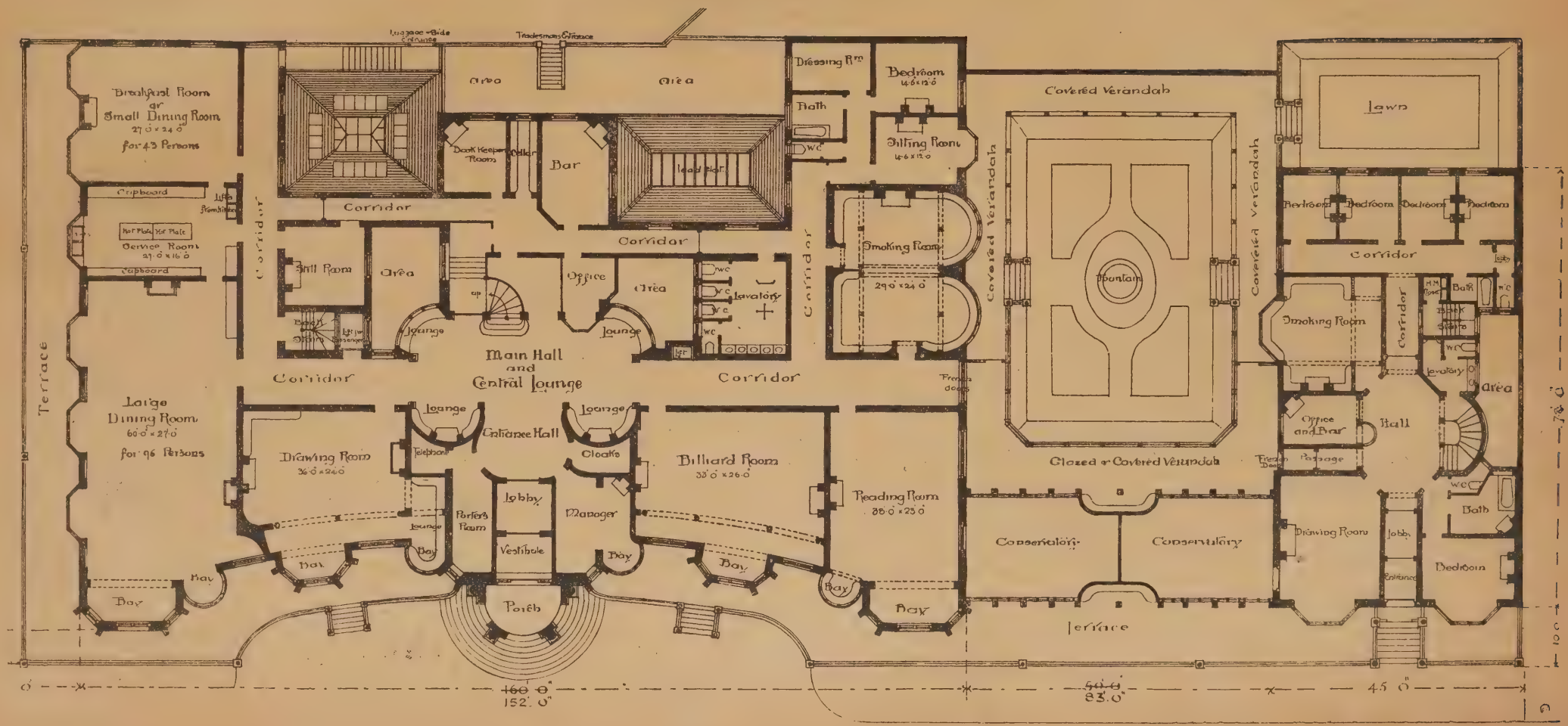
Wrottesley Hall, the seat of the Wrottesley family for the past two centuries, has been entirely destroyed by fire. The entire mansion was burned out. Its valuable contents of furniture, family heirlooms, pictures, and an extensive library of choice books were almost wholly destroyed. All that now remains of the noble mansion built in 1698 by Walter Wrottesley, are the blackened ruins of the outer walls. The most irreparable loss is that of the family title-deeds and other documents, which practically embraced the history of the district from the twelfth century. These were stored in the muniment room adjoining the library.



Elevation facing the Garden



Elevation facing St Peters Boulevard.



THE GRAND HOTEL, SHERINGHAM, NORFOLK.

Engineering Notes.

Proposed Improvements of the Metropolitan Railway.—The Metropolitan Railway Company have duly deposited their Bill for next session in the Private Bill Office of the House of Commons. The Bill is divided into six parts. By Part 2 the company seek powers to alter the levels of their existing railway for a distance of over 1¾ miles between Kingsbury - Neasden Station and Kilburn-Brondesbury Station, and also to acquire additional lands adjoining their stations at Northwood, Willesden-green, Wendover, Quainton-road, and Chorley-wood. Under Part 3 powers are sought to acquire properties in Marylebone-road, Finchley-road, and Euston-road for the purpose of maintaining openings for the ventilation of their railway. By Part 4 power is taken by the company to work by electricity the whole of the traffic on their railway or on any part of their system, including the lines owned jointly by them and the Metropolitan District Railway Company. For this purpose it is sought to erect a generating-station on land adjoining their Edgware-road Station, and power is also sought to enter into agreements with the Metropolitan District Railway Company with reference to the working of both systems by electrical power. Under Parts 5 and 6 of the Bill additional powers are proposed to be conferred on their Surplus Lands Committee for dealing with lands between Pinner Station and Verney Junction Station and between Chalfont-road and Chesham Stations. Power is also sought by the Metropolitan and District Joint Committee to accept a lease from the South-Eastern Railway Company of all the lands above the Joint Committee's Cannon-street Station.

In the case of John Gleves, Wolfington-road, West Norwood, builder, the order of discharge from bankruptcy has been suspended for three years, ending Nov. 11, 1900.

During last week the tone of the estate market for both East and West End properties was good, and in some instances prices were realised which were beyond the expectation of many experts who frequent the Mart. The sales were chiefly of brick and mortar investments, and these, together with the Mitre Hotel, Hampton Court, which sold for £20,050, and a few reversions and life policies, brought the total for the week to £116,137, as compared with £80,453 for the corresponding week in last year. At Leeds, a freehold site containing 817 square yards, with an hotel and several other premises upon it, was sold at auction for £30,000.

The foundation-stone laying ceremony connected with the new Masonic Hall which is to be constructed by the Blagdon Lodge of Freemasons in Beaconsfield-street, Blyth, Northumberland, took place on Friday. The exterior of the building will be of special pressed bricks, with terracotta ornamentation. The news-room, smoke-room, club-room, and caretakers' apartments will occupy the space on the basement, and a large lodge-room, with ante-rooms and offices will be located on the first floor. The total cost is estimated at £1,100, and it is being built by Messrs. Goulding and Sons, of Blyth, from plans prepared by Mr. J. Goulding, jun.

The sewage works for Heywood were formally opened on Saturday. The cost of the works, exclusive of the land and the culverting of a brook to provide a tip for the health committee, has been, up to date, £34,182 17s. 10. Mr. James Diggle, C.E., of Bury, Lancs, is the engineer, and the contractors were Messrs. Townsend, Watson, and Yates, of Sheffield. The corporation purchased two farms in 1882, and secured 15½ statute acres for £3,020. In addition to the sewage works, it has been found possible to secure a site for an isolation hospital.

The parish church of St. Mary, Scawton, was reopened on Wednesday-week by the Archbishop of York, after having been restored at an outlay of over £600. Until now it has been the oldest unrestored church in Yorkshire. At the time the present work was undertaken it was unfit for worship, with its decayed roof, its cracked walls, and tottering porch; while its wooden bell-cot, which rose a yard above the roof, had some time ago become so unsafe that it had to be removed. The porch has been rebuilt, also part of the west end, and the original window restored. The outer walls have been repaired where required, and the whole repointed. The roofs have been renewed, the heavy stone slates replaced by red tiles, the chancel roof brought to its original pitch, a new bell-cot provided, all dressed stonework stripped of its plaster and whitewash, and the floors replaced with cement concrete.

COMPETITIONS.

Cardiff Municipal Buildings.—Mr. W. Harpur, the borough engineer of Cardiff, writes us that Mr. Huon A. Matear, of Liverpool, is the author of design No. 23, and not Messrs. Hurrell and Taylor, of Manchester, as stated in our issue of last week, p. 859. The names of the authors of design No. 30, in the same list, should have been given as Messrs. William A. Pite and R. Shekelton Balfour, of 3, Upper Montague-street, Russell-square, W.C.

Sheffield.—The report of the assessor, Mr. E. M. Gibbs, F.R.I.B.A., of Sheffield, on the designs submitted by local architects in the twofold competition for the proposed George Wolfinden Almshouses at Brocco Bank, and the George Wolfinden Convalescent Home at Whiteley Wood, is of an unprecedented character, for in each competition all the designs submitted had to be excluded, on account of breaches of the printed conditions which it had been stipulated were imperative. Under the circumstances it was agreed to divide the premiums equally, and to pay an equal proportion to each competitor, and the sealed evelopes remaining unopened, to place the sets of drawings in order of merit, with the result that they were eventually placed as follows:—For the almshouses: first, Mr. W. R. Bryden, architect, Buxton; second, Messrs. Hemsoll and Paterson, architects, Sheffield; third, Messrs. W. H. Lancashire and Son, architects, Sheffield; fourth, Messrs. George Sampson and Son, architects, Sheffield; and fifth, Mr. Frank Wilson, architect, Sheffield. For the convalescent home: first, Messrs. Hemsoll and Paterson; second, Mr. H. W. Lockwood, architect, Sheffield; third, Messrs. Holmes and Watson, architects, Sheffield; fourth, Mr. W. R. Bryden, Buxton; and fifth, Messrs. George Sampson and Son, Sheffield.

CHIPS.

The death is announced of Mr. William Wood, gas engineer to the corporation of Bradford, West Riding.

The London County Council decided at their last meeting to employ Mr. Fitzmaurice at a salary of £800 a year in connection with the construction of the Greenwich tunnel.

The Works Committee of West Hartlepool Town Council have decided to recommend that the engineer at once proceed with a portion of the new drainage scheme to cost about £20,000.

The litigation between the Bowness District Council and the Furness Railway Company in reference to the proposed extension of the company's pier in Lake Windermere came before the Court of Appeal last week. In the hearing at the Westmoreland Assizes, the jury had made certain findings which the judge considered amount to a verdict for the local authority. There was no finding, however, as to whether the extension would be an obstruction, and the Court of Appeal, holding that this point should have been settled, now ordered a new trial.

Mr. Alfred Bevan has made up the collection at the Masonic Commemoration Service at St. Paul's Cathedral for the Freemasons' section of Sir William Richmond's Decoration to £1,100, so as to leave £1,000 or more clear for the mosaics.

At the meeting of the Edinburgh Architectural Society held on Wednesday in last week, Mr. A. R. Scott, ex-president, in the chair, Mr. T. Kershaw Bonnar read a paper entitled "Mosaics," in which he first treated of the art from a historical point of view, tracing it from its earliest times in Egypt down to the present day, and then described the several methods, ancient and modern, of carrying our the work.

The Duke of Norfolk will open early in the New Year the Victoria Institute at Arundel, the permanent local memorial of the Queen's Diamond Jubilee.

A guarantee found of £500 having been now promised, it is intended by the Shropshire Archæological and Natural History Society to hold an exhibition of Shropshire antiquities in the month of May next year, opening on Tuesday, May 10, and closing about Friday, May 20. It is proposed to arrange for the delivery during the exhibition of a series of popular lectures on subjects connected with archæology by experts in different branches of the subject.

Mr. A. Winstanley, deputy engineer of the Newcastle-under-Lyme Corporation Gasworks, has received the appointment of manager of the Rotherham Corporation Gasworks at a commencing salary of £200, rising to £300 per annum.

WATER SUPPLY AND SANITARY MATTERS.

Loanhead, N.B.—The new sewage purification works of the burgh of Loanhead were opened on Thursday in last week. The company met at the Haveral Wood, where the sewage from the southern section of the burgh is to be conveyed to the precipitation tanks which have there been erected. Mr. A. W. Belfrage, C.E., Edinburgh, gave an explanation of the undertaking, of which he is the engineer. He stated that formerly the drainage from Loanhead flowed into the May and Wadling burns, but objections were raised, and proceedings threatened by riparian proprietors. The international system of purification by precipitation and filtration had now been carried out. Owing to the situation of Loanhead, it was necessary to have two different outlets, and this necessitated duplicate systems, each complete in itself. New pipe sewers have been laid throughout the whole of the burgh, the old sewers being retained for road and surface water, which is not taken into the new system, but is discharged into the burns, as formerly. The sewage from the southern and larger section of the burgh is conveyed to the precipitation tanks, &c., constructed in Haveral Wood. The effluent from the precipitation tanks flows in an open channel on to four polarite filter beds, and, passing through the filtering material, is discharged into the stream purified. The works have been carried out at a cost of about £4,000. Messrs. Macdonald were the contractors.

Hints on Water Supply.—The Local Government Board has issued to town councils, urban district councils, and rural district councils, a circular letter directing attention to the subject of water supply. Outbreaks of typhoid at Maidstone, Lynn, and Clifton have obviously led to the issue of the communication, for the Board point out that the council are the body responsible for securing to the inhabitants of their district a proper and sufficient supply of water, and the council are specially asked to take the matter into serious consideration, "with the object of guarding their district against dangers, the gravity of which has been sufficiently shown by recent examples." Not only are the council under a responsibility for the wholesomeness of the water which they themselves supply, but they are reminded that they should, by careful inquiry, make themselves acquainted with the sources, nature, and quality of the various supplies in all parts of their district, and in every case in which the result of their inquiries is unsatisfactory should take such steps as may be within their powers with the view of supplementing or improving the supplies. The board observe generally that accurate information should be procured, if not already available, in such matters as the following:—(1) Where water is derived from gathering grounds or from springs, whether drainage from human habitations, from yards, and the like, finds its way directly or indirectly into the reservoir, or to any part of the water service; and whether risk of access to the water of excreta and similar refuse is likely to arise; (2) where water is derived from deep wells, whether surface or other water, liable to be contaminated by drains, sewers, cesspools, and the like, reaches or is liable to reach the wells.

The plans for the proposed clock-tower on the Eastgate at Chester, in ornamental ironwork, by Mr. Douglas, architect of that city, have been approved by the Duke of Westminster.

The new meat market in Bradford-street, Birmingham, erected from designs by Messrs. Essex, Nicol, and Goodman, of that city, will be formally opened for business purposes on Monday next.

On Tuesday week the Bishop of Shrewsbury (the Right Rev. Sir Lovelace Stamer) formally dedicated the new stained-glass window which has been placed by public subscription in Ellesmere Parish Church to perpetuate the memory of the late Rev. J. Peake, for 47 years curate and vicar of the parish. The window has three lights, and portrays scenes in the life of St. Paul. A representation of the Apostle is placed in the centre, while on the left-hand side his conversion is depicted; on the right-hand is a delineation of St. Paul's trial before Felix. Messrs. A. O. Hemming and Co., of London, were the artists.

In the original plans by Mr. W. Hamilton Beattie, of Edinburgh, of the new building in course of erection at the corner of North Bridge-street and Princes-street in that city, it was intended that offices for the North British Railway administrative staff should be provided in the part next the Bridge. At a meeting of the directors, held on Thursday in last week, it was resolved that the whole building should be devoted to hotel purposes. We illustrated Mr. Hamilton Beattie's design for the hotel, selected in competition, in our issues of May 3 and 31, 1895. The Directors of the North British Railway Company have purchased the Waterloo Hotel, in Waterloo-place, which will be converted into offices for their administrative staff.

NEW SCHOOLS FOR THE LOUGHBOROUGH SCHOOL BOARD.

GEO. H. BARROWCLIFF ARCHT.

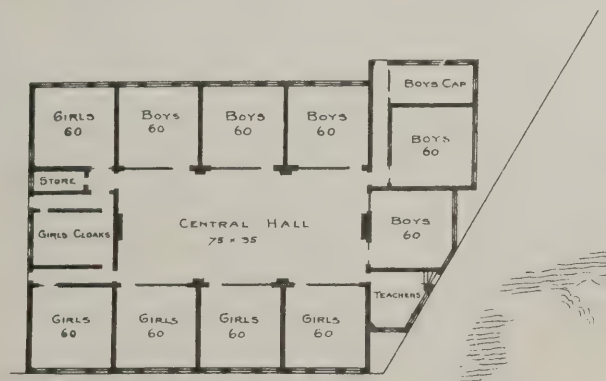
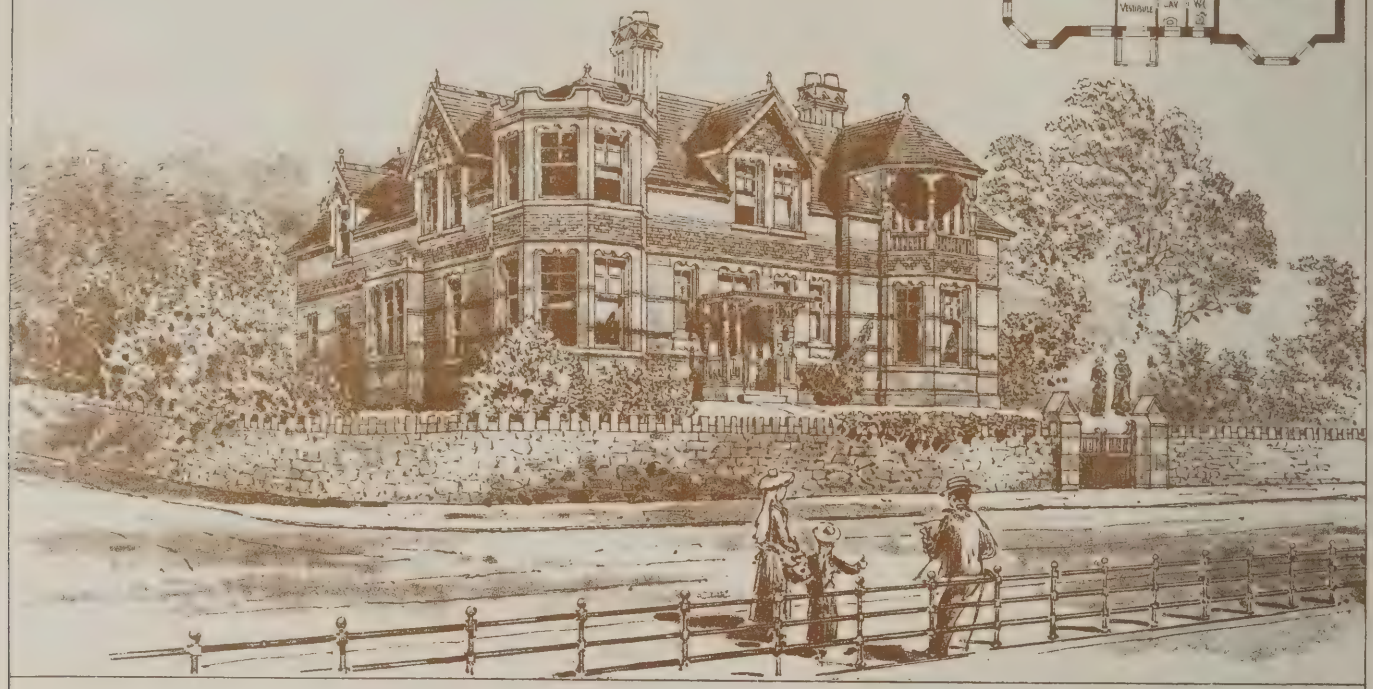


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

HOUSE AT COLWYN BAY.

BOOTH CHADWICK & PORTER *Architects*
MANCHESTER & COLWYN BAY



Villa at Lovelace Gardens SURBITON.

R. LANO PEARCE F.S.I. &c
ARCHITECT.

GROUND PLAN.

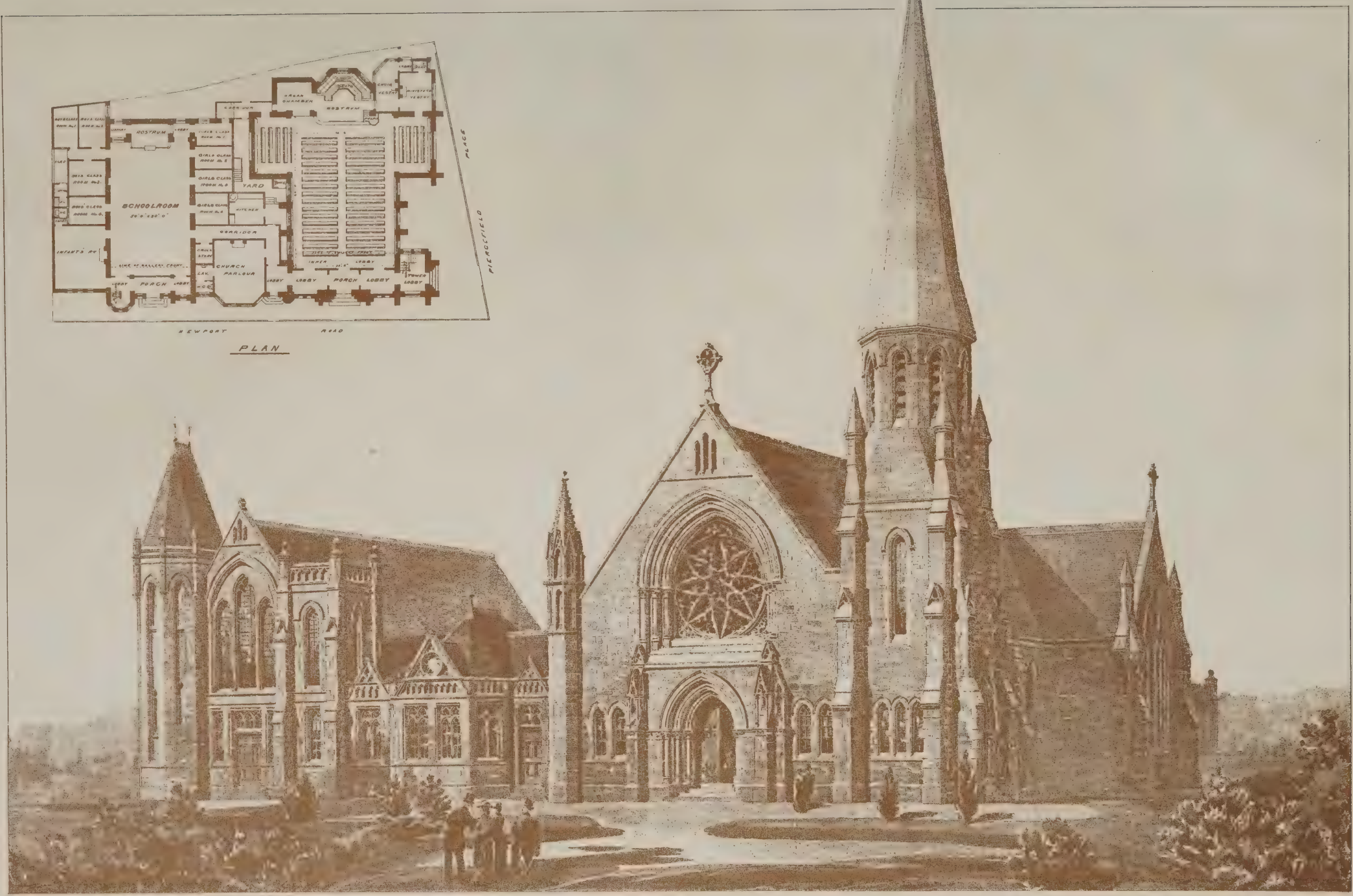
"SOLD FOR
A CAPFULL
OF BEANS"
P. Rollinson '96.

REAPING.
BY GEORGE
THORNE.

"PHOTO-TINT" by James Akerman, 6, Queen Square London, W.C.

THE CLOISTERS LINCOLN CATHEDRAL BY CHAS. H. HOLDEN

PLAN



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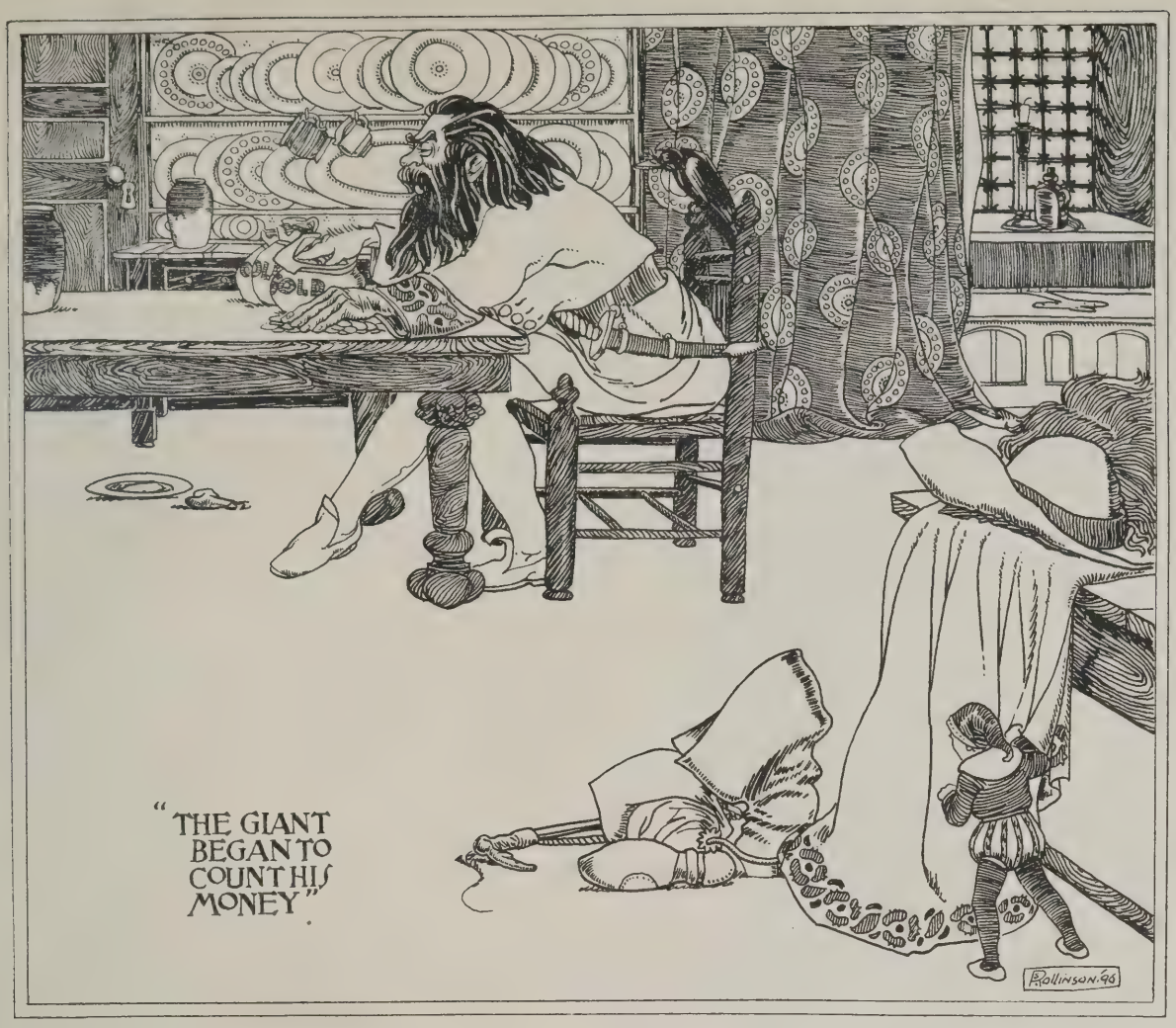
METHODIST FREE CHURCH · CARDIFF · MESSRS. INGALL & SON · ARCHTS.



"THE GIANT BEGAN TO COUNT HIS MONEY"

"JACK ESCAPES WITH THE GOLDEN HARP"

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HUNTING STABLES & KENNELS

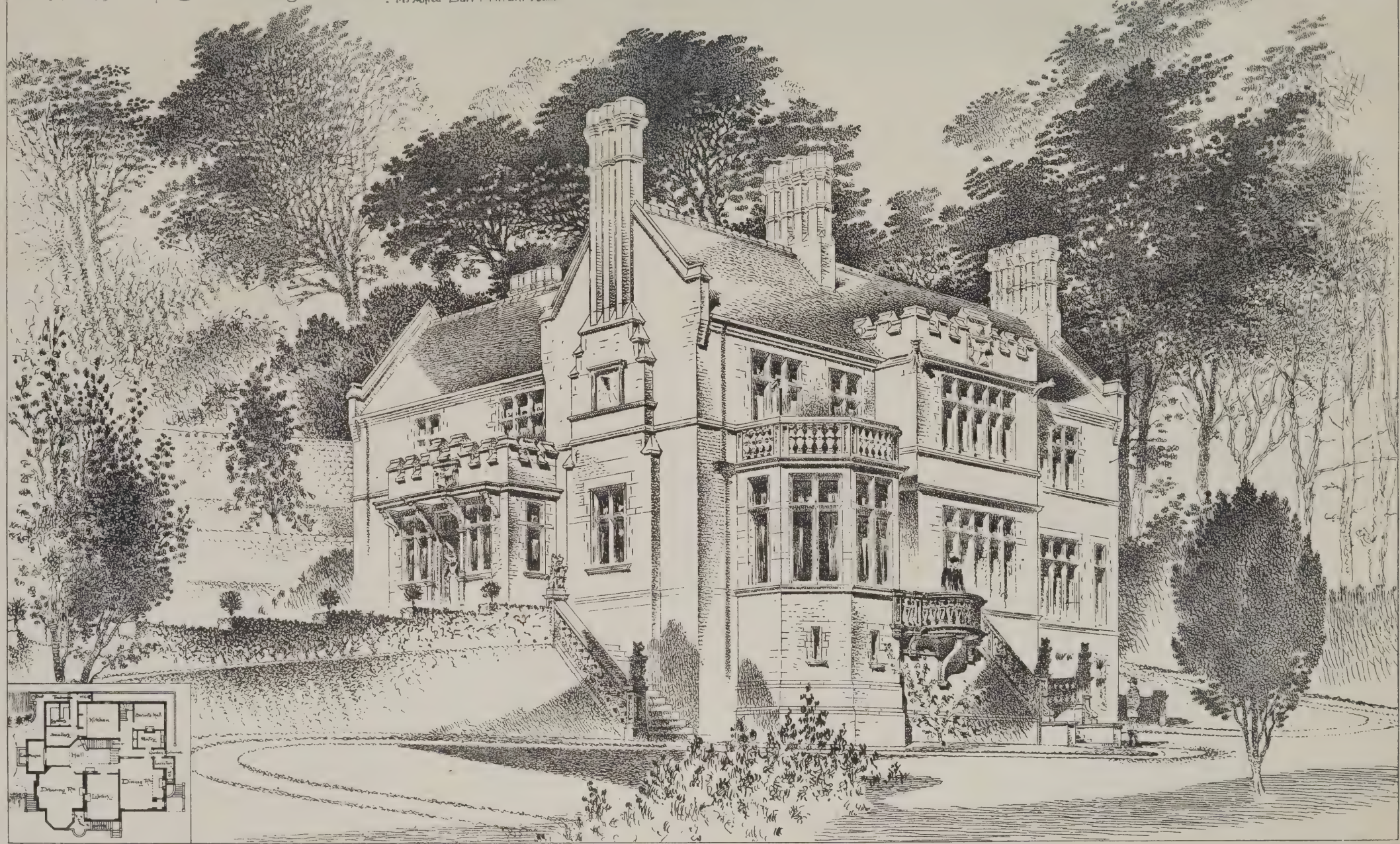
WOODLANDS SURREY

E. KEYNES PURCHASE ARCHT.

"PHOTO-TINT" by James Akerman 6, Queen Square, London W.C.

"The Cedars", Farnham.
The Residence of Col: W. Marsden.

Mr Alfred Burr, F.R.I.B.A. Architect.



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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the Building News, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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NOTICE.

Bound copies of Vol. LXXII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

J. W. Broughton. (Duplicates of letters sent to other journals are not desired.)

Received.—P. J.—W. H. C.—V. B.—R. L.—G. T. O.—A. W. and Co.—R.—S. T.

Correspondence.

WALTHAMSTOW BATHS COMPETITION.

To the Editor of the Building News.

Sir,—Let me inform Messrs. Spalding and Cross that the account referred to by them which I gave of their introduction as "unfortunately inaccurate," was merely an abridgement of the following dialogue which took place at a meeting of the council:—

Mr. French: He said he wrote to Spalding and Cross.

The Chairman: He said he received a letter from them.

Mr. McSheedy now said he had no letter from them, but Mr. Spalding called upon him, and wanted to show him some plans. He advised him to see the council, and subsequently told the committee he was outside, and that if they desired to see plans they could invite him in.

Mr. French: That was better still. Instead of writing, he had an interview with one of the firm who came down a total stranger.

Mr. Finch said if he had had Mr. Dunford at his house with plans to discuss them and had brought him to the committee to explain them, insinuations would quickly have been made. He did not suggest anything of the kind; but if the same thing had happened in his case someone would be saying he was making something out of it.

Mr. McSheedy: I can't prevent a man calling and asking for me, and I don't know what he wants until I hear what he says.—*Walthamstow Guardian* report, Nov. 19.

I can quite understand Messrs. Spalding and Cross disclaiming the accuracy of this amazing story; but why is it unnecessary for these gentlemen to favour your readers with the truth?

I note that the statement made in reference to Mr. Rowland Plumbe is denied. Messrs. Spalding and Cross say they have never mentioned Mr. Plumbe's name in connection with a "cocked hat," *nor have they ever competed against Mr. Plumbe.*

My remark was based on the report of a speech made by the gentleman who received a political telegram from Mr. Spalding (not denied), and who says Mr. Spalding called at his house with plans. This is the passage:—

"With reference to the submittance of the rival plans to Mr. Plumbe, he said Messrs. Spalding and Cross had been in competition with him and had knocked him into a cocked hat, and then he was appointed to arbitrate upon plans drawn by these gentlemen and Mr. Dunford. They had been successful competitors against him, and he knew their plans.—*Walthamstow Guardian* report, Nov. 19.

Messrs. Spalding and Cross must settle the matter with their special pleader, whose veracity they have already called into question.

Messrs. Spalding and Cross say that Mr. Dunford's name was not mentioned to them in connection with the competition, and "we were therefore surprised to find, subsequently, that Mr. Dunford had submitted a design," and, they might have added, "and won the competition."

The official minutes of the Council state "that Mr. R. Plumbe (he did not compete), Messrs. Spalding and Cross, and Mr. J. W. Dunford be invited to send in plans for public baths."

The conclusion to be drawn is clear. If an architect has not hitherto established a reputation for the erection of public baths, chiefly through lack of age (this will soon be remedied), time, and opportunity, he ought not to be allowed, no matter how much private study he may have given to the subject, to compete with men who have erected several such structures. Mr. Spalding should be invited to develop this dictum before the Architectural Association. I shall thank Mr. Spalding to keep out of my office in future when in search of information bearing upon subjects in which he has before now recognised in me an expert.

I have been informed on two occasions through your columns by Messrs. Spalding and Cross that "Mr. Plumbe considered our design superior to his own." I have never denied the fact. Referring to my design under motto "Hygiene," Mr. Plumbe said:—*This building is distinctly well designed and thought out, the whole seems to have been designed with a desire to carry it out for the estimated amount*, and in this respect it must be more economically planned than the other design. Although I think there will be the greatest difficulty in carrying out this building for the estimated amount; yet there is much more likelihood of its being carried out than the other; in fact, as I have roughly measured the building, there are nearly 130,000ft. cube less of building than in the other design." After a comparison of the two designs, Mr. Plumbe proceeds:—"I consider both the internal and external design of 'Experience' better than design 'Hygiene,' and, generally, I consider 'Experience' the better of the two. On the other hand, 'Hygiene' is in many respects an admirable design, and no doubt it is by far the more economical of the two. If, as I understand it, I am to give the greatest weight to this consideration, I should place "Hygiene" *first*, although even in the case of that design, I do not think it can be built for the money." (£7,000, I stated in my report, subject to 10 per cent.) Mr. Plumbe said it could be done for £8,000, after allowing for a sudden increase in the price of materials. When you consider that Messrs. Spalding and Cross require 130,000ft. cube more building to provide practically the same accommodation (seven slipper-baths extra, but no fitted laundry), which means an extra expenditure of about £3,000, I can only say that if the superiority is not in existence, then it ought to be.

I note that these gentlemen studiously refrain from discussing the cost. Well, perhaps they are wise. It certainly would be rather difficult to justify their estimate of £7,000.

In conclusion, permit me to say that after Mr. Plumbe's report was received, the plans were under consideration four months, and then I was appointed architect. An election shortly afterwards took place, the *personnel* of the council was slightly changed, and eight months after, without the slightest intimation being given me that the new council would not go on with my scheme, beyond a statement that they thought the site was too cramped for baths, my appointment was rescinded, and Messrs. Spalding and Cross appointed, with power to spend an extra £1,500 on a "site too cramped for baths."

To properly appreciate the situation, your readers must understand that the gentleman who introduced Mr. Spalding, as detailed above, is now the leader of the dominant majority of one vote.—I am, &c., J. Williams Dunford.

100c, Queen Victoria-street, E.C.

P.S.—I think it only fair to the section of the council that instituted the competition, instructed Mr. Plumbe to report, and appointed me their architect, to say that they have never failed to give me their undivided support.

A PARALLEL TO WALTHAMSTOW.

Sir,—The assertions and insinuations contained in the letter from Mr. James Cubitt, published in your last issue, are, so far as they concern ourselves, quite untrue, as we took no part in the competition for the East Finchley Sunday-schools, and we knew nothing whatever about the matter until we were asked by the committee to prepare working drawings and to obtain tenders from builders in *open* competition for the erection of the new school buildings.

Before we undertook the work we were distinctly told that it was *definitely* decided, for reasons it is unnecessary to state, not to intrust the work to Mr. Cubitt, whose charges for professional services had been settled.

Under the circumstances it does not appear to us that we should have advanced Mr. Cubitt's interests in any way had we refused the work.

The statement that we were introduced by a firm of builders who "happened to hear that the committee wanted a low tender" is ludicrous in the extreme, inasmuch as, in the first instance, the work was publicly tendered for by eleven builders, the lowest tender, amounting to £3,852, being ultimately rejected by the committee, on the ground that the amount was more than they were justified in expending on the building.

Eventually the committee intrusted the work to Mr. Wallis, a builder who was personally quite unknown to us, whose contract amounted to £3,688.

After Mr. Cubitt has satisfied himself of the truth of these statements, we shall expect him either to give us the name of his informant, or to send us an ample apology for his disgraceful insinuations.

Our plans, unfortunately, are not at present in our possession, so we could not, even if we were so inclined, discuss the question as to their authorship; but with regard to the School Hall and Gallery, we may say that they are almost identical in their arrangement and design with those we had previously carried out at Poplar, Cricklewood, and High Barnet.

However, until Mr. Cubitt has put forward a truthful statement of the general facts of the case so far as they concern ourselves, we shall treat his last insinuation with the contempt it deserves, as emanating from one who does not hesitate to publish untrue statements in his attempt to injure other architects.—We are, &c,

Spalding and Cross.

15, Queen-street, Cheapside, E.C.

Dec. 21, 1897.

TIMBER.

Sir,—I have endeavoured to answer some of the questions in Mr. D. Forbes Smith's letter in your issue of the 10th inst. as to the names fir, pine, deal, each further distinguished by the colours red and yellow, all applying to the wood of Pinus sylvestris or Scotch fir, which wood we do not, by the bye, get from Scotland, although it grows there in some quantity of inferior quality. Although I have tried to reply, the subject does not lend itself to explanation sufficiently succinct for your pages. Although the colour of the wood is yellow, of a somewhat reddish tinge, may not the term red have originated with the forester and timber exporter, who would so name it from its red bark?* Some workers of the wood in England might follow this name, whilst others would naturally call it by the colour of the wood, not by the colour of the tree, which they never see.

Mr. D. Forbes Smith will find a wealth of information in the following books, viz., "Timber and Timber Trees," by Laslett, 1875 (late Government surveyor of timber at Woolwich Dockyard), not quite up to date; "Trees of Commerce," by W. Stevenson (Rider and Sons, 1888); "Wood," by the same author (Batsford, 1894), the last two are by a timber merchant, a

* The black spruce of N. America (*Abies nigra*) is a tree with a black bark.

frequent and interesting contributor to your columns. The last, "Wood," is particularly full of information on the points touched upon by your correspondent. The nomenclature of timber and wood is, however, in a state of confusion quite hopeless.—I am, &c., A. H.

Intercommunication.

QUESTIONS.

[11873.]—**Safe Load on Solid Column.**—As there is a little mistake in this question, allow me to repeat it in another form. The load on a solid cast-iron column 12ft. high will be 1½ tons. What ought its diameter to be to prevent any tendency to yield by bending?—T. H.

[11874.]—**Quantity of Mortar.**—Is there any way of finding how much mortar is required for each thousand of bricks? As the quality and fineness of the work is a material point, I should like to know how much mortar is necessary in fine work with small joints, and how much in coarse brickwork?—Learner.

[11875.]—**Tracing Paper Preparation.**—I have heard that if the surface of tracing-paper is rubbed over with chalk, it will take the ink much better. Will any draughtsman inform me of his experience, and if there is not a better preparation than chalk?—G. T. S.

REPLIES.

[11852.]—**Slate Roofs.**—Countess slates are 20in. by 10in., and are generally used for roofs of a quarter pitch, and the steeper the pitch, the smaller the slate, is the general rule. For half-pitch, "ladies" or "doubles," 13in. by 7in., may be used. Slates are nailed near the head or near the middle. The gauge is the distance the battens are placed from centre to centre, and it is necessary to determine the gauge before the battens are fixed. It is calculated thus:—An inch is deducted from total length of slate, as the position of nail-hole from upper edge; deduct lap, and divide by two, which gives the gauge. For a Countess slate the gauge is—

$$\frac{20 - 1 - 3}{2} = \frac{16}{2} = 8\text{in.}$$

For a "lady" it would be 6in. If the slate is fixed near the middle, the gauge is a little more, about ½in. The head nailing takes more slates, but is more secure, as there is always two thicknesses of slate over the nail-hole. A thousand Countess slates is estimated to cover 5¼ squares. The hips and ridges can be of slate. Valley tiles are made; but lead valleys are preferable.—G. G.

[11861.]—**Roof Stresses: Graphics.**—The lines of action of three forces in equilibrium must either meet all at a point, or be parallel. Hence, the direction of one resistance being given, the direction of the other may be determined by drawing through its point of application to the point in which the first meets the resultant of the given forces. The triangle of the forces can then be drawn. The funicular polygon is very conveniently used for working such problems, especially when there are many forces to deal with; but a full description of the methods would be too long for insertion here.—J. C. Palmer.

[11862.]—**Strength of Cast Iron.**—The sketch given shows a manifestly inadequate base for the upper column. The column ought to rest directly on the lower column, for which purpose the latter ought to be continued to take the bearing of the base-plate, and the beam ought to be made to rest on an iron bracket or projection of the lower support. As drawn the construction is not safe. Of course, the upper plate D would have to bear compressive stress if used as shown, and the weight (100 tons) would be carried on the sides of the beam-box.—G. G.

[11862.]—**Strength of Cast Iron.**—On no account should the upper iron pillar be placed as shown on the beam-box or girder, by bolting the base of the upper column to the box or to the upper flange of girder. The girders carrying the floor should be carried independently of the column—that is, the whole section and column should go through, the lower column supporting directly the upper one. The ends of girder ought to rest on the cap of column or bracket cast on and secured to a core-box or continuation of the shaft of lower column by angle-irons riveted to the web and held by bolt. No vertical weight comes on the girder in this case; the core or stilting of lower column supports the whole weight. The upper column rests on a flanged cap of the core which passes through, so that the vertical support is in fact continuous; the girders simply rest on the projections or capital of lower stanchion or column.—G. H. G.

[11863.]—**Waterworks.**—The most complete work on this subject is undoubtedly "The Water Supply of Cities and Towns," by W. Humber, A.M.I.C.E. (Lockwood and Son). The cost is £6 6s.; but the work gives plans and details of wells, reservoirs, tanks, pumping machinery, conduits, &c. For the engineer intrusted with any waterworks, the volume is worth its weight in gold. It is illustrated by 50 large plates and hundreds of woodcuts. Send for particulars to publishers. "Student" will find it a most exhaustive treatise on the water supply of towns. Another useful hydraulic manual is Slagg's "Water Engineering." The latter is a useful treatise of moderate price, and published by the same firm.—Bibliophile.

[11863.]—**Waterworks.**—Get "The Water Supply of Towns and Construction of Waterworks," by W. K. Burton, M.Inst.C.E. (Lockwood and Son.)—G. H. G.

[11864.]—**Textbooks.**—Mitchell's "Advanced Building Construction" and Walker's "Brickwork" are good authorities. One of the best textbooks is "Building Construction" (Longmans). With these books "Kiln" ought to be able to coach himself up for the Honours Exam. I believe Prof. H. Adams has also published a handbook.—G. H. G.

[11865.]—**Sea-Walls.**—Upright walls, or with a slight battered face, of 1in. to 2in. to the foot. A slightly hollowed profile to the sea is preferable. If of earth the front or slopes may be pitched with chalk or local stone. Kentish ragstone has been used for this purpose, as at Canvey Island, where the walls are of considerable height, with a long slope 3 to 1 to the sea. This slope is pitched. Concrete is the best material, with a good slope to the sea of 1½ or 2 to 1. Groynes are necessary to prevent the foundation being undermined in many cases.—H. S.

[11867.]—**Safe Load on Solid Column.**—In reply to "T. H.," the question is vaguely put. If the load per square inch is known, the diameter of column must be known also. "T. H." no doubt wishes to know what the ratio of the length to diameter should be to be safe at the load he gives. He may take this as 25 to 1. If the column is 6in. in diameter, its length must not exceed 12½ft. Referring to some tables, I find that a safe load for a solid cast iron column 20 diameters long is 2 tons per square inch, so that a column, say, 25 diameters will carry about 1½ ton per square inch. For a column longer than this, wrought iron is rather stronger than cast iron; when shorter, the greater crushing resistance of cast iron comes into play.—Practical.

CHIPS.

The parishioners of Threlkeld, near Penrith, have this week decided to undertake the restoration of their ancient church at a cost of £1,500. The offer of a stained-glass window from the mother-church of Crosthwaite cannot be accepted.

The parish council of St. Agnes, Cornwall, have adopted plans by Mr. R. H. Worth, C.E., of Plymouth, for the supply of water to the town and Mount Hawke district. The estimated outlay is £5,000.

The Royal Academy's customary winter exhibition, which will open for private view on New Year's Day, is to consist of a collection of the works of Sir John Everett Millais, the late president. It will be an unprecedentedly complete representation of the work of the greatest English painter of the century.

Taunton's Endowed School at Southampton is about to be enlarged at a cost of £2,300. Mr. Gutteridge, of Southampton, is the architect, and Messrs. Brinton and Bone, of the same town, are the builders.

A movement is on foot for the restoration of the tower and spire of the well-known "round church" of St. Sepulchre, Northampton. The architect is Mr. Matthew H. Holding, A.R.I.B.A., of Northampton, and the estimated outlay about £1,000.

Mr. Robert John Hinton (eldest son of Mr. John Hinton, one of the district councillors and the chairman of the Woolston parish council), the senior partner in the firm of Hinton Brothers, builders, Woolston, Southampton, died last week at the early age of 27 years.

Mr. Richard Park, architect, Newton-Stewart, has been instructed to prepare plans for the Jubilee Cottage Hospital to be erected at Castle Douglas at a cost of about £1,200.

A three-quarter length life-sized painting of Mr. George Lord Beeforth, an ex-Mayor of Scarborough, and the founder of the Doré Gallery in London, was last evening presented to the Scarborough Corporation by Mr. Ernest Normand on behalf of his wife, *née* Henrietta Rae.

Sheriff Crawford, oversman in the reference between the commissioners of the river Tweed and the Edinburgh and District Water Trustees as to whether the salmon fishings of the Tweed will be injuriously affected by the construction of the Talla reservoir and the consequent abstraction of water from the Talla, has now issued his award. He finds that the Tweed salmon fishings will be injuriously affected, and fixes the compensation at £2,250. Alternatively he assesses the damages at £300 and £550.

Nearly two years ago Mr. Goodwin, a builder, employed a firm of solicitors to obtain a loan of £21,000 upon two blocks of flats in Westminster. Before the loan was effected the builder procured the money from a building society, and the solicitors claimed to be entitled to commission, as if, in fact, the loan had been secured by them. The late Mr. Justice Cave decided against the claim for commission, but held that the solicitors had a right to be paid for services rendered, judgment being given for £245. The Court of Appeal considered, on Tuesday, that the £100 paid into court by the defendant was sufficient, and they directed the plaintiffs to pay the costs of the appeal and of the trial.

At Tuesday's meeting of the London County Council it was resolved, after debate, to intrust to the Works Department the execution of certain buildings for housing the working class on the Millbank site at an estimated cost of £14,018. On a recommendation by the Parks Committee that the Council contribute £2,500 towards the acquisition of Churchyard Bottom Wood, Highgate, for purposes of public recreation, Mr. Shaw Lefevre moved that the recommendation be referred back to the committee with instructions to consider the desirability of increasing the contribution. The amendment was carried by a large majority.

LEGAL INTELLIGENCE.

Working-Class Dwellings and the London Building Act.—The London County Council v. Davis.—Same v. Rowton Houses (Limited).—In these cases, in which judgment was given by Justices Hawkins and Channell on the 9th inst., the the County Council appealed against the decision of two Metropolitan Police Magistrates, one at Lambeth, and one at Worship-street, dismissing summonses taken out by that body against the two respondents, in order to compel them to set back new buildings occupying the sites of old buildings which had been erected prior to the Building Act of 1894. The proceedings were taken under this Act, which reserved the rights of the owners of houses built prior to its passing to rebuild under certain conditions houses upon the old sites, without reference to the distance from the centre of the road and the height prescribed by the Act. There was a proviso, however, to the effect that no dwelling-house to be inhabited or adapted to be inhabited by persons of the working class should, without the consent of the County Council, be erected within the prescribed distance to a height exceeding the distance of the front or nearest external wall of such building from the opposite side of the street This was the enactment upon which the County Council relied, and they contended that the structures now in question were inhabited by and were adapted to be inhabited by persons of the working class, and as they were erected without their consent should be set back so as to comply with the general terms of the Statute. In the second case—that of the Rowton House company—it appeared that the County Council had requested the respondents to apply for their consent to the erection of buildings, which it was not denied would have been granted, as the structure faced disused churchyard, and no question of air space or overcrowding could arise; but the company declined to do so, contending that in law the Council's consent was not necessary. The facts of the first case were briefly as follows. The respondent, Mr. Davis, was the owner of a plot of land fronting Brick-lane, upon which originally ten shops and living-rooms behind stood. In the place of these ten shops, &c., and occupying precisely the same site, Mr. Davis built eleven shops, with rooms over them. In the case of one of these, however, No. 105, the space formerly used as an open yard was utilised for living-rooms, there being also rooms over the shop. It was in regard to these latter rooms that the question in this case arose. The premises were let to a Mr. Cohen, who sublet the two or three stories over the shop to people who earn their livelihood by manual labour, and were working people, and occupied the rooms at the back of the shop himself. This, it was said, brought the premises within the proviso. In the second case, the Rowton Houses (Limited), of which company Lord Rowton was chairman, had demolished thirteen old dwelling-houses, and erected on the same site a building capable of accommodating some 800 persons. The building, which was in Churchyard-row, Newington Butts, and was opposite a disused churchyard, now used as an open space, was erected for the use of single men, who were received for the night, or by the week, and had, in addition to the use of the place in which they slept, the use of recreation-rooms and facilities for obtaining food. It was described as a poor man's hotel, or club, by the respondents; but the County Council contended that it came within the proviso in regard to any dwelling-house to be inhabited, or adapted to be inhabited, by people of the working classes. For the respondents, in both cases it was submitted that the proviso referred to flats and artisans, and model dwellings, tenement houses, &c., which were being erected for the purpose of housing of the working classes, and not to buildings where it happened that, after erection, working men, as in the first case, lived, or, as in the second case, working men, mixed with clerks and other people, resided, as in an hotel or club. The Court adopted the contention of the respondents, and dismissed both appeals with costs.

A Party-Wall Dispute.—Before his Honour Judge Edge at Stonehouse County-court, on Dec. 14th, an adjourned action remitted from the High Court was heard. John Mullis, a builder, sued Thomas Jeffery Monk, builder, for £26 16s. 9d., the price of a party-wall between 49 and 50, Grenville-road North, on the Seymour Building Estate, Plymouth. Plaintiff alleged that he built the wall on his site, and the conditions of the estate under which the defendant bought his land adjoining stated that the person using a party-wall should pay the adjoining owner and builder the amount ascertained by the architect of the estate. The architect of the estate had been called upon to make the valuation; but as he had not done so, an outside architect had been called in, who assessed the party-wall at the amount sought for. It was submitted for the defence that the architect of the estate had not refused to make the valuation, and, even if he had, it did not affect the defendant, who, according to the conditions, had only to pay within one month after the architect for the estate had given his certificate; and as he had received no

such certificate and had done nothing to impede it being given, it was submitted he was not liable. Verdict for the defendant, with costs.

Davies-street Station Arbitration. — The Value of a Corporation Lease.—Mr. Undersheriff Burchell and a special jury, at Red Lion-square, Holborn, on Monday, heard the case of "Major Robson v. the Central London Railway Company." It was a claim for £13,653 and 10 per cent. for compulsory sale, in respect of the premises Nos. 29 and 30, South Molton-street, and 82 and 84, Davies-street, Oxford-street, held of the Corporation of London, on lease, renewable in perpetuity, at a ground-rent of £20 8s. 6d. per annum. The property was underleased at rents amounting to £430 per annum. Alderman Sir J. Whittaker Ellis (Messrs. Farebrother, Ellis, and Co.) said he took the rental of £430 less the ground-rent, £20 8s. 6d., £409 11s. 6d., on the 4 per cent. table for the term of the underlease, giving £6,143, to which he added the present value of the reversion, £5,995, making £12,138, to which the customary 10 per cent. for compulsory sale should be added. He expressed the opinion that corporation leases were quite equal to freehold, and stated that the covenants meant no more than that the lessee should use the property in a prudent and judicious manner. Mr. Bridgewater (Messrs. Debenham, Tewson, Farmer, and Bridgewater) said his total estimate was £11,266, plus 10 per cent. Mr. Frederick Warman gave a valuation amounting to £13,368. On behalf of the railway company, Mr. Freeman, Q.C., contended that a lease, however good, could not be regarded as equal in value to a freehold. Mr. Daniel Watney stated that, as far as title was concerned, a corporation lease was indefeasible, but it was not equivalent to freehold, as the lessee could not do as he liked with the property. He was of opinion that 20 years' purchase of the existing rent, £430, less the ground-rent, represented the fair compensation. His estimate was £8,020, plus 10 per cent. for compulsory sale. Mr. Samuel Walker (Walker and Son) estimated the value of the property, until the expiration of the underleases, at £5,637, and the reversionary value of the site at £2,836, a total of £8,473, to which the customary 10 per cent. should be added for compulsory sale. Mr. Walter Rushworth gave an estimate of £8,200, plus 10 per cent. The jury awarded the claimant the sum of £11,800, including the 10 per cent. for compulsory sale.

Does a Building Agreement Require Registration?—At the Liverpool Assizes, on Friday, before Mr. Justice Bruce, the case of Callow v. Galt, Edmunds, and Co. was tried. This case raised the question as to whether a building agreement between an owner of land and a builder constituted a bill of sale and required registration. William Orry Callow, the plaintiff, who was the owner of certain land, had entered into a contract with a builder to sell the land for building purposes on a building agreement which vested the materials brought on the land in the owner of the land, and gave him a right to take possession of and sell the land and materials upon default by the builder in fulfilling his part of the agreement. The plaintiff having taken possession under the agreement, the defendants, a firm of timber merchants, with the consent of a partner of the builder, went on to the land and removed certain timber and materials which they had supplied to the builder, and for which they had not been paid. The plaintiff thereupon brought this action for trespass to the land, and for conversion of the timber removed by the defendants. After considerable argument, Mr. Justice Bruce decided that the building agreement came within the decisions of "Brown v. Bateman" and "Reeves v. Barlow," and was not a bill of sale. He gave judgment for the plaintiff for £60, the agreed value of the timber removed, in addition to £1 paid into Court in satisfaction of the trespass.

Claim for Commission.—In the Queen's Bench Division, last week, Mr. Justice Bigham gave judgment in the case of Walton v. Lord Churchill. The action was brought by Messrs. Walton and Lee, estate agents, London, to recover from Lord Churchill, a lord-in-waiting to Her Majesty, the sum of £1,550 commission on the sale to Mr. Du Crois of the defendant's Cornbury estate in Oxfordshire, which, it was alleged, had been bought by the action of the plaintiffs. The defendant denied liability. The estate was sold for £115,000. His Lordship reviewed the facts of the case in a written judgment. He said he had come to the conclusion that the sale of the estate could not be attributed to the action of the plaintiffs, either direct or indirect, and he gave judgment for the defendant with costs.

Liability for Repairs to Drains.—At North London Police-court last week, before Mr. d'Eyncourt, William Jennings, of Bayston-road, Stoke Newington, sought to recover a proportion of £31 7s. 6d. which had been paid by him for making good some drainage defects. In 1878 five houses in Bayston-road were erected, with combined drainage at the rear, the flow to the main sewer coming under Mr. Jennings's house, which was in the centre of the five. In September last there was a stoppage in the drains, and the Hackney Vestry served a notice on Mr. Jennings to unstop, make good, and provide an inspection-chamber. Mr. Ware, a local builder, was called in and did the work, and had been paid his bill by Mr. Jennings. Two of the adjoining four tenants had paid their proportions, and the two owners now summoned were Mr. J. G. Padden and Mr. J. Astins. Complainant called the sanitary inspector to prove the cause of the complaint, and the builder to say he had done the work; and the latter, in cross-examination, said he should think the accumulation in the sewer had been going on for some years, and there were articles in the drains which might have come from any of the houses. Complainant's counsel said the 11th section of the Public Health Act gave him power to come to a court of summary jurisdiction; but Mr. Avory said the provision was only for local authorities to recoup themselves, and not for private individuals. In fact, there was a covenant in all the leases on the Tyssen-Amherst estate that, in the event of such a dispute, the surveyor to the estate should arbitrate, because one house might be liable to pay £6, and another £4, and another £3. Mr. D'Eyncourt said a good deal would depend upon whether or not these drains were laid according to plans approved by the vestry, proof of which was not now present, and he adjourned his decision.

Architects and their Differences.—At the Cardiff County-court, on Thursday in last week, the case of William Lewis, architect, of Newport v. David Morgan, architect, of Cardiff, was heard, in which plaintiff claimed £57 8s. 9d. In 1894 the two architects were employed by the Bedwellty School Board to prepare plans for three new schools. They were to receive commission at the rate of 7½ per cent. on the cost of the buildings. Only one had been originally appointed architect to the school board; but it was afterwards arranged with the board that they should act together, and an arrangement was made between the men as to the division of the commission. Under that arrangement one was to take the plans of schools in the Tredegar Valley, and the other those of schools in the Rhymney Valley, this to prevent competition between them. One set of plans had been rejected because they were drawn up according to wrong instructions. A new set were prepared. The division of commission had been taken upon the plans accepted, but there was a sum of £150 paid in respect of the plans that were rejected, and plaintiff argued that that sum was not commission within the agreement made between the two professional men. Defendant had received the payment for the plans that he prepared; plaintiff claimed that he had not received enough from defendant in the division; and defendant urged that the £150 should have been brought into the account for division. The amount of commission on the plans accepted from defendant was £312 15s., and on the plans accepted from plaintiff was £188 8s. 11d., besides the £150. His Honour (Judge Owen) ruled that the sum in dispute did not come within the terms of the agreement made between the two men, and gave judgment for the amount claimed, with costs.

Is a Wall a Building?—Park v. Rawcliffe.—In this case, recently heard at Manchester by the Vice-Chancellor of the Duchy, the plaintiff, who is the owner of a building estate at Fulwood, Preston, asked for a mandatory injunction to compel the defendant to pull down a wall erected by him on a plot of land forming part of the estate, on which the defendant had built two semi-detached villas. The plaintiff fixed his building line at 15ft. from the road; but the defendant, who erected his houses in 1887, set them 62ft. back. Subsequently the plaintiff conveyed a plot of land adjoining the defendant's to a person named Livesey, who set his house up to the 15ft. building line. There was litigation in the High Court with respect to Livesey's building, an attempt being made to compel him to adopt the 62ft. building line, but the Court declined to interfere, and Livesey thereupon christened his house "The Victory." The effect of the erection of his house was to make the defendant's windows overlook Livesey's back premises, and Livesey's side windows to overlook defendant's front garden. In May of this year the defendant erected in his garden a wall 24ft. high and over 40ft. long, the effect being to shut out the sight of Livesey's house from the defendant's house, and to block several of Livesey's windows. The plaintiff, as the owner of the building estate, said he was damaged by an unsightly erection, and in behalf of his claim that it should be pulled down it was contended that the defendant had contravened a covenant in the conveyance of his land, by which he undertook to erect no buildings the plans of which had not been submitted to the plaintiff. After hearing legal arguments as to whether the wall was a building within the meaning of the covenant, the Vice-Chancellor held that, although the erection in question was undoubtedly a building, it was not a building within the scope of the covenant, which clearly contemplated certain buildings mentioned in the conveyance such as could be entered. The action was, therefore, dismissed with costs.—Mr. Mansfield said that he was afraid Mr. Livesey's stone bearing the words "The Victory" would now have to be taken down from his house and transferred to the wall.

CHIPS.

A new Wesleyan mission chapel is about to be built in Hill-street, Bingley, from plans by Mr. R. Nunn, of that town.

The Local Government Board have given formal sanction for the borrowing, by the district council of Farsley, of the sum of £15,700 for purposes of sewerage and sewage disposal.

Mr. Shelmerdine, the city surveyor of Liverpool, who is lying ill from typhoid fever at his residence, Blundellsands, has passed the crucial point, and is now progressing satisfactorily.

An inquest was held at Lichfield, on Monday, concerning the death of John Elsworthy, a foreman bricklayer, of 215, Bracebridge-street, Birmingham, whose body was found shockingly mutilated on the London and North-Western Railway, on Saturday morning. The evidence showed that the deceased had folded his arms, and placed his head, face downwards, on the line, in front of a passing train. He had been somewhat troubled about losing his situation and over making up the accounts of a society to which he was secretary. The jury returned a verdict of "Suicide while in a state of temporary insanity."

The plans prepared by Mr. W. C. Williams, architect, Halifax, of the new board school to be erected at Sunnyside, Haley Hill, have been accepted by the Halifax School Board.

The foundations of SS. Simon and Jude's Church, in the parish of North Meols, Southport, have for some time past been in such a defective condition that the fabric has sunk appreciably in different parts. In such circumstances the rector has deemed it dangerous to hold services in the edifice, and on Sunday it was closed. A meeting of the congregation has been convened to consider what steps should be taken in the matter. The church was erected only five years ago.

The death is announced of Mr. H. Fenner, of Bristol, one of the vice-presidents of the Bristol Cabinet Manufacturers' Federation. The members of that body were represented at the funeral at Brunswick Burial Ground, near that city, on Wednesday, by the President (Mr. C. Newth) and other officers.

The building trade in Dundee, which for the past few years has been attended with steady briskness, has enjoyed during the past twelve months another period of unbroken prosperity. Opening the year with abundance of work on hand, contractors have been fully employed, with the result that many large blocks of property have been added to the assessable rental of the city.

At a meeting held in the Shire Hall, Shrewsbury, on Monday, under the presidency of the Lord Bishop of Lichfield, it was resolved, on the proposition of Lord Harlech, to form a society for the purpose of preserving and publishing the parish registers of the county of Salop. It was agreed that copies of the registers as published from time to time by the society should be deposited with the original register in the parish chest, in the diocesan registry, in the British Museum, and in the library of the New England Historic Genealogical Society in Boston.

The inquest on the body of Joseph Webster, 18 years of age, of Parr, St. Helen's, who was killed, while two other young men, named Jones and Johnson, were seriously injured, by a fall of clay at the Ramford Brick and Tile Works, on the 22nd ult., was held before Mr. S. Brighouse, county coroner, at Parr, on Monday. Mr. H. Hall, her Majesty's inspector of mines, was present, as well as Mr. Peter Tickle, owner of the works, and Mr. John Gaskell, manager, was called into the room. After hearing the evidence, the jury returned a verdict of "Accidental death," arising from the negligence of the management in employing inefficient men to get clay, and they recommended that the clay should be got in 5ft. benches, instead of 10ft., and that the labour of more experienced men should be engaged in future.

The Diamond Jubilee hall in Higher Bebington village, Cheshire, was formally opened on Monday. The accommodation provided consists of two classrooms for technical instruction, entrance hall, and the large hall, which latter contains 350 seats and stage. The walls internally are finished in red duresco, with a frieze of buff laid direct on the brick lining. The building has been carried out at a cost of about £1,400, and is so planned that a future extension may be added. The contractors' work has been carried out by Messrs. Lee and Son, of Higher Bebington, under the direction and from the designs of Mr. Charles E. Deacon, architect.

The workhouse at Richmond, North Riding, is about to be enlarged in accordance with plans prepared by Messrs. Moscrop and Sons.

Our Office Table.

Eight additional portraits have recently been acquired by the trustees of the National Portrait Gallery. A large family group of Adam Walker (1731-1821), natural and experimental philosopher, with his wife, his daughter, afterwards Mrs. Gibson, and his three sons—William and Deane F. Walker, lecturers on experimental philosophy, and Adam Walker, afterwards Prebendary of Hereford; painted by his friend, George Romney. This was bequeathed by the late Miss Ellen Elizabeth Gibson, of Durham, grand-daughter of Adam Walker. Another work, presented by Major Harrel, portrays Sir George Hayter (1792-1871); a sheet of sketches by himself, representing himself in the act of painting the large picture of the House of Commons in 1833, now in the National Portrait Gallery. A third picture represents Mungo Park (1771-1806), the African traveller and explorer of the river Niger; a miniature painting after H. Edridge, A.R.A. The other works, all of which were purchased, are Thomas Gainsborough, R.A. (1727-1788); a drawing by F. Bartolozzi, R.A., taken from the original portrait of Gainsborough by himself for the purpose of engraving. Jane Porter (1776-1850) and Anna Maria Porter (1780-1832), novelists; companion drawings by G. H. Harlow, which were engraved for Jerdan's "National Portrait Gallery," Vol. V. Tobias George Smollett, M.D. (1721-1771), the eminent novelist; painted at Pisa, probably by an Italian artist, and formerly in the novelist's own possession at Leghorn. General James Wolfe (1726-1759); a full-face portrait, seen to the knees, in the uniform of the Marines; painter uncertain. A full-length portrait of Henry, Prince of Wales (1594-1612), painted by Paul Van Somer, and formerly at Blenheim Palace, has been purchased from a fund presented by the committee of the Stuart Exhibition in 1890.

The trustees of the British Museum have decided to discontinue the opening of the exhibition galleries on week-day evenings from eight to 10 p.m. after the close of this year, and, instead, to keep them open until 6 p.m. all the year round. The evening opening commenced in February, 1890, on the installation of the electric light, the galleries, however, being opened only in sections, as the electric plant is not powerful enough to light up the whole building. At first the eastern and the western portions of the Museum were opened on alternate week-day evenings; but the number of visitors so rapidly declined that the galleries were afterwards further sub-divided into three sections. The numbers, however, have still continued to decline. The experiment of evening opening will now be abandoned, and a lengthened exhibition by day will be substituted, during the months when the Museum has hitherto been closed at 4 p.m. or 5 p.m., according to the season. On and after Monday, the 3rd January next, the Exhibition Galleries will be kept open throughout the year from 10 a.m. to 6 p.m., with this reservation, however, that when the electric light has to be employed, only half of the Museum (the eastern and the western galleries alternately) can be opened to the public. The present arrangements for opening on Sunday afternoons will not be altered, visitors being admitted at hours varying between two p.m. and 7 p.m., according to the season of the year.

At a meeting of the Socratic Society of Birmingham held on Friday afternoon, Mr. F. A. C. Morrison, the newly-appointed Classical lecturer at Mason College, read a paper on the application of colour to sculpture among the Greeks. The President (Professor Sonnenschein), in introducing Mr. Morrison, expressed his hope that Mason College would play its part in the new revival of classical learning which is going on all around us, and his confidence that the appointment of Mr. Morrison would reinforce the teaching of classics in Birmingham on its archæological and artistic side. The lecturer then gave an account of the practice of colouring both buildings and statuary in all periods of Greek art, and said that the modern aversion to coloured marble was due to some extent to a misconception. In the early stage, no doubt, the Greeks used colour to conceal the deficiencies of the chisel; but in the fifth century the effect of colour was to heighten the beauty and to bring out the characteristic features of works of art. The lecture was illustrated by lantern slides, exhibiting some of the chief works of art in which traces of colour have been found.

"The Unity of the Arts" was the subject of a Glasgow Corporation art lecture given by Mr. Edward Pinnington on Saturday evening. Mr. Pinnington adduced the intellectual torpor of the craftsman, resulting from mechanical production, as one of the obstacles to the modern restoration of the ancient unity of the arts. Presiding over a machine dulled his invention. If the people insisted upon having household utensils which were individual works of art, and not manufactured in sets and dozens, the genius of the artificer would be stimulated, and machines instead of men be left to rust. This was simply to restore the condition of things existing in ancient Greece and at the Renaissance. Some interesting instances were given of the carrying of the skill of a craftsman into painting. The ancient supremacy in technique and manual cleverness was admitted, and the old conditions of life were not to be overlooked; but there was nothing in the former to induce despair. The painter could learn much by studying decoration as exemplified in the old objects of industrial art, and the artificer could learn much by going to the old masters for instruction in design. But both would be wrong if, instead of inspiration, they only found hints for imitation.

At the quarterly meeting on Friday of the Devonshire County Council, the Main Roads Committee re-submitted a scheme for maintaining the rural main roads after 31st March next, the consideration of which was postponed from the last meeting of the council until the present. The scheme provided for taking the rural main roads out of the hands of the rural councils and replacing them under the direct control of the county council; for the division of the county into three districts, for each of which a county surveyor, three assistant surveyors, and five foremen should be appointed, each surveyor to receive a salary of £400 a year, with £80 besides office and clerical assistance; also an allowance for necessary travelling expenses, and 10s. a night when from home; each assistant-surveyor £140 a year; each foreman 25s. per week. After a long discussion the scheme was adopted.

The annual dinner of the Cardiff Master Builders' Association was held at the Royal Hotel on Thursday evening in last week. Mr. J. E. Turner, the president, occupied the chair. "The Army, Navy, and Reserve Forces" was proposed by Mr. A. J. Howell, and responded to by Major E. M. Bruce Vaughan, F.R.I.B.A. Mr. David Davies submitted the toast of "The Architects and Engineers." Mr. Edwin Seward, F.R.I.B.A., in responding, referred to the recent architectural competition for the designs of the new municipal buildings. According to some people, the question of the successful design was already settled; but there were opinions to the contrary, and if the advisers of the corporation in the matter had not yet spoken, he believed it to be most judicious and discreet to withhold criticism until after the pronouncement had been made. The architects of Cardiff had taken a very creditable part in the competition, and he hoped their work would not be utterly thrown away. Mr. Fawckner (Messrs. Habershon and Fawckner) also replied. Mr. W. Symonds gave "The Cardiff County Council." Councillors F. J. Veall and J. W. Courtis also responded. Mr. E. W. M. Corbett, in submitting "The Cardiff Master Builders' Association," said the speculative building trade of Cardiff could not have built much less than 29,000 houses at a cost of £6,000,000 or more, while they were annually adding to the town something like 1,500 houses at between £300,000 and £400,000. The president (Mr. J. E. Turner), Mr. J. Seymour Chubb, and Mr. George Couzens acknowledged the toast. "The Visitors" was proposed by Mr. John Gibson, and responded to by Mr. A. Krauss, Bristol, and Mr. T. W. David.

The new fever hospital, Llandudno, is being warmed and ventilated by means of Shorland's patent Manchester grates, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

Both branches of the Manx Legislature met in Tynwald on Thursday in last week, at Douglas, Lord Henniker presiding, when authority was given to the Douglas Corporation to borrow £17,600 for the new municipal buildings and public library, £5,750 for the erection of a block of artisans' dwellings, and about £7,000 to acquire property for the improvement of the North Quay.

LATEST PRICES.

IRON, &c.

	Per ton.		Per ton.
Rolled-Iron Joists, Belgian	£5 15 0	to	£6 0 0
Rolled-Steel Joists, English	6 0 0	„	6 10 0
Wrought-Iron Girder Plates	5 15 0	„	6 10 0
Bar Iron, good Staffs	7 0 0	„	8 0 0
Do., Lowmoor, Flat, Round, or Square	17 0 0	„	17 0 0
Do., Welsh	5 15 0	„	5 17 6
Boiler Plates, Iron—			
South Staffs	7 17 6	„	8 5 0
Best Snedshill	10 0 0	„	10 10 0

Angles 10s., Tees 20s. per ton extra.

Builders' Hoop Iron, for bonding, &c., £6 15s. 0d. per ton.

Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.

Galvanised Corrugated Sheet Iron—

	No. 18 to 20. Per ton.		No. 22 to 24. Per ton.
6ft. to 8ft. long, inclusive gauge	£10 15 0	...	£11 0 0
Best ditto	11 5 0	...	11 10 0

	Per ton.		Per ton.
Cast-Iron Columns	£6 0 0	to	£8 10 0
Cast-Iron Stanchions	6 0 0	„	8 10 0
Cast-Iron Sash Weights	—	„	4 2 6
Cast-Iron Socket Pipes—			
3in. diameter	5 10 0	„	5 15 0
4in. to 6in.	5 5 0	„	5 10 0
7in. to 24in. (all sizes)	4 15 0	„	5 5 0

[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]

Pig Iron—	Per ton.
Cold Blast, Lilleshall	105s. to 110s.
Hot Blast, ditto	57s. 6d. to 62s. 6d.

Wrought-Iron Tubes—Discount off Standard Lists f.o.b.

Gas-Tubes	75p.c.	Fittings	77½p.c.
Water-Tubes	70	„	72½
Steam-Tubes	62½	„	65
Galvanised Gas-Tubes	60	„	62½
Galvanised Water-Tubes	55	„	57½
Galvanised Steam-Tubes	45	„	47½

	10cwt. casks. Per ton.		5cwt. casks. Per ton.
Sheet Zinc, for roofing and working up	£22 0 0	to	£23 0 0
Sheet Lead, 3lb. per sq. ft. super.	14 10 0	„	15 10 0
Pig Lead, in 1cwt. pigs	13 17 6	„	14 17 6
Lead Shot, in 28lb. bags	16 10 0	„	17 10 0
Copper Sheets, sheathing and rods	58 10 0	„	59 10 0
Copper, British Cake and Ingot	50 10 0	„	51 10 0
Tin, Straits	63 11 3	„	64 11 3
Do., English Ingots	67 0 0	„	68 0 0
Spelter, Silesian	18 7 6	„	19 7 6
	Per ton.		Per ton.
Cut Clasp Nails, 3in. to 6in.	£8 15 0	„	£9 15 0
Cut Floor Brads	8 10 0	„	9 10 0

Wire Nails (Points de Paris)—

0 to 7	8	9	10	11	12	13	14	15	B.W.G.
8/6	9/0	9/6	10/3	11/0	12/0	13/0	14/9	16/9	per cwt.

TIMBER.

Teak, Burmah	per load	£14 0 0	„	£15 10 0
„ Bangkok	„ ...	10 10 0	„	15 0 0
Quebec pine, pitch	„ ...	—	„	—
„ yellow	„ ...	2 12 6	„	4 12 6
„ Oak	„ ...	5 5 0	„	6 5 0
„ Birch	„ ...	4 2 6	„	6 2 6
„ Elm	„ ...	4 5 0	„	5 10 0
„ Ash	„ ...	3 5 0	„	4 10 0
Dantsic and Memel Oak	„ ...	2 2 6	„	3 2 6
Fir	„ ...	1 16 0	„	4 0 0
Wainscot, Riga p. log	„ ...	2 2 6	„	3 7 6
Lath, Dantsic, p.f.	„ ...	4 10 0	„	5 10 0
St. Petersburg	„ ...	5 0 0	„	6 10 0
Greenheart	„ ...	8 0 0	„	8 5 0
Box	„ ...	4 0 0	„	15 0 0
Sequoia, U.S.A.	per cube foot	0 1 8	„	0 1 10
Mahogany, Cuba, per super foot 1in. thick		0 0 5	„	0 0 6½
„ Honduras	„ ...	0 0 5	„	0 0 6½
„ Mexican	„ ...	0 0 4	„	0 0 5
Cedar, Cuba	„ ...	0 0 4	„	0 0 4½
„ Honduras	„ ...	0 0 3	„	0 0 4½
Satinwood	„ ...	0 0 6	„	0 1 1
Walnut, Italian	„ ...	0 0 3½	„	0 0 7

Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 1in.:—

Quebec, Pine, 1st	£20 15 0	to	£26 15 0
„ 2nd	15 5 0	„	17 15 0
„ 3rd	7 15 0	„	11 5 0
Canada Spruce, 1st	10 15 0	„	12 5 0
„ 2nd and 3rd	8 5 0	„	9 5 0
New Brunswick	7 15 0	„	8 5 0
Riga	6 15 0	„	7 15 0
St. Petersburg	8 15 0	„	12 15 0
Swedish	9 5 0	„	15 15 0
Finland	8 5 0	„	8 15 0
White Sea	9 15 0	„	16 5 0
Battens, all sorts	5 0 0	„	20 0 0
Flooring Boards, per square of 1in.:—			
1st prepared	£0 8 6	„	£0 15 6
2nd ditto	0 7 0	„	0 12 0
Other qualities	0 5 0	„	0 6 6
Staves, per standard M:—			
Quebec pipe	—		—
U.S. ditto	35 0 0	„	42 10 0
Memel, cr. pipe	230 0 0	„	240 0 0
Memel, brack	200 0 0	„	210 0 0

OILS.

Linseed	per ton.	£14 10 0	to	£14 17 6
Rapeseed, English pale	„ ...	27 0 0	„	27 10 0
Do., brown	„ ...	25 10 0	„	26 0 0
Cottonseed, refined	„ ...	14 10 0	„	15 0 0
Olive, Spanish	„ ...	32 0 0	„	33 0 0
Seal, pale	„ ...	23 10 0	„	24 0 0
Cocoanut, Cochin	„ ...	30 0 0	„	31 0 0
Do., Ceylon	„ ...	22 0 0	„	22 10 0
Palm, Lagos	„ ...	22 10 0	„	23 0 0
Oleine	„ ...	18 15 0	„	19 15 0
Lubricating U.S.	per gal.	0 6 3	„	0 7 6
Petroleum, refined	„ ...	0 0 4½	„	0 0 4¾
Tar, Stockholm	per barrel	1 0 0	„	1 5 0
Do., Archangel	„ ...	0 12 6	„	0 15 0
Turpentine, American	per ton	23 0 0	„	23 10 0

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PROSPECTS.

In making a forecast of any subject—weather, rainfall, business, or the crops—it is customary to take a few averages of the previous years on which to base it; and in the same manner, if we try to make a forecast of the architectural profession, it is necessary to see what has been accomplished. We may consider the profession as influenced by the three great movements: Educational, the Commercial or Utilitarian, and the Artistic. An attempt has been made of late years to place architecture upon a better footing as a profession—to give its members a higher social status—to improve the education of those who enter the business. How far this endeavour has been rewarded remains to be seen. So far as these efforts are directed to bring about an exclusive professional clique, associated with any one professional body—a favoured "ring"—there can be little doubt of the result; success only will be attained by guarding all the approaches to the profession, so that those who enter, irrespective of being a member of this or that society, will be guaranteed to be qualified in the essentials of the profession. There is a coterie who wish the test to be applied only to those who enter their charmed circle. So one-sided a view of architects' training will never do. Every man who enters the profession and practises must be examined, or the really able and artistic will be left outside. Already we see a reaction against what appears to be a professional monopoly. We mean the school of artist-craftsmen, who base architecture on workmanship and personal skill. What has been truly called the "scholarship theory of architecture" has failed, and in its place has grown up a belief that the art rightly practised is an association of the several building trades. Architecture is the "builded word" as "literature is the written word," so says one of the leaders of this view, and he is right. Then we live in the days of trade-unions and free trade, and these principles have begun to operate upon the profession of building. No man under this *régime* minds his own business. Division of labour has brought this result, that no man can be his own master. Individuality is getting more lost in this division of the trades. What has become individually impossible is now tried to be gained collectively. And it is this reaction of one trade or craft on another that is leading to confusion. The architect finds it equally with every trade; he finds that the engineer, the manufacturer, the specialist in art have each to be reckoned with, limiting his own function. Irresistible facts, scientific and otherwise, condition his design at every step. But out of present conflict harmony will be restored by-and-by.

The connection of the architectural profession with many important movements of the day is one of some concern. It has fallen to the lot of the modern architect to develop and express some of the most recent activities of the age—hygienic, sanitary, social, and ameliorative—and the vast produce of the markets of the world, the importation of cattle, live and dead stock, vegetables, and fruit and manufactures of all kinds have to be provided for. Depots and markets, abattoirs, and refrigerating requirements, far beyond our forefathers could have dreamt of, have been demanded, in which the builder's art, if not the architect's resources, are taxed. For these buildings, the architect has been called upon to master numberless details. Economical construction of walls, floors, and roofs, doors and windows, with cavities for non-conducting materials in the case of cold-meat stores; overhead travellers and mechanical appliances for moving carcases and heavy loads, refrigerating apparatus, machinery of lifts, hoists, and other things have not only to be mastered before an architect can draw a line of his plan, but he is called upon to consider these several arrangements and appliances so as to incorporate them in his deign—to make them, in fact, features of the architecture. The time has gone by when these things were passing through the tentative stage, when such a thing as an iron crane was stuck outside a building anywhere; when overhead travellers were fitted up after the builder had done his work; when a market building was built like a railway station, or a factory was nothing more than a shed with openings evenly spaced, divided by pilasters. Now each kind of structure, however commonplace or however sordid and repulsive in its use—like an abattoir—must have a shape and form of its own, and the architect who has not mustered this elementary condition of his art has yet a great deal to learn. Why it should be that the engineer who contracts for an engine or apparatus should also devise the scheme of building—that the railway engineer should be intrusted with railway stations and bridges and even hotels, and that many manufacturers find it to their advantage to design their own buildings, is a question that is not flattering to the architect, and only indicates the desire of our commercial companies and manufacturers that their buildings should be designed by men who know the *raison d'etre* of the trade or commercial requirements.

The man who knows architecture simply as a matter of orders or styles; who thinks he has discharged his professional duty if he designs a factory simply as a brick shell with floors and staircases, relying upon the engineer to fit up the necessary machinery, gearing, and overhead pulleys and apparatus, is not the man the manufacturer or commercial company wants. It is like employing two architects where one should be sufficient. The engineer and boiler-fitter have probably to take down partitions, or to make larger entrances and alter floors—in fact, to pull down and reconstruct what the architect has done, and, therefore, the cost is increased. We know of many instances in which the architect's work has had to be done over again. Solidly-built structures have had to be knocked about to enable the boilers to be introduced. Again, the arrangement of belting and pulleys in workshops often requires alteration; belt-holes in the floors are necessary to be made, and other details which might have been all provided for if the architect had been acquainted with the mechanical wants.

Since the introduction of electric power in workshops an important question has arisen as to the design of buildings of this sort: the walls and roofs may be lighter, and less room is necessary in the ground floor. The motors are small. In great clothing factories, as we see in the Yorkshire towns, hundreds of sewing-machines, band knife-saws, and other tools are driven by electric motors and shafting, these being placed under the floors; the machinery is nearly all out of sight. The result is that much lighter factories are required than those originally erected, as the loads are smaller, and the same thick walls and heavy pillars are not wanted. The question for the architect here is simple shafting and belting *versus* electric driving. A small building may be more profitably fitted with the former; but in the erection of new large factories or workshops the electric power is more economical, and the working expenses are reduced proportionately. Also in the old buildings vibration had to be provided against which was set up by the belting; but an electric cable is not only lighter, it does not cause tremor. We mention these details as bearing on the design. In workshops where heavy weights are lifted and carried, the electric overhead traveller, now used largely in America, is rapidly supplanting the old rope-driven crane, and is working a revolution in the mode of construction of foundries and workshops. Who knows but that in a few years we shall see electric motors employed in various trades and manufactures, altering entirely the construction and equipment of buildings?

Taking the class of buildings which minister to health and cleanliness, like workhouses, hospitals, and baths, &c., the advance made has been rapid. Clinical medicine and the healing art have entirely revolutionised the old ideas of hospital plan and construction. Compare, for example, the older buildings erected in the early part of the century with those of recent construction, such as the large fever hospitals at Hither Green, near Lewisham, and Tooting. In these buildings hygienic construction has been developed to a degree exceeding the architect's expectations. Science and nursing requirements have outstripped him, and we cannot yet boast of the architecture of our hospitals as an artistic expression. Before long we may see a group of pavilions even on the *échelon* plan treated architecturally, and in a few of the latest buildings there are evidences of a better understanding between medical requirements and art. A new departure seems to be taken in providing buildings on the large hotel system for the working classes. Lord Rowton's liberal schemes for providing accommodation on this plan, both near King's Cross, and just lately at Newington, are steps in the solution of a great social problem. The promoters of these schemes have been endeavouring to provide for a large mass of our great city toilers the comfort of a club or hotel life. Provision for buying and cooking their own food, large dining-room accommodation, amusements and recreation, and cubicles for single men are provided. This problem is a new one in architecture. Our great "metropoles" or hotels, where luxurious accommodation and living are to be found, stand on a different level. They are erected by rich landowners on seaside sites or by companies in our large cities, and they are easily put into palatial form. Architectural embellishment and luxurious fitting-up are not spared, and ample means are forthcoming; but in a huge working man's "metropole" the difficulty is to make the simple structure and plan tell or express itself agreeably. These are a few instances in which utilitarian and commercial objects have come before the architect. That he has been fully prepared to make the most of his new materials we cannot admit; but there seems a desire to grapple with these problems in a more honest and true art spirit.

The late terrible destruction of a densely-built part of the Metropolis by fire is a warning that in structural science we have something yet to learn from the past. What we have done in this direction has been too much in piecemeal. We have excellent fire-resisting materials, but have not used them to the best advantage. It is clear, also, that while we have been improving and patenting inventions, we have left unguarded the openings and channels through which the enemy advances. But we have so recently dealt with the subject, we say no more here. One other enemy almost as insidious and destructive of our buildings is the advertising hoarding. It is a product of our commercial and competitive age which the architect will probably have to deal with in the future: how to restrain it or to make less offensive and obtrusive to our sight. The illuminated advertisements of beef products, pills, and

soap are now threatening the façades and sky-lines of our finest squares and thoroughfares; even the Athens of the North has only just averted the infliction of these commercial *entrepreneurs* by the opposition of the Lord Provost and municipal authorities.

Scientific classification and administration are other facts which the architect is called upon to learn. A large proportion of his buildings are intended to accommodate a number of rooms and persons having different functions. A municipal building, for instance, has to provide for various officials, and these have to be classified in the place. The hospital has also to be arranged on an administrative basis for different classes of patients, and the offices are arranged to afford economical administration. In short, the principle of classification enters very largely into various kinds of modern buildings like schools and libraries, and the architect who is ignorant of the functions and requirements of those he has to provide for is hopelessly at sea, and cannot possibly design his buildings to meet the wants of our age. We have pointed to a few of the more important of the new conditions and movements which affect the architect. Whether or not he will grasp them and turn them to account is a question of time. At present there is a great deal of friction, if not inertia, to be overcome. Society likes to move in old or new grooves; architects are wedded to particular schools and styles;—so there is also a strong personal equation to be reckoned with with the crafts contending for collective arrangements—a power which shall recoup them for the loss of their individual position. It is rather hard to see how the future will be cast; but these are all agencies in the outlook of the next few years.

THE BATTERSEA PUBLIC BATHS AND WASHHOUSES COMPETITION.

THE three premiated designs for these baths are on view at the Municipal Buildings, Lavender Hill. These have been awarded the premiums of £100, £50, and £25; the first to Mr. F. J. Smith, of Great George-street, the second to Mr. J. Hatchard Smith, F.R.I.B.A., and the third to Mr. A. Hessell Tiltman, F.R.I.B.A. We hardly understand on what principle the assessor in this case has made his selection, if the terms of the instructions are adhered to. Both the second and third have unquestionable merits of plan and design which appear to us to have been underrated, as we shall point out after describing the main features of the plans.

The first premiated plan, as in all the three others, places the large swimming-bath along Cringle-street facing north. It is 150ft. by 50ft., with an official corridor on the south side. The reading-room, of the size prescribed, occupies the acute angle between Cringle-street and Battersea Park-road, and runs to a point—an unsatisfactory mode of returning the two fronts, and contrary to the conditions, which say the public reading-room should be on the first floor with the committee and club rooms, &c. The main entrance to the swimming-bath is on the Cringle street front, near this angle. Close to it is a small entrance to the reading-room. The slipper-baths for women, first and second classes, adjoin the reading-room on the Battersea Park-road front, with entrance, and one ticket office is placed between it and the men's entrance to their slipper-baths, which are located on the south side. Adjoining these entrances are the superintendent's office and stairs to offices at the south-east corner. There is also a stair entrance to gallery, adjoining the women's entrance in Battersea Park-road. The slipper-bath entrances give access also to the swimming-bath at one corner. The washhouse, with 67 drying horses and laundry, are placed at the other end on south side, a space intervening between the washhouse block and the men's slipper-baths. A separate entrance at the end of main front in Cringle-street is provided to washhouse, and the artists' rooms and separate artists' corridor abut on the end of swimming-bath. On the first floor over the men's slipper-baths is the establishment laundry and towel-room, and the superintendent's apartments and committee-room face Battersea Park-road. The lighting to slipper-baths and waiting-rooms is by skylight. The section shows an iron rib roof over large swimming-bath. We certainly object to the position and shape of the reading-room on ground floor; the windows on both sides come too close to the acute corner, and would be seen through; the club room, too, at end of large bath and behind entrance hall, is small, and it would have been better placed above. The walls of main fronts are built to the outer limit of the boundaries, and thereby lose the effect that would be gained by setting back a little. The Battersea Park-road front is unrelieved and flat, and the squareness of the reading-room is sacrificed. The elevations have ornamental gables, and are treated in a Renaissance style. The plans are neatly drawn and coloured, and the details have been fairly worked out. A correspondent writes expressing doubts whether this design can be carried out as planned, as it infringes the L.C.C. regulations requiring the entrances and exits to be in different streets.

The design by Mr. J. Hatchard Smith places the main elevation towards Battersea Park-road, and the author has avoided the acute and unpleasant sharpness of a straight wall by breaking up his front with the various entrances to the baths and in preserving right angles. This has been done at a little sacrifice of breadth, but the result is more architectural. The entrances from this front give access to the swimming-bath, men and women's slipper-baths, reading and club-room. One of the main features of the plan is a large entrance-hall to the swimming-bath at this end of it, the men's cloak or swimming club-room, lavatories, &c., being put at the corner of the site. The entrance to men and women's slipper-baths are separated by the ticket office, and have separate vestibules and halls, each with its own waiting-room at end; and the superintendent's office is placed centrally, so as to allow of one supervision—a very desirable point. The women's first and second-class baths are on south side, and the men's adjoin with a small light area between. The closets are well ventilated into open areas. The author has considered also the use of the large bath for entertainments. The large vestibule at the main front before mentioned, and the staircase at the extreme and alternate corners, together with lavatory accommodation, &c., enable a large assembly to disperse without danger, in addition to the exits on ground floor. The public laundry and washhouse is placed, as in the last, at the west end approached from Cringle-street. This part of the plan has been well considered; the entrance corridors are so planned as to prevent confusion and crossing, the women entering by one entrance and leaving by another. The author here introduces a *crèche* and waiting-room near entrance, with closet and lavatory accommodation. The establishment laundry is below the entrance to slipper-baths; a towel lift from the laundry in basement to superintendent's office on ground floor is a good point of some value which other plans do not show. Subways communicate with them. One omission on this plan is an official corridor connecting the baths and washhouses. Again, we notice that the committee and superintendent's rooms are well situated on the first floor, approached by a staircase as required leading from entrance-hall, and the w.c. and lavatory accommodation for the committee are well placed and ventilated. The library and club-room are on the first floor also. These rooms are of the required size. The plans show all square rooms—an advantage we have poined out. The style adopted in the elevations and perspective, despite good drawing, is of a too Domestic character.

The design marked "M," by Mr. A. Hessell Tiltman, is characterised by ability. The corner between the two fronts is rounded, and the swimming-bath is pushed far enough to the east to give space for the women's slipper-baths, with an entrance from Cringle-street, an entrance to the establishment-hall as well as a stair approach to gallery, thus enabling the assembly to divide itself easily. The public washhouse for 60 washers, 65ft. by 40ft., is at the south-west corner, with a separate corridor access and ironing-room in front on one side. On the south side at the other end of site are the men's slipper-baths, well arranged with their own entrance from Battersea Park-road, also to the swimming-bath through an entrance hall. At the extreme south, and on this front, is the stair approach to reading-room, and there is also a good stair access to gallery of large swimming-bath. These form a recessed part of the elevation on this side, and are treated externally in a distinct manner. The end of large bath or hall is ingeniously canted, and at the corner between the main fronts is a male performers' club-room and conveniences, with distinct entrance for artists in the Battersea Park-road front. Another entrance to hall is obtained between the canted end of hall and the artists' club-room. The swimming-bath or entertainment hall, of the specified size of pond, has 114 movable dressing-boxes. The ticket office serves for the large bath and the men's slipper-baths. A gallery surrounds the larger bath on three sides, and approached by two entrances at each alternative end—one in the Battersea-road and the other in Cringle-street. The swimming-bath or hall is lighted on both sides and at end. The iron roof comprises a wide centre span over main bath with two small spans over the side galleries with iron columns supporting the trusses, which is more pleasing than a single-span roof over the whole. The public reading-room is in the first floor over entrance-hall and offices, and has a separate entrance, as before stated. There is also a committee-room. At the other end, a crèche 35ft. by 18ft. is shown over the washhouse waiting-hall—perhaps a less desirable place than the ground floor. The entrance to washhouse and ticket-office and matron's room are well placed, and the ticket office serves also for entrance to women's slipper-baths. The establishment laundry is in the basement. There are subways for pipes below the dressing-boxes, and the whole of the engineering details are well studied. The plan has a working corridor on the south side of swimming-bath, returning at the end between the women's slipper-baths and washhouse. Each washing compartment includes two troughs for washing and rinsing, the other for boiling, and two drying horses. The exterior is appropriate, and handled with much breadth; the corner to main fronts assumes a circular shape above, and is roofed by a flat cupola. The main gable of hall to Battersea Park-road is well broken, and the drawings are effectively tinted in sepia.

CONSTRUCTION OF ARCHES IN CONCRETE.—XV.

IT has been pointed out that, so far as general dimensions, proportions, and form or profile of the experimental arches may be regarded, the only difference between them was that the wrought-steel structure was given a polygonal, instead of a circular, shape. The skeleton elevation of the half-arch in Fig. 1 illustrates this

very clearly, and also the braced trussed staging which was erected to support the platform P P, upon which the testing loads were accumulated in successive tiers. There is a disadvantage connected with the employment of the polygonal form instead of the parabolic, and even the circular, which should be noticed, as it tends to counterbalance to some extent the greater facility afforded by it for the building up and erection of the work. The flange-plates and angle-steels bend to a more or less degree as the loads increase, and ultimately secondary stresses, and, consequently, additional deflections, take place. In determining the sectional area of the ribs, the unit stress was made equal to five tons per square inch for a working load of 1·12 tons per lineal foot. A detail of the elevation of a part of the rib to an enlarged scale is shown in Fig. 2. Notwithstanding the comparatively small depth of the rib, small angle steel stiffeners, S S, measuring $2\frac{3}{4}$in. by $2\frac{3}{4}$in. by $\frac{5}{16}$in. are riveted to the web at intervals of 4ft. 6in. The stiffeners are double, one upon each side of the web of the rib, and were not shown on the cross-sections of the arch given in our last article, to avoid confusing the figures.

The steel rib was articulated or hinged at both springings, but continuous at the crown, and the arrangement for effecting the pivoting so as to allow of the slight degree of motion required is shown in Fig. 3. A pair of similar castings, *a* and *b*, bear one upon the upper and the other against the lower half of a steel pin 3in. in diameter. The rib is bolted to the upper casting *a*, and the lower *b* is connected in a similar manner to the solid stonework of the abutment, and the line A B represents the axis of the arch. In this manner the rib, under the influence of increasing loads, can move a little round its pivot as a common centre, and thus, so to speak, accommodate itself to the varying conditions of the loading. As the whole subject of hinged arches is rather complicated, and presents many difficulties to the beginner, a few words of practical information and advice will not be superfluous. In the first place, arches may be divided into four classes:—(1) Arches without pivots, (2) arches with one pivot, (3) arches with two pivots, and (4) arches with three pivots. Taking each of these in progressive order, let A E B in Fig. 4 represent the axis or centre line of an arched rib solidly fixed at the ends, and P a load at any point above the arch. If, as occurs with two of the other classes which will be investigated, the reactions meeting at the point P passed through the points A and B—that is, through the terminations of the neutral axis of the rib—the problem would be much simpler of solution. But they do not, but really take the direction of lines which may be situated either above or below those terminal points. The intersection of the reactions with the loads placed at different points of the arch will occur along a certain curve or locus, which can be found by an intricate and tedious mathematical investigation, which is too elaborate to be entered into at present. Suffice it to say, that for all practical purposes this curve, under certain conditions which prevail with sufficient accuracy in properly designed and constructed metal arches, assumes the form of a straight line, which is represented in Fig. 4 by the line C D. To find the exact position of locus C D, put r = rise of the arch and x the distance of the line C D above the axis at the crown E. Then we have—

$$x = \frac{r}{5}$$

This is the equation of a straight line parallel to A B. If, then, we knew the vertical distances or ordinates above or below the points A and B, the direction of the resultants of the load P could be found, and the resulting stresses throughout the arch calculated by moments or by diagram. Let x_1 and x_2 equal these distances, which will not be the same; put s for the half-span of the arch, and d for the distance of the load from the centre of the rib, then the value of x_1 is given by the equation—

$$x_1 = \frac{2}{15}\left(\frac{s + 5d}{s + d}\right)r$$

and that of x_2 becomes—

$$x_2 = \frac{2}{15}\left(\frac{s - 5d}{s - d}\right)r.$$

It must be borne in mind that, although one point in the reaction lines is at the intersection of the vertical load line and the straight line or locus already determined, and is thus found for any position of any or of all the loads, yet the values of x_1 and x_2 must be found separately for all the loads. Since the reactions do not pass through the ends of the axis A and B, there is, therefore, in addition to the vertical and horizontal com-

Fig. 1.

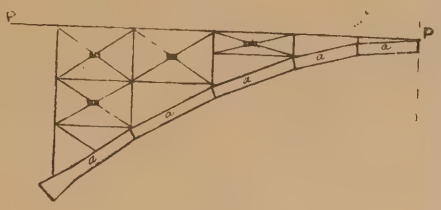
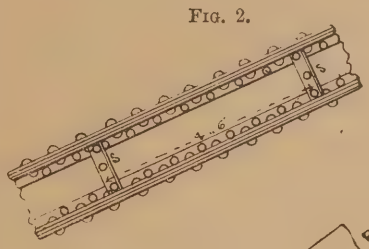


Fig. 2.



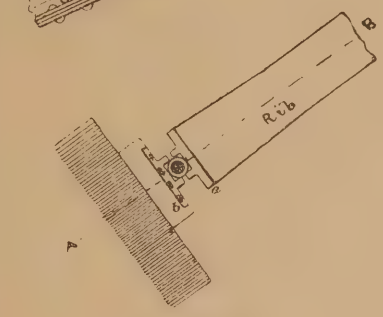


Fig. 3.

ponents of the reaction, a bending moment which varies as the position of the load changes, and must each be sufficient to maintain the direction of the ends of the arch constant and invariable. This is equivalent to stating that the bending moment must be of a magnitude sufficiently great

FIG. 4.

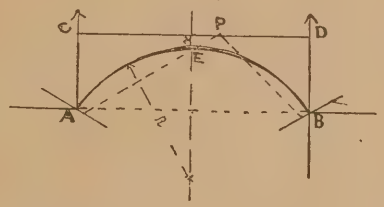


FIG. 5.

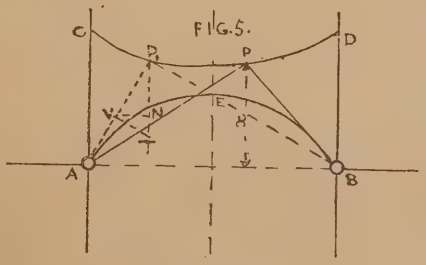
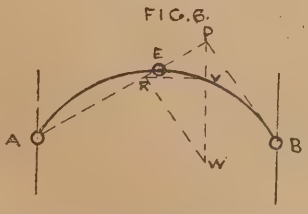


FIG. 6.



to insure that the tangents at the ends of the arched ribs shall have a constant direction. According to the position of the load, x_1 may be positive, and x_2 negative—that is, one may be above one of the points A or B, and the other below it, or both above or both below. Type (2), or the arch with only one hinge, is so rarely used, that it may be passed over, and we may take up number (3), which is the most used of all of them.

Referring to Fig. 5, in which the arch is pivoted at the supports A and B, it will be at once seen that we have more data at our command for calculation than in the former case. For any position of a given load, P, the resultant pressure must, in order to insure equilibrium, pass through the pivots at A and B; and thus we have one point in each of the two resultant reactions determined *à priori*. If we know the exact position of the load P upon the locus or line C D, which, in this instance, is a curved, and not a straight line, as in type (1), our difficulties would be speedily at an end. As it is, the different points in this curve are best obtained analytically by the aid of the calculus; but it will be sufficient for our purpose to give the result in such a simple form as will enable our younger readers to make the necessary calculations themselves. Employing the same notation as before, and taking x as the ordinate, measured as shown in Fig. 5, we have—

$$x = \frac{32\,s^2 \times r}{25\,s^2 - 5\,d^2}$$

It is obvious that by shifting the position of the load P_1—that is, taking as many values for d as may be desired—we can obtain as many points as we please in the line or locus C D, and it can be located and drawn in to any wished-for degree of accuracy and minuteness. Having located the curve C D, suppose it were required to determine the resultant pressures and vertical reactions due to the action of another load P_1. Draw a vertical line through the point where the weight is situated on the arch to meet the locus on the point P_1. From P^1 plot off to any convenient scale P_1 T equal to the weight, and, from the same point draw the lines P_1 A and P_1 B, which will give the directions, but the directions only, of the resultant pressures. From the point T draw T V parallel to P_1 B, then the lines T V and P_1 V will give the amounts of the resultant pressures at B and A. Draw V N parallel to A B, and P_1 N and N T are the vertical reactions at A and B.*

There remains now only type (4) to be considered, which is the simplest of all. It is represented in Fig. 6, and is closely analogous in principle to a pair of straight rafters, one of which has one end at A, the other one at B, and both have a joint intersection at E, while the thrust at the abutments is substituted for the rod in the roof. In Fig. 6 it will be seen that we have another point through which one of the resultant reactions must pass. That point is the third pivot placed at the crown of the arch. Let P represent any weight situated at any point of the rib, and let a vertical line, P W, be drawn through the point. Through the pivots A and E draw a line, and prolong it to meet the vertical, and from the pivot B draw B P, or from P draw P B. If P W be made equal to the load P, and the same lines drawn as in the left half of Fig. 5, then P R and R W are the resultant pressures at A and B, P V and V W the corresponding vertical reactions, and R Y the horizontal thrust.

We may now consider, having rejected the arches belonging to the (2) class, which of the remaining three possesses the best claim to practical consideration, and is the best adapted for practical use. It is not possible to lay down too hard and fast a line upon this question. For bridges of comparatively limited spans, and in which the live or moving load bears a large proportion to the dead load or insistent weight of the structure, the arch with three pivots (4) one at the crown and one at each springing, is not so well adapted for use as the first and third types. The introduction of the additional pivot at the crown diminishes the rigidity of the rib, and, in fact, causes the whole structure to become somewhat rickety. But should the conditions become reversed, that is, should there be no moving load, or should it bear but a small proportion to the dead load, then the fourth type will answer very well, both as regards economy and other features. The arch hinged only at the springings, and continued over the crown, appears to be the one most employed by engineers at present, and deservedly so. At the same time, class (1), which may be termed the primitive type, has always given complete satisfaction, whether as a roadway or a railway bridge, and for large spans, is quite as economical, and a great deal stiffer than any other. It is, nevertheless, unquestionably out of date, and in future the selection will lie between the third and fourth

* Those who wish to study this subject further should read the works of W. M. Patton, A. Jay, Du Bois, Malverd, A. Howe, W. H. Warren, W. Ritter, W. Burr, H. Greene, and other writers.

class. It may be remarked that the function performed by the web of the rib is common to all, and therefore, it does not enter into competition in making a choice of one type or the other. A word or two about stresses caused by variation of temperature. In the three-pivoted arch, these are equal to zero, since, as already explained, each semi-arch can rotate slightly, but at the same time freely, about its pivots and thus nullify all changes of form due to alterations in temperature. But stresses of temperature are set up in the arch with two pivots, whether the temperature rise or fall, the only difference consisting in the fact that if a rise occasions positive stresses in the flanges, a corresponding fall will induce equal ones of the same amount, but opposite in sense or character. It must be remembered that temperature stresses must be added to those already found for the two descriptions of loading to obtain the total stresses on different parts of the arch. The weak point in the unpivoted arch (class 1) is that the temperature stresses are excessive when compared with those of the pivoted type, and there is no doubt that this feature is the principal cause of its use being discontinued. These stresses, similarly to those due to the action of the dead and live loads, will not pass through the ends of the axis of the rib.

During the testing of the steel arch experimented upon, observations were made to ascertain and record the vertical and horizontal deflections at certain fixed points previously selected along the longitudinal axis, and also the angular displacements at the same points, due to the different rates of loading. From these observations, formulæ were deduced, and tables calculated which enabled certain constants to be computed, which would serve for other examples, and effect a consequently large saving in time and labour. The results of these tests will be briefly described, and some remarks and comments made thereon in our next and concluding article. T. C.

NOTES FROM EDINBURGH.

A RETROSPECT of the closing year shows it to have been one of the busiest in building operations of many tabulated, whilst there is every prospect of 1898 being another record year. The standard or minimum wage for masons has not advanced; but the maximum is 10½d., and other trades share in the general advance. The works which have made progress during the year are still far from completion, being of unusual magnitude. The new North Bridge has been completed so far as it can be, pending the completion of the new work at its extremities. The reconstruction of the railway buildings has also made good progress, and the various platforms have been made. The whole range will be under glass, and the sheds will extend far to east and west of the bridge. The external appearance will be much the same as formerly. The extensive series of roofs is carried on lattice girders and strong iron pillars about 30ft. apart, and the glazing (which is the Penicuik patent) is interrupted only by gutters of no great breadth. The height is not such as to obstruct a view of the arches of the bridge, and, provided some better arrangement than formerly is made to keep the surface clean, the great field of glass will not be so much of an eyesore as it has been. The building, at the north end, now makes some appearance at street level, and what may be styled the basement is complete on the railway side. The company, it appears, having purchased the Waterloo Hotel, intend to fit up their offices there, thus giving the whole of the building at the north end of the bridge to the purposes of the hotel. This arrangement will make an important addition to the work of the coming year, as much alteration will be required. The past year is memorable for the opening of the McEwan Hall, begun seven years ago, and which has been well illustrated in the Building News. Although the ground plan appears simple enough, the interior is unique in its proportions and probably unequalled in the splendid design of its decorative detail. The foundations of the new fever hospital have been laid, and work of a similar kind has been carried on during the year in connection with the extension of the Municipal Offices.

Another important addition to the architecture of the city has been made during the year in the new Prudential Insurance Buildings at the south-east corner of St. Andrew's-square. The edifice is now completed in the mason-work, and is notable for the contrast in its style as compared with any of the buildings in the square. Its most characteristic features are the large, wide openings of the ground floor, partly fitted for shops, and the many vertical pilaster divisions over this floor, which terminate above a very heavy cornice in arcading ornamented with vigorous sculptured panels. These at some distance appear to be intended for tongues of flame, but closer inspection shows them to be sculptured foliage of Gothic character—in either case appropriate emblems for the decoration of a fire and life insurance institution. The whole is an interesting combination of Gothic proportions and Classical details. The base, or ground floor, is polished red granite, which, in strong light, is hardly distinguishable from the polished red sandstone above. The best feature is the angle turret, and its treatment of the corner, which is very happily designed. The lower portion of the octagon is not, as usual, carried up throughout, but is transformed into a similar octagon—with the angle over the centre of the face beneath—with ingenious devices, which make the top lively with balconies, gables, &c.

The building of the Equitable Insurance at the north corner of the square is now well above foundations, and will also make a notable addition. It is being carried out in the red freestone, from one or other of the Dumfriesshire quarries. The demand for this stone is very great, and new quarries are being opened.

The Standard Insurance Company, it is said, will reconstruct their premises at the north-west corner of the square. The Scottish Provident Society are enlarging their premises, which adjoins the remaining corner. This corner house is the one occupied by David Hume when he left the Old Town for the New. It is much disfigured on both frontages by the shop and shop floors above, which leave little but the upper floor and gable visible, and the sooner the reconstruction of this remaining corner is in hand the better.

The conversion of the old tramways into the cabled system has been proceeding, and is well forward with the engine stations. The number of tenements of middle-class and workmen's houses erected during the past year is very large, but houses of the highest class have not been many. The U.P. Church, having sold their church in Infirmary-street, the building is now fitted up for the Working Men's Club. The new church is built in Fountain Hall-road, in Early English Gothic, with wide nave and narrow passage aisles, a hall, and other accessories. The Free Tron congregation has left the church in Chambers-street, disposed of for business premises, and is building a new church on the Dalkeith-road. One new school has been added during the year in Preston-street, to accommodate about 1,000 pupils, at a cost of £15,000, and the end of school-building is not yet.

The Gas Trust are in terms for the purchase of part of the Grantham estate as site for new gasworks, which means another large outlay for the advantage of the building trades. It is said by those who ought to know, that this great scheme can be carried out without adding to the rates. Nothing has surprised the public more than the great increase in consumption of gas within the city, despite the increasing demand for the electric light, the increase on last quarter alone having been upwards of 2,000,000c.ft. It is accounted for by the increasing number of gas-engines and cooking ranges. The present electric plant is inadequate to supply the demand for the light, and a new station in another quarter of the town is to be provided. The new hospital for the Castle barracks is far advanced, but not finished sufficiently to say how it may affect the appearance of this interesting feature. Its altitude, in any case, will be an advantage, and will make the large block of street-like buildings on the west less conspicuous. So far the new building is of the plainest possible description. The Royal Engineers, or whoever is architect for this military post, are not happy in their architecture as a rule, and the Cockburn Association have been instrumental in preventing an addition being made to the barracks on the south side of the Castle-road, where the married soldiers reside.

No progress, seemingly, has been made during the year, in solution of the difficulty of finding a site for the Usher Hall. The difficulty lies in finding a desirable site which will not cost as much or more than the hall itself. The site at the canal basin cannot be had from the N. B. Ry. Co. The most economical and central site is the one in Chambers-street, where the hall would be a fitting companion to the Industrial Museum and University buildings, and within easy distance of the Council Chamber. Another site, less costly than others, is spoken of in George-street, where St. Andrew's Church now stands. It is said that the congregation are not indisposed to migrate to a more accessible neighbourhood farther west, and that £14,000 would be required for it, and probably as much more for premises behind the church.

The new North Bridge-street buildings cannot be much longer delayed; but in this matter also no decision has been come to, and it seems likely that nothing will be gained by rejecting the offer of Mr. Moss for purchasing the site for £200,000.

THE ECCLESIASTICAL ARCHITECTURE OF SCOTLAND*.

[WITH LITHOGRAPHIC ILLUSTRATIONS.]

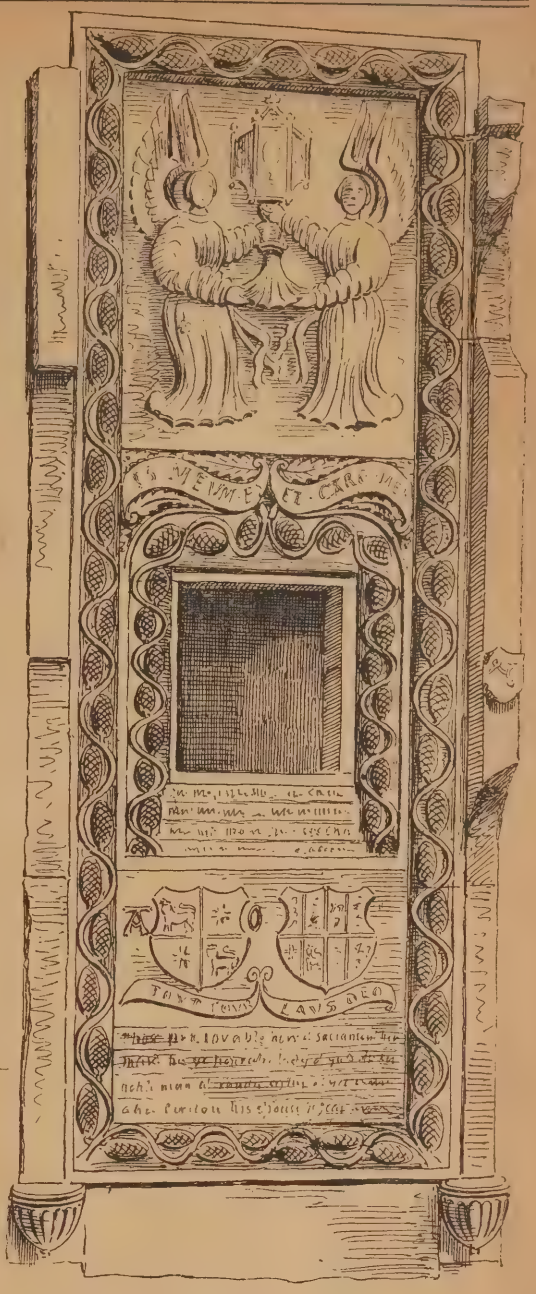
MESSRS. DAVID MACGIBBON AND THOMAS ROSS have just produced the third volume of their replete history of what remains of the Church buildings of Scotland from the Earliest Christian times to the 17th century. The present book, in concluding the work, opens with the Late Pointed Gothic Period, and "from the series of examples given in this volume there can scarcely be any question as to the gradual deterioration of ecclesiastical architecture which occurred generally throughout Scotland during the latter half of the fifteenth and the first half of the sixteenth centuries, and it is certainly surprising to find some exceptionally good work in a few structures of that period." French influence rightly accounts for much of this excellence, and "latterly the office of King's French master-mason became a regular Court appointment, and the position was held by several Frenchmen." James IV. and James V. both employed master-masons from France, and the Merlionns, a family distinguished in this connection, are found still at Linlithgow, Dunbar, Ravenscraig, Perth, and other places.

No new churches of great scale were undertaken during the Late Gothic period. Some of the older buildings were either reconstructed or restored. The largest new church of this time is that of Trinity College in Edinburgh, founded by the widowed Queen of James II. The ecclesiastical edifices north of the Border, generally speaking, are usually much smaller than English churches, and often consist of a nave without aisles, or transepts and choir minus the nave. Many, no doubt, were intended by their designers to have been cruciform, but, for various reasons, have never been completed. The French fancy for the apse is often realised in Scotland, and this feature is distinctly characteristic of the Late Pointed period in Scotland. Another and more distinguishing mark of this Scottish style is the vaulting, the pointed barrel vault being almost universally employed. Domestic features of an architectural kind were freely imported into ecclesiastical buildings, such as the barrel vault carrying a stone roof, a very notable and common arrangement. The windows had to be kept low down to permit of the main vault springers starting clear of their heads. The intersection of vaulting gave way to superficial surface ribs of an ornamental kind, but which structurally serve no purpose. A roof of carefully-wrought flagstones arranged in courses was the common mode, and sometimes the stones were hollowed in the centre to carry the water away from the joints. At Rosslyn the same stone which forms the interior vault is made also to form the outside roof, the exterior pitch of the roof being curved like the interior. This, however, is quoted as an exceptional instance. Generally speaking, there is little connection in matters of detail between the contemporary church work in England and France with the Late work in Scotland, though examples of Flamboyant tracery may be described as not very uncommon.

The present series of buildings illustrated are Paisley Abbey, which it will be remembered, has a very remarkable triforium, with semicircular openings filled with pointed arches and cuspings, in design not unlike the plainer triforium at

* The Ecclesiastical Architecture of Scotland, from the Earliest Christian Times to the Seventeenth Century. By David MacGibbon and Thomas Ross. Vol. III. Edinburgh: David Douglas. 1897.

ST. SALVATOR'S CHAPEL, ST. ANDREW'S.



SACRAMENT HOUSE, DESKFORD.

Dunkeld Cathedral in Perthshire. This church is a ruin only now, but it is possessed of the greatest interest, as mainly representing the Third Pointed period. Passing Iona Cathedral and St. Machais Cathedral, Old Aberdeen, St. John's, Perth, and the famous Dundee Church Tower, we arrive in the book at the celebrated Collegiate Church of Rossyln, from which the authors have lent us two of their sketches, reproduced among our lithographs to-day. In some respects this is the most remarkable piece of architecture in Scotland, and had the church been finished in the same spirit as that in which it was so far carried out, it would have gone a long way towards realising a poet's dream in stone. Much of its detail is, however, crude, and in construction the principles of Gothic work are not adhered to; indeed the authors of this book tell us that Mediæval method is ignored. For all that, the exuberant fancy of the designer manifests itself so abundantly in the profusion of his conceptions that the work as a whole stands alone. It was built by Sir William St. Clare, third Earl of Orkney, in the middle of the 15th century, and when he died, in 1484, he seems to have left the building very much in the condition in which we now find it. Both inside and out the choir is remarkably symmetrical in its parts, the bays are all of the same dimensions and correspond very closely in general detail. The pinnacles are ornamented with rosettes on the angles and crochets on their roofs. The richness of the design is well illustrated by the accompanying drawings, which only form a small part of the sketches with which the church is represented both inside as well as out.

The Church of St. Salvator is the only portion of the college buildings which still survives. It is attached now to the united Colleges of St. Leonard and St. Salvator, which form the existing University of St. Andrew's. There are no windows on the north side of the church, which is an oblong building, 107ft. long by 28ft. wide, with a three-sided apse at the east end. The arched porchway is illustrated by the sketch, which also shows the base of the tower—an unbuttressed form common at this period in Scotland. On the ground level this tower formed the gateway to the College. King's College Chapel, with its exceedingly picturesque tower, is represented by the accompanying sketch. It is located at the north-west corner of the college quad.

Like the chapel of St. Salvator at St. Andrew's, it is long and narrow on plan, measuring inside the walls 122ft. long by some 28ft. wide. It is divided into six bays by big projecting buttresses with large traceried windows between on the north side and to the apse. Over the west door, which is mean in its proportions, there is a four-light window divided by a massive straight pier and loop-like tracery, as seen in the picture. James IV. began this chapel in 1500. The finishing of the tower forms one of the three crown steeples of Scotland, the two others still standing, from among the many of a like kind of which the Scotch could once boast, being St. Giles', Edinburgh, and the Tolbooth, Glasgow. King's College tower is about 63ft. high to the top of the battlements. From that point to the base of the lantern pillars is about 16ft.; from thence to the top of the cross is some 20ft. Mr. J. C. Watt, of Aberdeen, gives the total height as 99ft. The upper part was rebuilt about 1640 by Master Mason George Thomson, after a severe storm which greatly damaged the original some few years before. The tower, with most of the chapel, is built of sandstone.

Stirling parish church is one of the best-preserved ecclesiastical buildings in Scotland. The plan which we print shows the scale of the church, measuring, as it does, including the apse and tower, some 200ft. long. The interior sketch illustrates the choir, and Messrs. MacGibbon and Ross publish a good many drawings from the same building. There is an Easter sepulchre in the north aisle. From Deskford Church we have reproduced a drawing of the sacrament house as representative of many similar structures. It is uncommonly large, measuring 8ft. high by 3ft. 6in. wide. Two angels above the ambry are shown supporting a monstrance with a quasi-buttress on either side, and several inscriptions and enrichments. The vine is quaintly introduced in the remaining carving. The work was done, according to the inscription, in 1551, a date which would lead one to expect very debased Gothic detail, and here we note the influence of the approaching Renaissance. Our next example shows this style in its developed dress nearly one hundred years later: the Kinnoull monument from Kinnoull Church aisle.

The design is pompous in the extreme, and inspires none of those feelings of reverence suggested by the monuments of the Middle Ages. It occupies the entire end wall of the aisle, and is marked by a Rococo feeling untrammelled by the limitations of a purer style. The work is eminently debased; but it is picturesque and queer, while suggesting that George, first Earl of Kinnoull and Chancellor of Scotland, is represented impersonating a professor of legerdemain, introducing a show about to commence. Morham Church, Haddingtonshire, carries the student to a remote village to see one of the latest examples which Messrs. MacGibbon and Ross have to show us of church building. The unusual work to which they refer is really confined to the elevation of the north aisle, dating about 1724. It is uncommon in Scotland to find work of this type in church building, and there is in this example a degree of originality and quaintness which in a way becomes suggestive, while at least it is refined and not vulgar, like the Weem Church Monument, the last full page picture-subject in this book, and which we mention only to condemn.

We close the volume with a sense of due indebtedness to its authors for all their pains-taking endeavour to build up and illustrate so much interesting material from out-of-the-way places, and although possibly, and as a matter of necessity, perhaps, much which they have so carefully garnered must have mainly a local interest, there is so much more of wider scope and of larger importance. These three handsome books undoubtedly will command readers among all who really seek to know all about the ecclesiastical architecture of Scotland. The printing is excellent, and the blue buckram binding is strong and suitable.

ELECTRIC LIGHTING NOTES FOR ARCHITECTS.—XIV.

By an Assoc. Inst. Elect. Engs.

DISTRIBUTION.—(*Continued.*)

THREE-WIRE SYSTEM.—From what has already been said it is clear (1) that smaller conductors may be employed for distributing electrical energy, and, consequently, considerable economy may thus be effected by using high voltages for distributing purposes; (2) that independence of the individual lamps is secured by means of parallelism; and (3) that the difficulty encountered by the electrical engineer for lighting large buildings or institutions and extensive areas, is that of increasing the range of distribution—*i.e.*, the permissible distance between the generator and the lamps without undue loss or variation of pressure, or violating the laws of economy of conductors. One of the solutions of the problem of economical distribution of electrical energy consists of an extension of the simple parallel system and a modification of the multiple series system, forming what is known as the *three-wire system*. This system was invented simultaneously by Dr. Hopkinson in this country, and by Edison in America, and, as proved by the numerous cases in which it has been adopted, and as we shall presently see, it is an economical method of distributing electricity for lighting purposes. As may be inferred from its name, there are in this system three conducting mains, the centre one of which is a neutral or balancing wire, and, unlike its fellow in the multiple-series system, it is connected to an intermediate point between the two dynamos so as to be in connection with the positive terminal of one machine and the negative pole of the other. The arrangement is represented in Fig. 29, in which P and N are the positive and negative mains respectively, and M is the neutral or balancing wire. The source of electricity consists of two exactly similar dynamos connected in series, each giving the voltage required by an individual lamp, so that twice the pressure of the simple parallel system is used in the three-wire system. These dynamos, D_1 and D_2 in the figure, are shunt or compound machines, and it will be observed that the lamps are connected in groups of two in series, one on each side of M.

The essential feature of this system is that double the lamp voltage is maintained between the positive and negative mains, whilst the usual pressure is used for the service or house mains, which are connected between the middle wire and either the positive or negative mains, as shown in the figure. It is thus clear that the system is equivalent to two distinct parallel systems, the middle wire of the three-wire system playing the same function as the return of the first of the two parallel systems, and at the same time forming the lead of the second of the two systems. In other words, the part of the middle wire between the source and the first lamp is traversed by a current equal to the difference between the currents required by the lamps on the two sides of

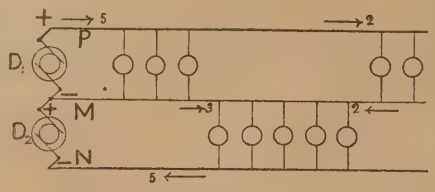


Fig. 29.

the middle wire. A representation of a complete installation is shown in Fig 30.

As we have already stated, one of the advantages of using the three-wire system is the economy in the copper which results, and to decide what the gain really is, it is usual to compare the weights of the copper required for the conductors for a simple parallel system and a three-wire system supplying the same number of lamps. And as the statements made with reference to what the exact saving in copper is, vary considerably, it is necessary to point out that two factors may enter into our calculation—*i.e.*, (1) the density of the current decided upon, and (2) the permissible drop in volts. Then, again, the middle wire may, or may not, be of the same section as the outside wires; and for lighting purposes it is obvious that the supply mains should be so arranged that the number of active lamps in use at any time on one side of the neutral wire is approximately equal to the number of lamps lit simultaneously on the other side.

By paying proper attention to this matter when designing the system, a considerable saving in the weight of copper may be effected with

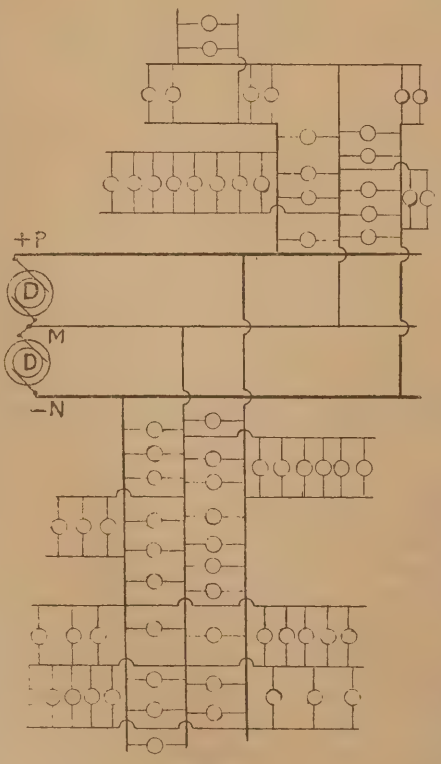


Fig. 30.

respect to the middle wire, for in practice it is found possible to distribute the supply mains so that not more than half the maximum current, passing along the positive or negative distributor at any time, traverses the neutral conductor. Very often it will be considerably less than half; consequently the area of the cross-section of the middle wire may, and often is, reduced to half that of the outside wires. Obviously the most care is required when the district lighted consists partly of business premises and partly of residences. For large installations, where the number of lamps working at any time are liable to vary, it has been found convenient and possible to introduce switching arrangements for transferring a portion of the load from one side of the middle wire to the other. By this means any installation may be subdivided into two halves at any time, and balance between the two loads readily secured, so that the middle wire never carries much current.

The section of the middle wire, however, should not be less than that of the outside wires when two motors are connected in series, and are supplied by means of three wires with energy from two dynamos, also connected in series. When both motors are working, the middle wire—connected between the common junction of the generators and that of the motors—plays the part of a balancing wire, as in lighting circuits. Should, however, only one motor be at work, then one of the outer wires is passive, and the middle wire has to carry the same current as the active outside wire. In cases where several motors are grouped together, after the manner of lamps, then, of course, the same considerations apply as we have already mentioned in connection with lighting circuits.

Whilst considering the middle wire, we may, in passing, refer to the magnitude and direction of the current passing along it. Let C_p, C_n, and C_m be respectively the currents traversing the conductors, P, N, and M of Fig. 29 at any particular time; then, if the same number of lamps are in use on both sides of the middle wire,

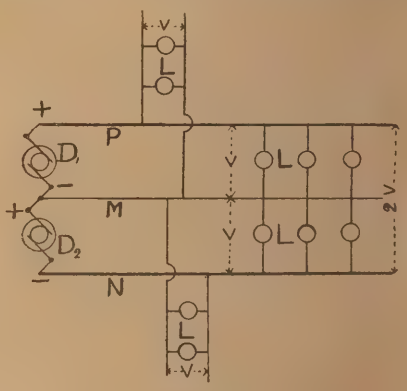


Fig. 31.

no current passes along the neutral wire M, either from or to the dynamo, since—

$$C_p = C_n \text{ and } C_m = 0.$$

It is for this reason that the middle wire is termed the *neutral* wire. If more lamps are in use between P and M than between M and N—

$$C_p \text{ is greater than } C_n, \text{ and } C_m = C_p - C_n$$

—that is, a current equal to c_m passes along the middle wire from the lamps to the dynamo D_1. On the contrary, if—

$$C_n \text{ is greater than } C_p, \text{ then } C_m = C_n - C_p.$$

and a current equal to C_m passes along the middle wire from the dynamo D_2 to the lamps. If $C_n = 0$, then $C_m = C_p$, and so on. It thus follows that each dynamo supplies the energy required individually for the corresponding groups of lamps. It is thus evident why the middle wire is also termed the *balancing* wire, and that the middle wire plays the part of a positive, neutral, or negative main at different times according to the equality or inequality of the two loads on the two sides of the middle wire. In fact, the third wire was introduced and connected to the generators because of the difficulty of maintaining an exact balance between the number of lamps on the two sides of the middle wire, without introducing special arrangements.

In Fig. 31, a special case is represented, from which it will be observed that we have an interesting arrangement indicating an equal number of active lamps on the two sides of M, and that although no current passes from or to the dynamos along the neutral wire, there are currents of different intensity and direction traversing different parts of that conductor, as indicated by the arrow-heads. By assuming that each lamp takes one ampère, we are able to give the magnitudes of the currents along with the directions for each conductor.

In dealing with the question of economy of conductors forming any system, it is evident that the calculations must be based upon some law or rule relating to the minimum cost of working. Such a rule, as Kelvin's law of economy of conductors for instance, enables us to decide upon the cross-sectional area, and the proper current density for a minimum cost of working. In what follows, it will be assumed that from the consideration of such a law, the current density employed for the simple parallel system satisfies

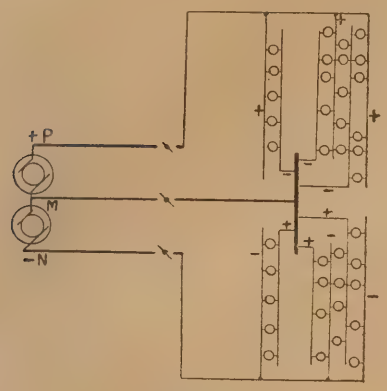


FIG. 32.

the conditions of the problem. Since the essential feature of the three-wire system is to employ double the pressure of the corresponding simple parallel system, it follows that only half the current will be required for the same number of lamps. In comparing the two systems—i.e., the two-wire and three-wire systems, the following cases may be considered.

Let C_2 and C_3, W_2 and W_3 denote the currents and weights of copper respectively used in the two systems.

I.—*Same Gauge and Length of Wire in the Distributing Mains.*

(1) Middle wire same gauge as outer ones.

$$W_3 : W_2 :: 3 : 2.$$

(2) Middle wire half the section of the outer ones.

$$W_3 : W_2 :: 5 : 4.$$

In this case, however, it will be noticed that the drop in pressure with the three wires is only half that with the two wires. Also, when the two sets of lamps are balanced and no current

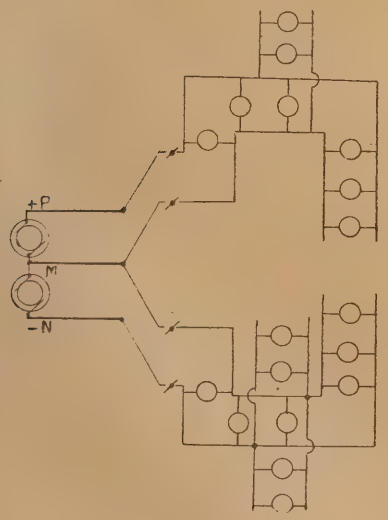


FIG. 33.

passes along the middle wire, the energy wasted in the distributing mains is as follows:—

Watts lost in three-wire system : Watts lost in two-wire system :: 1 : 4.

Since— $C_3 : C_2 :: 1 : 2.$

II.—*Same Gauge of Distributing Mains with the same Fall in Pressure.*

Since in I. the drop in pressure with the three wires is only half that with the two wires, it follows that with equal conductors, giving the same fall in pressure, the distributing mains will be twice as long as for the simple parallel system. Also—

$$W_3 : W_2 :: 5 : 2,$$

if the middle wire is half the section of the outer ones, and four times the number of lamps may be used for the same fall of pressure.

III.—*Equal Lengths of Distributing Mains and same Current Density.*—In this case the outer distributing mains will have half the area of the wires in the corresponding simple parallel system.

(1) Middle wire same size as the outer ones.

$$W_3 : W_2 :: 3 : 4$$

(2) Middle wire half the area of the outer ones.

$$W_3 : W_2 :: 5 : 8$$

Therefore, there is a saving of three-eighths or 37·5 per cent. by using the three wires. Again, if the middle wire is passive—

Watts lost in three-wire system : watts lost in two-wire system :: 1 : 2

Also—

Percentage fall of pressure three-wire system : percentage fall of pressure two-wire system :: 1 : 2,

although the drop in volts per yard in the distributing mains is the same in the two systems, since the pressure at the generators in the three-wire system is twice that for the two-wire system. Therefore, in the three-wire system the lengths of the distributors may be twice as great as in the two-wire system if the same percentage fall of pressure is allowed in the two systems.

IV.—*Equal Lengths of Distributing Mains and Same Percentage Fall of Pressure.*

Since fall of pressure = ampèrage × resistance,

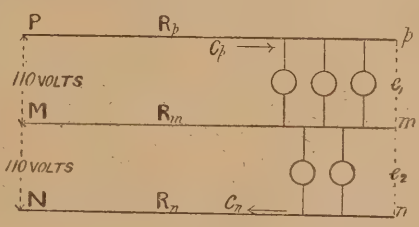


FIG. 34.

we have the same percentage fall of pressure if the middle wire is passive, when—

$$\frac{C_2 R_2}{E_2} = \frac{C_3 R_3}{E_3} = \frac{(\frac{1}{2} C_2) R_3}{2 E_2},$$

that is when $R_3 = 4 R_2$; that is, the area of the cross-section of the outer wires for the three wires will be one-quarter that for the two wires. E_2 and E_3 are the impressed E.M.F.'s respectively, and R_2 and R_3 are the resistances of the distributing mains in the two systems.

(1) Middle wire same size as the outer wire.

$$W_3 : W_2 :: 3 : 8.$$

Therefore, there is a saving of five-eighths, or 62·5 per cent., in favour of the three-wire system, while the watts wasted by heating the conductors is the same in each system.

(2) Middle wire half the size of the outer ones.

$$W_3 : W_2 :: 5 : 16.$$

Another point in connection with the three-wire system which requires notice is the fact that the far end of the middle wire may be earthed. When we remember that the pressure used in the three-wire system is double that used in the simple parallel system, it is clear that the chances of leakage to earth and of accident are twice as great with the former as with the latter system, and also that the insulation should be carefully attended to. At the same time, it is evident that the potential of the middle wire is approximately that of the earth, and if the two divisions of the consumers may be assumed to have an approximately equal consumption at all times, the middle wire need not be insulated; it may, therefore, be replaced by the lead, iron, or other metallic covering often used to protect the copper, and thus permanently earthed. It, however, must be remembered that only the middle wire must be earthed. The result of earthing the middle wire is to reduce the strain on the insulation to one-half. With the middle wire not earthed, the insulation has to withstand a pressure of 200 volts, whilst with earthing the insulation has only to withstand a pressure of 100 volts. That this must be so is clear from the fact that by earthing the middle wire its potential is zero, so that the potential of the positive main, P, is + 100 volts, and that of N, the negative main, − 100 volts.

The three-wire system is used considerably for distributing purposes and for large installations, because it offers the following advantages over the simple parallel or two-wire system.

(*a*) It enables the E.M.F. to be maintained in a system of conductors for electrical supply at a fixed and constant potential.

(*b*) It combines the advantages of higher pressures for distribution in the distributing mains, and the easy manipulation of the simple parallel system by adopting lower and safe pressures in the service mains. It is clear that more energy may be delivered because of the higher pressure used, and that larger areas may be served without increasing the losses in the mains.

(*c*) It permits of the independence of each lamp. Although the lamps are connected two in series on a parallel system, the failure of lamps on one side of the neutral wire does not affect the lamps on the other side; consequently, any lamp may be turned out independently of all the others.

(*d*) It secures a considerable reduction in the cost of the copper in the distributors consistently with efficiency and safety.

Although we have so far only considered this system as a distributing system, it is clear that it is adapted for house-wiring, and specially so for large buildings. The usual methods of adapting the three-wire system for house-wiring are shown in Figs. 32 and 33, and from the former it will be seen that small circuits are led to a main distributing board, whilst in large buildings the three wires are led in as the supply mains, from which the house circuits are divided equally between the two pairs of mains, so that the separate circuits are kept distinct from each other, and more under control.

It may also be mentioned here that not more than 10 volts are ever allowed for the loss in pressure in the mains, so that if 100-volt lamps are used the generators should give 110 volts each. It is, of course, important that the drop in volts in the mains should be determined, so that it is certain the lamps are supplied at the proper pressure, and we give here equations which are useful for determining the pressures between the two sets of mains.

Let R_p, R_m, and R_n, C_p and C_n denote the resistances of P_p, M_m, and N_n (see Fig. 34), and the currents for the two sets of lamps respectively. Also, let e_1 and e_2 be the differences of potential between p and m, and between m and n respectively. Then, if the generators give 110 volts between P and M, and between M and N, we have—

$$e_1 = 110 - C_p . R_p - C_p R_m + C_n R_m$$
$$e_2 = 110 - C_n R_n - C_n R_m + C_p R_m$$

If $C_n = 0$ and C_p be of constant value, we have—

$$e_1 = 110 - C_p R_p - C_p R_m$$
$$e_2 = 110 + C_p R_m$$

In this extreme case the second dynamo, D_2, is doing no useful work, and may be cut out of action.

Another point to which we must draw attention is the difference between mains used to carry

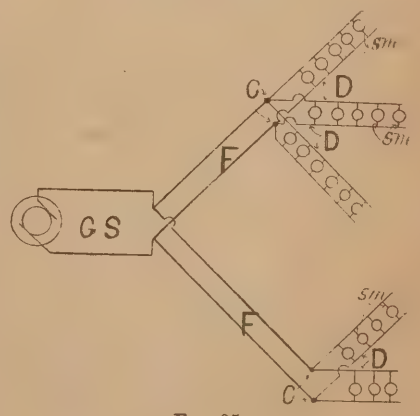


FIG. 35.

currents to distributing centres, and those used for distributing electricity. In the former case the general method is to decide upon a certain number of *centres of distribution* at comparatively short distances apart—as, for instance, at the junctions of main streets, and by connecting

these nodes or centres together so as to enclose a certain area, we have a representation of a net or mesh, more or less regular. The whole of such a system of mains, together with the service-mains (supplying the consumers) connected with them, forms a distributing network. To feed such a network, the centres of distribution are connected to the generators by a series of special feeding mains which divide the current supplied, and are of sufficient section to carry the current required at the distributing centres. These feeding mains are termed "feeders," and by some French writers "artères" (arteries), which is a very significant and suggestive term. A simple network supplied by feeders is shown in Fig. 35, in which G S is the generating station, F the feeders, C the centres of distribution, D the distributing mains or distributors, and S M the service mains.

The function of a feeder is that of a carrier, and it is evident that they may be long or short to suit the circumstances, and as they are only used for the transmission of electrical energy, they are never tapped by distributors. It is also obvious that if the feeders for a network have been properly designed so that the drop in pressure in them shall be the same, then the centres of distribution will all be at the same potential. These points may thus be looked upon as secondary sources or centres of feeding maintained at a constant potential, distributing the current into the network. The pressure at these centres is maintained constant by regulating appliances at the generators. The section of the feeders is determined by considering the maximum current which traverse them and their length, so that the permissible drop in pressure is not exceeded.

The distributors distribute the current received from the feeders to the service mains, and are therefore tapped at all points where current is required. They vary in size and length according to circumstances, and in some cases do not form a network, but a series of radiating mains. Unlike feeders, the current carried by the distributors is not the same at all points.

(*To be continued.*)

WROUGHT-IRON AND STEEL IN CONSTRUCTIONAL WORK.—XXXII.

CONTINUING examples of the building up of elements:—Two illustrations of the use of gussets as broad supports are shown in Figs. 207 and 208. In each of these, A A are portions of

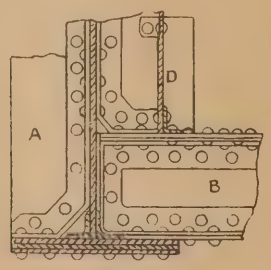


Fig. 209.

long lattice girders which rest at their ends upon columns. The principal arched ribs of a roof rest upon the same columns; but the intermediate ribs rest on these girders, A—three intermediate ribs on each girder. The bases or springings of

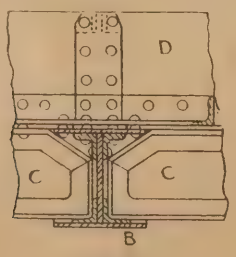


Fig. 210.

these girders are shown at B in these figures, starting in the direction of adjacent spans. The gussets C C are inserted underneath the springings, and their dimensions are proportional to the ribs B B.

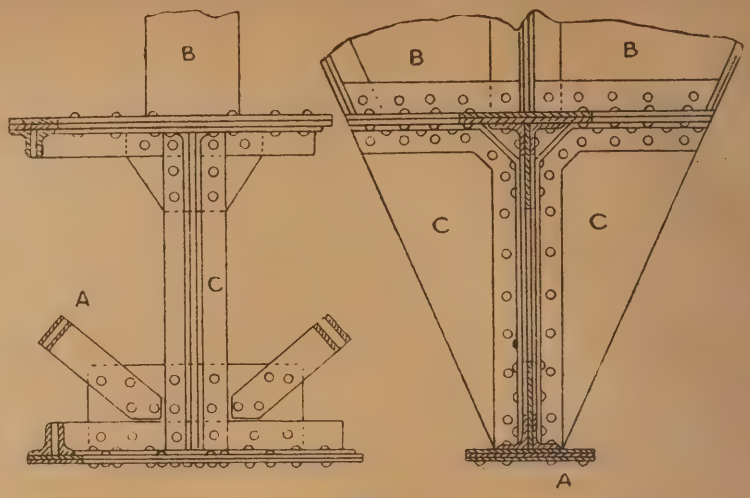


Fig. 207.

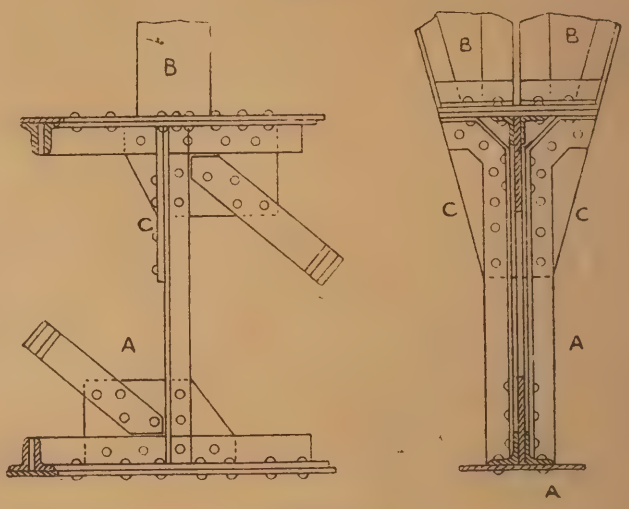
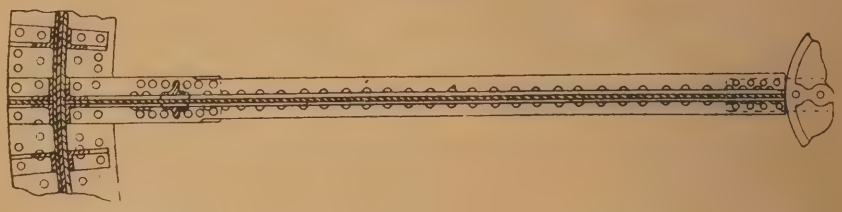


Fig. 208.



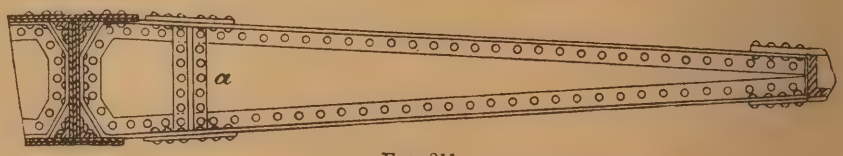


Fig. 211.

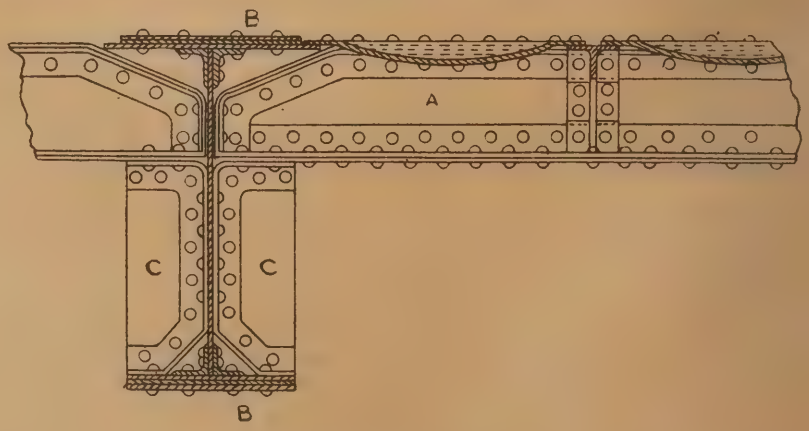


Fig. 212.

Figs. 209, 210 show how cross girders and rail-girders in the roadway of a railway-bridge may be united to the main girders. A is one of the main longitudinal girders, B one of the cross girders, and C C rail-girders running parallel and intermediate with the main girders A. The rail-girders are short, placed directly under the rails longitudinally, to take the rolling load

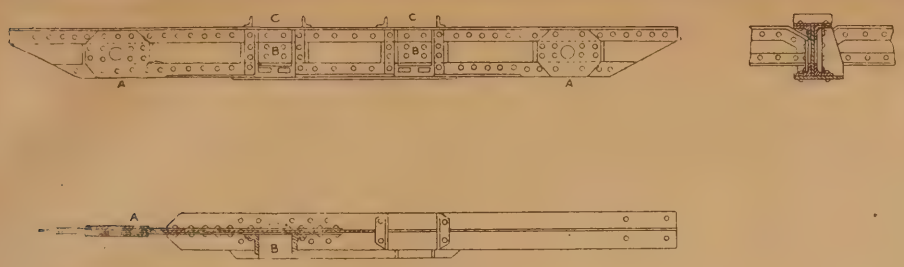
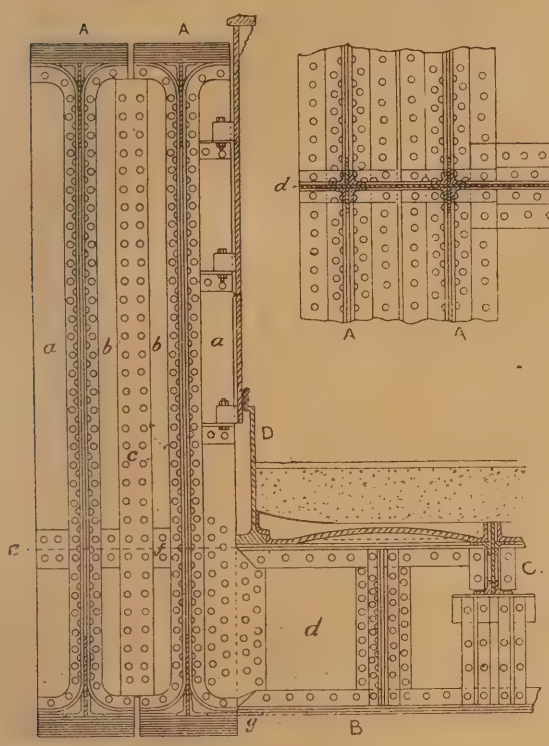


Fig. 213.



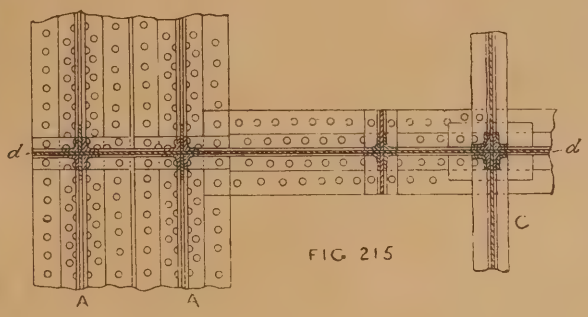


FIG. 215

FIG. 214

between the cross girders. They are of various forms—single webbed and of the trough type—and are united to the cross girders by similar methods to those by which other girders are united at right angles. Trough girders are used instead of the type shown in the figures when the depth available is but small. To keep the bottom of a railway girder bridge dry, and to prevent leakage, floor-plates are laid over the girders and filled in with asphalte and ballast. Leakage at the sides is prevented by means of vertical fender-plates D, riveted along the edge by means of angle-irons.

One of a series of radial girders is shown in Fig. 211 attached to an annular girder, the whole ring running on live rollers for a swing-bridge. The small ends of the radial girders are riveted with straps to the centre pivot casting. In work of this kind every part is proportioned as nearly as practicable to the work it has to do. Thus, the radial girder is not only tapered, but it is jointed at *a*, the plate to the left being ½in., that to the right only ¼in. thick. The circular girder is formed of three plates, as shown at the parts where the load is imposed, but dies away to two and one in intermediate positions.

Fig. 212 shows the union of shallow built-up girders, A, with deep girders, B, either at right angles or askew. A is supported by means of gusset-brackets, C, riveted to B. Girders A are bevelled off at top to clear the top flange and flange-angles of B. One of the flange-plates is made wider than the rest, to receive the wrought-iron buckle-plates which support the concrete floor.

A curious method of securing girders is shown in Fig. 213. It is one of the cross girders of the Loa Viaduct. These, instead of being riveted to the main girders, were carried on turned steel pins in holes drilled through web and packing-plates at A A. The pins were carried by steel castings on saddles, which bridged the top booms of the main girders. The longitudinal rail-girders were riveted at one end, but were received in cast-iron supports at the other, to permit of expansion. The recesses B B receive the expansion ends, the rails going in C C above. The small figure to the right shows a fast and an expansion end.

Figs. 214, 215 illustrate a portion of a bridge which embodies several departures from usual practice, the principal being the building up of the main girders by means of twin girders and the carrying the cross girders through the main girders, instead of carrying them upon the inside bottom flanges of the latter in the usual way. The twin girders A A which form a single main girder are composed of top and bottom booms, vertical struts, and diagonal ties. The ribs or webs *a a*, *b b* form portions of the vertical struts, and the inner ones, *b b*, are made one of the bonds of union between the twin girders by the wrapper-plates *c* riveted to both. The other connection

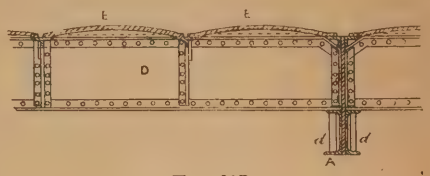


Fig. 217.

is that of the web *d* of the cross girder B, which is carried through the main girders A A, as indicated by the dotted line, the vertical webs *a a*, *b b* stopping short at the edge *e* of the cross girder to permit to permit the web *d* to pass through; wrappers or covering plates *f* unite the webs of struts and cross girders. The girder also rests upon a plate, *g*, riveted to the bottom flange of the main girder. The vertical angle irons of the struts are also riveted through these webs. The method of bending of these angles irons over the longitudinal angles of the booms is also a variation from illustrations previously

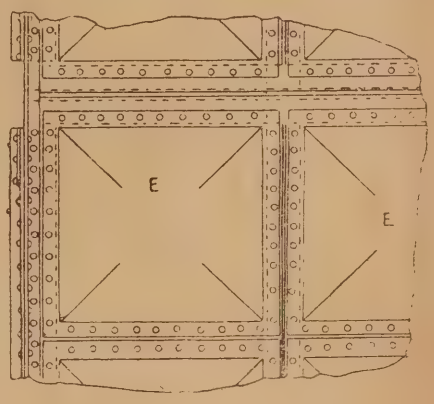


Fig. 218.

given, in which the angles have been bent sharply, and is preferable in some cases, avoiding the making of an overlap and weld in the abrupt angle. Another detail relates to the union of the small longitudinal girders or stringers between the cross girders. These are shown at C. They are built of plate and angle, and the web-plate comes up above the main girder A to receive the flanges of the buckle-plates which carry the concrete roadway, and the covering asphalte. Earth-plates, D, of cast iron confine these materials sideways.

Fig. 216 illustrates the combination of several parts in a road-bridge with footways. It is a part section through the Clarence Bridge at Cardiff, already alluded to as having been built on the American pin-connected system, and is believed to be the largest swing-bridge erected in this country. The centre swinging span is 190ft. 8in. long by 40ft. wide, and is supported entirely on the central pin, both when closed and

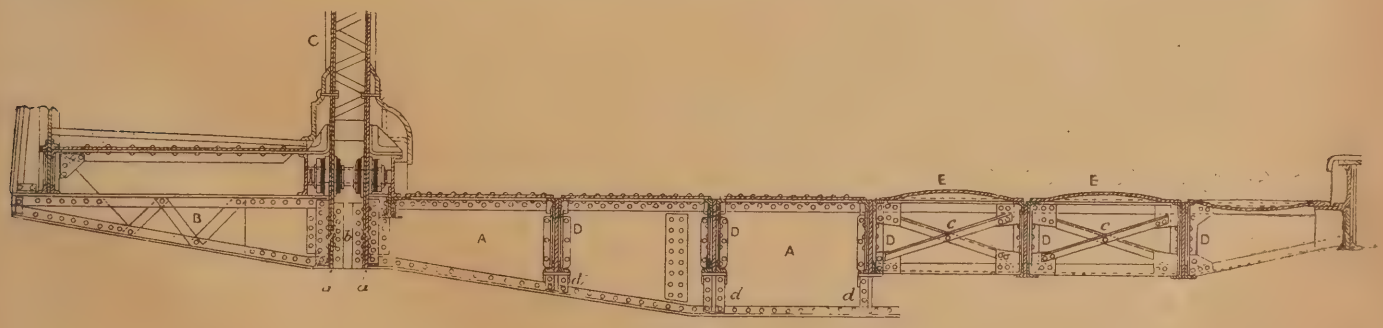


Fig. 216.

open. The figure shows a section through the roadway and one footway, with the method of the connection between their girders and the main girders. The shape of the roadway main or cross girders is indicated by A, which represents one of these girders broken off at the centre of the bridge. One of the footway cantilever girders is shown at B, and a portion of one of the main or longitudinal girders at C. The bottom booms of C are above the level of the floor girders; but the side plates of the vertical struts *a a* are continued below the booms to receive the end flanges of the girders A and cantilevers B, and the riveting is carried through angles on a central diaphragm, *b*. A principal advantage of this mode of construction is that the open web bracings of the pin-connected trusses leave clear ways between roadway and footways, so that passengers may cross from one side to the other. There are five rows of longitudinal girders, D, connecting the cross girders, and these are stiffened with diagonal bracings, *c*, as seen to the right of the figure. These girders are covered with buckle-plates, concrete, and timber. They are supported at the ends by stools and riveted to the cross girders A, the diagonal bracings occupying intermediate positions. The buckle-plates E are riveted over girders, as shown in Figs. 216—218. The cantilevers B support the parapet and flooring.

A slight camber upwards is imparted to the trusses of bridges, in order to prevent the trusses from bending below the horizontal under heavy loading. A rule for the amount of camber is: Divide the span in feet by 50, though a less amount than this is often given. A bridge should not deflect more than half this amount under its heaviest load. J. H.

PAINTS AND THEIR VAGARIES.

EVERY paint user knows that for a painted surface to be successfully accomplished, great care and attention have to be exercised in the selection of one of the materials used. It is pretty generally ackowledged that when a man has failed at any other trade he can wield the brush as a painter. This wielding of the brush is a very simple matter of manual labour only—one which requires but little skill, and capable of being performed by any one of average ability. But it is not everybody who wields a brush that can or does understand the nature and vagaries of the paint he is using. The conditions of use are so diverse that it is only the skilled craftsman—the man who has been a painter by trade all his life—who can give a rational explanation of any defects in a painted surface. What causes blisters in paint? What causes the colours to sink in? What causes paint to remain soft underneath while the exterior surface is bone-dry and fairly hard? What, in fact, causes any and all of the "deviltree" a painted surface exhibits six months after the paint has been laid on? The jobbing hand, the nondescript sort of fellow, who has tried every trade and failed at all, cannot tell his employer why the paint he has laid on exhibits the above mentioned, or any other defect. It is only the "old hand," the skilled workman, who can offer an explanation. But even with him the explanation offered is not always the correct one. It requires the aid of the chemist as well as the craftsman to interpret all the reactive changes that a coat of paint undergoes. It is the writer's purpose, therefore, to explain the nature, qualities, reactive changes that occur in the paint-pot and the coat of paint laid on the surface of any material. In the present paper the question of the

SINKING-IN OF COLOURS

will be considered. Before doing so, however, it will be best to explain the actual composition of this compound called "paint."

Essentially a paint is composed of linseed-oil, pigment, driers, and turps. The oil used is generally boiled-oil—that is, the raw linseed-oil has been subjected to a particular treatment whereby it loses its raw or native qualities, and becomes converted into a different body in many of its characteristics. The boiling process consists in heating the raw oil to a temperature of over 500° Fahr., whereby a lot of water that is inherently present in the oil is expelled. The oil is then either oxidised by passing steam or air through it, or it is boiled with some sort of a mineral such as litharge (an oxide of lead), borate of manganese, calcium sulphate of zinc, or some other body which will react on the fatty acids of the oil to oxidise them and thereby change the fluid from a limpid oil to a viscous varnish. (To illustrate the difference between an oil and varnish, drop a drop of each fluid on a piece of glass or porcelain, and note the difference in the drying power: the oil, if in the raw state, will remain fluid a very long time before it shows any signs of drying or hardening, and then it is only on its exterior surface that the drying occurs, forming a skin thereon; whereas, with the spot of varnish, that begins to dry and harden immediately it is exposed to the air.) Now, the object of boiling the oil has been to render the oil of a more drying nature—raw oil takes three months to dry when exposed to the air, but boiled oil does not take as many weeks. The pigment of a paint consists of a dry powder colour which imparts the tint to the paint; this is ground up in the oil vehicle, whereby each dry particle of paint becomes coated with a layer of drying oil, whence such mixtures, when spread out thinly on a surface, will dry to form a thin layer or coat of paint. If the mixture of pigment and oil is not sufficiently siccative, the painter mixes in some "driers," which enables the compound to dry at a quicker rate. The addition of turpentine to a paint is made so as to render the paint of a thinner or more fluid consistence, whereby the paint can be easily spread by means of a brush. These details are of necessity known to most painters; but this explanation is needed here, so as to render perfectly comprehensible what is to follow.

Now, apart from the chemical nature of the pigment used—whether it be a sulphide, oxide, chromate, silicate, carbonate, &c., of a metal—it will be noted, from the above, that the nature of the "driers" mixed with the paint has also to be reckoned with, and, lastly, the mixture of the turpentine. Consequently a "pot of paint," or "coat" of ditto, is not a simple compound. Quite the opposite, in fact; for, although the oil of turpentine used is always of the same nature, putting out of consideration for the moment the idea of adulteration or substitutes, the chemical composition of the pigment is not always the same; neither is the drier always the same. We shall have occasion to consider these points in other articles. At present we will confine attention to the loss of brightness, or "sinking in," as it is called, of colours.

Let us consider the nature of a coat of paint. It consists of pigment, an oil-varnish (i.e., the boiled oil), drier, and turps. When this layer is exposed to the air (that is, when the painter has ceased spreading it with his brush) the oil vehicle begins to become decomposed, whereby it is separated with its components, oleic, palmate, &c., acids, and at the same time the base of glycerine, to which these components are attached in the undecomposed oil, is eliminated. As these chemical changes occur, the atmospheric oxygen seizes on the olein, and converts it into linolein, which is a solid, tough, elastic transparent body. The other fatty parts of the oil are more or less absorbed by the pigments, or else they are pushed to the surface of the coat of paint (as will be explained *infra*). The glycerine, however, does not become absorbed.

As the exterior surface of the coat of paint becomes oxidised as above explained, the particles of solid linolein sink to the undermost parts of the coat of paint, and thus a fresh layer of the oil vehicle is pushed up to the exterior surface of the coat of paint, to be similarly converted by the atmospheric oxygen into solid linolein. When all the oil has become thus converted, we can conceive that as each particle of solid linolein sank down, the particle of pigment was left denuded of a pellicle, or covering of oil. Also, we can conceive that the interstices between the particles of solid linolein and those of the pigment become filled with air, and also with the glycerine that has been eliminated from the oil by the decomposition it has undergone.

Now, glycerine is a greedy absorber of moisture, and, as a consequence, side by side with the transparent shining particles of solid linolein there are particles of water or moisture. We can now conceive the coat of paint to be in this condition. First, there is most of the oil next to the surface on which the paint is laid; above this we can conceive its pigmentary particles almost uncovered with oil, and side by side, or permeating the mass, is a quantity of aqueous particles. Now, the colour of the pigment is, of course, dull or bereft of sparkling brilliancy, and it is the object, or should be, of the oil vehicles to clothe each particle of pigment with a layer of shining oil. This, however, is not the case for the conception above foreshadowed. Now, when all the oil has become converted into solid transparent linolein, this linolein will rise to the surface if it has not become too hard and solid (that is, if it has been quickly formed); but as it rises above the pigment particles they sink down, and becoming mixed with the glycerine and the water it has imbibed, we have a layer of transparent linolein above a layer of pigment, glycerine, and water. Now, the oxidation of this linolein still proceeds, and will proceed until it is of a uniform tough skin. To enable it to do so its absorption of oxygen proceeds, and as this oxygen unites the layer of glycerine and water that is imprisoned by the superimposed skin of linolein, the glycerine becomes oxidised to a glyceride, and which more or less permeates the skin of linolein, and thereby causes the latter to lose its transparency and become opaque; consequently the surface of the coat of paint is bereft of brilliance, and exhibits a dull appearance.

It will naturally occur to the thoughtful reader that what is wanted to prevent this sinking in of the pigment is either the incorporation of some solid transparent body that will not allow the solid pigment to sink through the oil, or else some process or material that will quickly convert the oil vehicle into solid transparent linolein, for if the oil be converted into this substance before the pigment has had time to settle away from it, the linolein as it dries will inclose the particles of pigment in it, and slowly form a transparent layer of linolein round each particle of pigment (the glycerine that has been eliminated would in this case be driven to beneath the pigment and linolein, with what effect we shall see in a future article). Now, if a resin be incorporated with the oil, or a varnish be used as the binding vehicle for grinding up the pigment in, then the colours will not sink in, because side by side with each particle of solid opaque pigment there would be a particle of solid transparent resin which would reflect the light, and consequently cause the coat of paint to exhibit a brilliant appearance. Paint grinders, therefore, should grind up their pigment in an oleo-resinous vehicle. There is an additional reason why such a vehicle should be used, because a resin will absorb glycerine, and thus, instead of fluid glycerine and water being beneath a coat of paint, which is often the cause of blistering and peeling off of paint, the coat of paint would be one solid homogeneous mass from exterior to the undermost surface. H. STANDAGE.

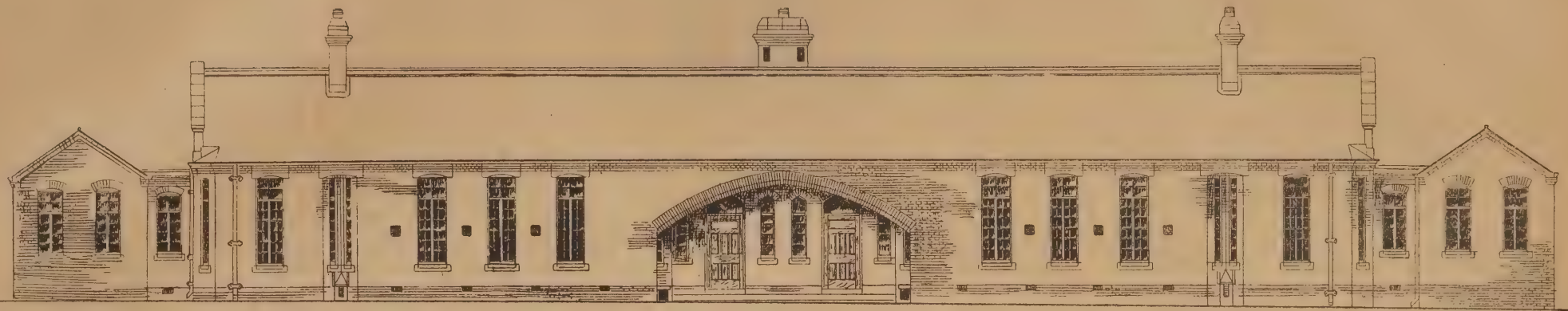
THE LUNATIC PAVILION FOR THE LEWISHAM BOARD OF GUARDIANS.

THIS building is now being erected on land adjoining the infirmary in the High-street, Lewisham. The exterior is of red and yellow stocks with Doulting stone sills, heads, and copings. The floors of wards are to be laid with wood-block flooring and those of the offices with tiles. The walls and ceilings generally are to be plastered with "Adamant" plaster. Specially designed and glazed skirtings are to be used throughout, and the offices are to be lined with glazed bricks to a height of 7ft. The casements and hoppers are to be of iron, those for the wards being specially designed. The heating is partially by the hot-air and by the hot-water systems. Mr. Robert Williams, F.R.I.B.A., of Lee, S.E., is the architect; Mr. T. I. Barden, of Maidstone is the builder, and Mr. I. R. Williams is the clerk of the works.

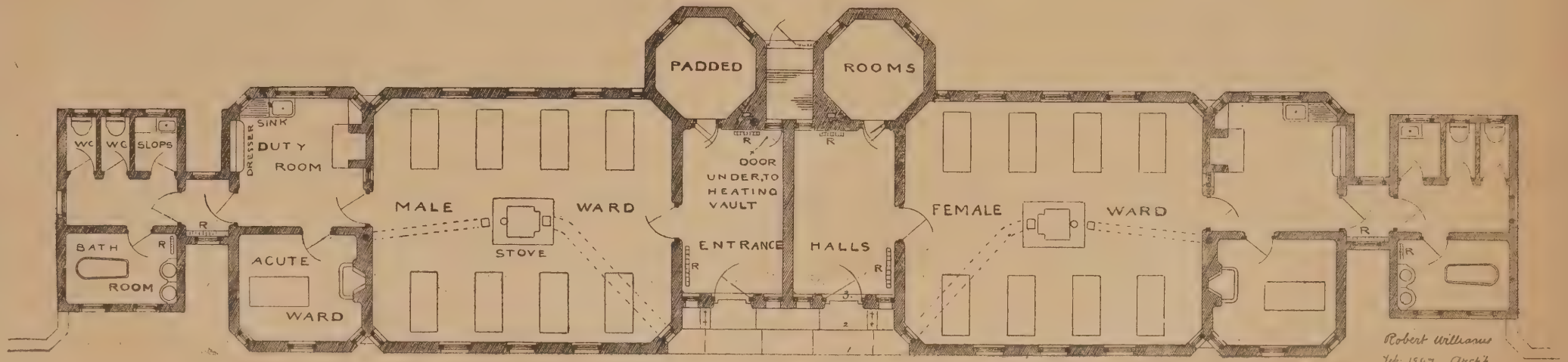
Mr. Frederick Dale Banister, late chief engineer to the London, Brighton, and South Coast Railway, died at his residence at Forest Row, Sussex, late on Wednesday evening in last week. He had been in the service of the company fifty years, and succeeded Mr. Hood, now a director, more than thirty years ago as chief engineer, a post he resigned in February, 1896.

At a meeting of the parishioners of St. Cuthbert's, Southport, the rector announced that, on the advice of experts and the Ecclesiastical Commissioners, it had been resolved to pull down St. Simon and St. Jude's Mission Church, opened four years ago at a cost of £6,000. The reason for this step was the settlement in the foundations through the sandy soil, which could not be remedied except at great cost, and even then the appearance would be unsatisfactory, and the risk not entirely eliminated. He also announced the gift of a large iron church by an anonymous donor.

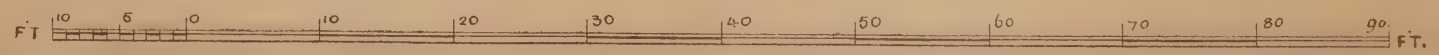
Lunatic Pavilion for the Lewisham Board of Guardians.



Elevation.



Ground Plan.



BOOKS RECEIVED.

House Drainage Manual, by Wm. Spinks, Assoc. M.Inst.C.E., Mem.San.Inst., &c. (London: Biggs and Co., Salisbury-court, Fleet-street). The author of this manual treats more fully of the designing and apparatus connected with the entrant end of a drainage system, and, from a casual glance of the chapters, twenty in all, the sections discussing requirements, planning of drains for different kinds of buildings, and subsoil drainage are of value. In the chapter on planning the author illustrates by plans several town blocks, a town court with backyards, others without yards, cottage property to conform to model by-laws, the blocks of cottages having through passages 10ft. wide between. The main lines of drain are laid on the passages, the house-drains each separately connected therewith. By this means legal difficulties and trouble are avoided, as, for example, when the drain from one house is connected to that of the other in the adjoining yard, each being owned by different persons. When a stoppage of one takes place, the adjoining owner may object. In the plan given, the Northern system is shown of making the drains pass through the closets. Another plan for semi-detached houses shows the position of each drain, manholes, wastes, soil-pipes, intercepting-chambers, and air inlets, &c. Other arrangements for a town house, a detached house, and a block are shown. Some useful remarks are made about the surface and subsoil drainage of hillside houses, and the means taken to keep them dry, such as a gutter or drain to carry away the surface or subsoil water. The remarks on drains, inclination of pipes, jointing, disconnection, intercepting traps, and manholes are up to date, and are fully illustrated. The chapters on the law relating to drainage add much to the usefulness of Mr. Spinks' manual.——*Electric Light: Its Production and Use*, by John Urquhart, Electrician, &c. Numerous illustrations. Sixth Edition. (London: Crosby Lockwood and Son.) The rapid development of the art of electric lighting has rendered a new edition of this handbook necessary. The author has now added a chapter on "Electricity in Mining," and the regulations issued by the L.C.C. for the electric lighting of theatres have been included.——*The Local Distribution of Electric Power in Workshops*, by Ernest Kilburn Scott, A.I.E.E. (London: Biggs and Co., Salisbury-court, Fleet-street, E.C.)—This little book deals with the application of electric motors to power work in factories. It is a compilation of facts and data that will be found useful to engineers and proprietors of factories. The author shows that the electric power is a commercial success, and that it can be transmitted to isolated points comparatively near together as well as to long distances. Mr. Scott lays down certain advantages of electric transmission to factories and workshops, such as absolute control over the machines, owing to the self-indicating nature of electric motors, concentration of the generating plant in one central position, lighter construction of walls and roofs, less cost of repairs, lubrication, and maintenance, less periodic vibrations than with steam-engine, and less wear and tear, saving of belts and cables. The author points out in detail many of the advantages of electric driving, and gives examples, the horse-power required to drive various machine tools, vertical motors, wood working, woollen-mill, and flax-mill machinery, and these types of machines are illustrated by photos. The tables and data will be found of value by the factory engineer and owner. Part III. is a useful summary of a power installation, with recent examples.——*Practical Forestry*, by Charles E. Curtis, F.S.I., &c., second edition, revised (London: Crosby Lockwood and Son), is the substance in book form of a series of articles which appeared in the *Land Agents' Record*. The author's wish is to encourage the study of forestry among landowners, land agents, and the occupiers of land—a very laudatory object. No one will deny that the subject of tree-planting has been much neglected. Many large districts in this country remain unoccupied or only partially cultivated, much to the loss of future generations. A perusal of Mr. Curtis's little volume will be found of value to all landowners and their agents. The principles of forestry are now taught in all agricultural colleges, the Surveyors' Institution offers a special certificate to those who show a certain degree of knowledge in it, and portions of the Crown forests are set apart as models to follow. The author deals with the objects to be attained by planting, such as shelter from winds, the amelioration of climate, the improvement of scenery, and to plant for profit. These objects are discussed. Probably to plant for profit has been the main incentive, though this may be so directed as to realise the other advantages. On building estates the value of well-devised planting is immense; but how often it is neglected! What, indeed, gives greater value to building plots than the presence of trees? They increase the market value of estates, and attract purchasers and tenants if sufficient timber is left standing. The chapters on soil and site, laying-out for plantation, preparation of ground, drainage, planting trees, thinning plantations, pruning, sale, measurement of timber, cost of planting, &c., contain many useful suggestions.——*The "Practical Engineer" Pocket Book* for 1898 (Manchester: Technical Publishing Company, Ltd.) is a new and revised edition of a well-known practical pocket-book and diary. Additions have been made to the section of the steam-boiler, engine, and electric matters, which latter are fully dealt with. The tables are full and complete. To the practical engineer engaged in steam-engine and mechanical work the book will be found of every-day service. There is a good diary, ruled in squares, at the end, the diagrams are clear and render the book a *multum in parvo* of mechanical data.——*The Engineering Magazine* (London: 222, Strand) for October has some interesting articles on "Electric Power for Trunk Railways," by Professor George Forbes; "Modern Wharf Improvements," by Foster Crowell (illustrated by photo-blocks); "Rapid Electric Travel," by Charles Henry Davis and F. S. Williamson; "Machine Shop and Foundry," by Henry Roland; "Industrial Awakening of Russia," by F. J. Guyon; "Progress of the Rack Railway," illustrated by E. L. Carshell; also illustrated articles on turret-ships, and "Notes on Civil and Mechanical Engineering," &c.——*Painting and Decorating*, by Walter Pearce (London: Chas. Griffin and Co., Ltd.)—This volume treats the subject of painting in a commercial and practical manner, and does not enter into the higher branches. The author is a practical house-painter and decorator, and lecturer on the subject at the Manchester Technical School for House-Painting and Decorating, and has brought together notes of processes and combinations of colours that have come under his notice that may be found useful for technological classes on the subject. A large portion of the book is devoted to workshop requirements, colours, driers, oils, tools, brushes, and other plant. Painting materials, like brushes, occupy a large space of the book, and are intermixed with patterns for wall and wood decoration, and plates in colours illustrating polychromatic, complementary, and other colour schemes. These designs and colour schemes we cannot admire—they rather detract from the value of the treatise. Some of the designs for colour decoration, as Plate II., illustrating a complementary scheme, are crude. The orange or monochrome treatment, and the "analogous" scheme are also unpleasing. With these exceptions, Mr. Pearce's book will be found generally useful to practical painters and decorators. There are many valuable hints and suggestions on the technical processes, hints on damp walls, duresco and distemper painting, new woodwork, on stucco and cement, staining and varnishing, wall hangings, Lincrusta Walton, and other fabrics. As a practical handbook for the student and house painter, we can recommend the work.——*A Short History of Hampton Court*, by Ernest Law, B.A. (London: Bell and Son, 7s. 6d.), is condensed from the author's larger works, and it is for the most part a readable popular manual of the well-known palace, and contains little of special interest to architects or archæologists. It is very readable, and the illustrations are numerous.——*Hints to Young Valuers*, by Richard Anthony Cragg, F.G.S.; with Explanations of the Legal Principles Involved, by J. R. V. Marchant, M.A. (London: Land Agents' Record, Limited), is the republication of a very useful series of articles in the *Land Agents' Record*. The manner in which the legal part is incorporated with the practical part, and the numerous examples of valuations given, will render it valuable, especially to young surveyors and valuers.

Among the new members returned to the City Court of Common Council is Mr. Tom F. Rider, the well-known builder, and for many years a member of the Metropolitan Board of Works.

ALMANACS AND DIARIES.

Among the most really useful of general diaries the Folio diary, half-bound, at four shillings, and the shilling Quarto and Octavo diaries, interleaved with blotting, sent us by Messrs. Partridge and Cooper, are good value. The "City Diary" (London: W. H. and L. Collingridge) is useful, and in many respects, unique. The Rugby Portland Cement Company's noble Wall Calendar for 1898 is as effective as the speciality whose manufacture it illustrates is dependable. Waterlow Bros. and Layton's, Limited, Architects' and Surveyors' Diary (3s. 6d.) is of business-like proportions, and contains several useful features not to be found elsewhere.

Messrs. Hudson and Kearns send us their always welcome Architects' and Builders' Diaries and Desk Remembrancers. We have used these now for 23 years, during which period many additions and improvements have contributed to the achievement of a degree of convenience that is, we sincerely believe, as near perfection as anything human can be. For comprehensiveness of information, convenience of size, quality of material used, and intelligent provision for every conceivable need of the architectural profession and the building trades, Messrs. Hudson and Kearns' diaries have no compeer.

CHIPS.

But little business was transacted at the Mart, Tokenhouse-yard, during last week, which closed the year's business at this centre. Properties of various classes were offered on three days, the total sales amounting to £14,025. In the provinces the chief sale was that of the Histon Manor Estate, near Cambridge, which, submitted in lots, realised £11,170.

At St. Chad's Haggerston, the Bishop of Stepney has dedicated an eagle lectern which has been given to the church in memorial of the long and prosperous reign of Queen Victoria. It has been executed from designs by Mr. James Brooks, the architect of the church.

A fire occurred on Wednesday night at the saw-mills, Oval-road, East Croydon, belonging to Mr. J. Horrocks, a builder and contractor. Seven shops, machinery, and stacks of timber were destroyed. The damage is estimated at about £3,000.

A brass, designed by the late Mr. J. L. Pearson, R.A., has just been placed in St. George's Chapel, Windsor Castle, to the memory of the late Rev. the Hon. Charles Leslie Courtenay, who was for many years vicar of Bovey Tracey, and also Canon of Windsor.

The annual meeting of the British Institute of Certified Carpenters was held last week at Carpenters' Hall, London Wall. Mr. Harry Turville, who presided, was elected the vice-president for the coming year, and the hon. secretary, Mr. T. M. G. Lloyd, was also re-elected.

In celebration of the completion of the restoration of the historic church of St. Bartholomew the Great, West Smithfield, the executive committee are about to present an illuminated address to the architect, Mr. Aston Webb.

Mr. Herbert H. Law, an inspector of the Local Government Board, conducted an inquiry on Friday into the application of the Otley Urban District Council for sanction to borrow £4,000 for additional sewage works at Otley. Mr. Holt (engineer) stated that they were providing tanks with an additional capacity of 213,214gal., the necessity for which was mainly brought about by the great quantity of trade effluent to be taken into the sewers from the Wharfe-side Paper Mill.

In order to meet the need created by an increase of insanity in the West Riding of late years, the Asylums Committee of the West Riding County Council are making preparations for the erection of an additional asylum capable of accommodating about 2,000 patients.

A disastrous fire occurred at Weston-super-Mare on Monday evening, at the sea end of the pier connecting the mainland with Birnbeck Island, on which the pavilion refreshment-rooms and concert-hall are erected. The fire appears to have originated in a bedroom of the pavilion through the overturning of a paraffin lamp. The damage is estimated at £4,000. The property is insured.

Plans have been prepared for the renovation of Queen Anne United Presbyterian Church, Dunfermline, at a cost of £3,000. The church is to be practically gutted from floor to ceiling. The pews are to give place to modern seats, and the gallery is to be so reconstructed as to form a semi-circle. The pulpit is to be removed, and behind its site a pipe-organ is to be built. Improved methods of heating and ventilation are also to be introduced.

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ILLUSTRATIONS.

THE THREE PATRON SAINTS OF GREAT BRITAIN AND IRELAND.—EXAMPLES OF THE ECCLESIASTICAL ARCHITECTURE OF SCOTLAND.—KINCARDINE HOUSE, DEESIDE, N.B.—KING JAMES'S GRAMMAR SCHOOL, KNARESBOROUGH.—HOUSES, THE AVENUE, LINCOLN.—LUNATIC PAVILION FOR LEWISHAM BOARD OF GUARDIANS.—LEIGH SAVINGS BANK COMPETITION: SECOND PREMIATED DESIGN.

Our Illustrations.

THE THREE PATRON SAINTS OF GREAT BRITAIN AND IRELAND, CHURCH HALL, PUTNEY.

These mural paintings have been executed this year in oil, and are treated in a decorative manner, with strict regard to emblematic detail. They were designed and painted by Mr. Fred Roe, of Victoria-grove, Chelsea, for the Church Hall, Putney, a building erected at the cost of Mr. J. W. Lancaster, from the designs of Messrs. Lee and Pain, architects, Lincoln's Inn Fields. The figures measure 8ft. 6in. high, and occupy a space of about 4ft. 6in. wide each—St. Patrick, St. George, and St. Andrew.

ECCLESIASTICAL ARCHITECTURE OF SCOTLAND.

(See article and further sketches on page 932.)

KINCARDINE HOUSE, DEESIDE, N.B.

This house was finished about a year ago; it stands in a very fine position, commanding splendid views up and down the Dee Valley, Aberdeenshire. The walls are rough-cast with granite dressings, the roof being slated with green slates. The interior, of which the hall is shown, is finished simply but substantially in oak. Messrs. Niven and Wigglesworth are the architects. The second drawing herewith reproduced was shown at the Royal Academy this year.

DESIGN FOR PROPOSED GRAMMAR SCHOOL AT KNARESBOROUGH.

This design was submitted in competition by Messrs. Hall, Cooper, and Davis, architects. Provision is made for 20 boarders and 80 day-scholars at a total estimated cost of £3,153 2s. 10d. The materials it was proposed to use were Ruabon bricks, with stone dressings to walls and red tiles to roof. The drawing illustrated was hung in this year's exhibition at the Royal Academy.

HOUSES, THE AVENUE, LINCOLN.

These houses have been erected for Mr. G. W. Henton, ironmonger, the larger one for his own occupation. In addition to the accommodation shown there is a basement under the whole, containing washhouses, larders, servants' w.c.'s, and cellars for coals, beer, and wine; there are also bedrooms and boxrooms in the roof. The walls are built of local red bricks, the doorways, window sills, &c., being of red terracotta and the roofs are covered with Penrhyn slates. The general contractor was Mr. G. F. Harrison, the plumbing and glazing was done by Mr. J. H. Green, and the painting by Messrs. Waller and Mead, all of Lincoln. The work was carried out under the superintendence of the architect, Mr. J. H. Cooper, of Lincoln. The total cost was about £1,800.

COMPETITIONS.

Birkenhead.—In a recent limited competition the plans submitted by Mr. T. W. Cubbon, architect, of Birkenhead, have been placed first by a professional assessor for new Unitarian school buildings to be erected in Bessborough-road. The scheme includes a church and other buildings.

Lewisham.—In the competition for free library buildings, the public libraries committee of the Lewisham Vestry have appointed Mr. Edward W. Mountford, F.R.I.B.A., 17, Buckingham-street, Strand, W.C., as assessor.

Newark-on-Trent.—In the competition for a school of art and technical buildings for the borough of Newark, the assessor, Mr. Ernest George, has just made his award. The first premium of £50 is taken by Messrs. C. E. Mallows and Grocock, of London and Bedford, who will be intrusted with the work; the second premium of £25 by Messrs. T. B. Silcock and Reay, of Bath.

Nottingham.—In the competition for a new cemetery at Basford, instituted by the Nottingham Corporation, Mr. Aston Webb has been been appointed assessor for the buildings, including chapels, crematorium, and lodges, and Mr. H. E. Milner will help in the adjudication of the premiums on schemes for laying out the grounds. Twenty sets of drawings have been sent in. The premiums offered were £100 and £50.

CHIPS.

An oak altar-rail, supported on six brass standards, has been erected in the parish church of Long Sutton, from a design by the Messrs. Bassett-Smith, architects, Adelphi.

The oil-painting of Lord Russell of Killowen, in his robes as Lord Chief Justice of England, which has been subscribed for by the inhabitants of Hackney, as a testimonial to his long connection with the borough, will be unveiled at the Hackney Town Hall on February 10. Earl Spencer will preside.

Mr. David Richards, the well-known sculptor, who died recently at Utica, United States of America, was a native of Abergynolwyn, Merionethshire, where he was born 68 years ago. He spent the years of his youth up to his 24th year as a farm labourer. He had a taste when a boy for making models of clay and plaster, and he displayed, after emigrating to America, such skill in that direction that he decided to study sculpture.

Colonel Marsh, R.E., Local Government Board inspector, held an inquiry at Portsmouth on Tuesday in respect to an application to borrow £21,000 for electric lighting purposes.

Mr. James Freret, an architect of New Orleans, who had designed many of the prominent buildings in that city, died on December 11.

Colonel A. J. Hepper, Inspector for the Local Government Board, held an inquiry on Dec. 23rd at the Shipley District Council offices, as to an application to borrow £2,500 for the purposes of waterworks.

The church of Holy Nativity, Knowle, Bristol, has just received the addition of a stained-glass window, one of the lights in the north side having been filled in on Friday last. The subject is the visit of the shepherds to the manger at Bethlehem.

The Burslem School Board have adopted the plans of Messrs Wood and Hutchins, of Burslem, for a school accommodating 500 children, at an estimated cost of £6 per head.

There is reason for hoping that arrangements will be made whereby a costly fight between Rochdale and Todmorden on the waterworks question will be avoided. Negotiations are now in progress on the proposal that Rochdale should acquire the whole of the undertaking of the Waterworks Company, and should supply Todmorden until such time (five or six years hence) as the corporation of that town is able to complete a reservoir.

Mr. Robert H. Bicknell, an Inspector under the Local Government Board, held an inquiry at Harpenden, Herts, on the 23rd inst., into the application by the Harpenden Parish Council to borrow £400 for the provision of buildings for public offices.

Mrs. Edis, the wife of Colonel Robert W. Edis, J.P., F.S.A., died, we regret to hear, on the 22nd inst. at the Old Hall, Great Ormesby, Norfolk.

Last week the last horse-tramcar was taken off the streets of Buda-Pesth. The whole of the tramway lines have been converted into electric lines for a length of seventy English miles, while the Buda-Pesth Underground Railway also has electric traction for a further distance of fifty-three miles.

Engineering Notes.

New Cross and Waterloo Electric Railway.—A Bill to incorporate the New Cross and Waterloo Railway Company has been deposited in the Private Bill Office. The proposed company seek power to construct an underground electric railway commencing at a point in Old Kent-road near the bridge carrying the London, Brighton, and South Coast Railway over that road, and terminating under Waterloo-road near the point where the South-Eastern Railway crosses that thoroughfare. The capital proposed to be created by the company is given in the Bill at £975,000. The Bill contains provisions prohibiting the construction of ventilators, or other openings, in any road or footway, and also the exhibition of advertisements upon any part of the works. During the period of construction power is sought to pay interest out of capital to an amount not exceeding £80,000, and power is sought to enter into working agreements with the London and South-Western Railway, the Waterloo and City Railway, and the Baker-street and Waterloo Railway companies.

A New Railway for Banbury.—Operations have commenced in the construction of the Banbury branch of the Great Central Railway. The new line leaves the main line of the Great Central at Culworth, about nine miles from Banbury, at a point on Lord Valentia's Eydon estate. It passes through a rich grazing district, and one well known to the followers of the Bicester Hounds. With the exception of a long deep cutting between Thorpe Mandeville and Chacombe, the works are comparatively light. The steepest gradient is 1 in 132. The line will be a double one, and will join the Great Western Railway about a mile to the north of Banbury Station. The Act obtained for the construction of the line allowed for a capital of £200,000. The engineers are Sir Douglas Fox and Mr. Francis Fox, and Messrs. Walter Scott and Co., of Newcastle-on-Tyne, are the contractors.

The proposal to construct a light railway in the South of Lincolnshire, from Spalding, through the Marshes, to Sutton Bridge, has been abandoned for the present, owing to the lack of financial support locally.

An inquiry was held on the 23rd inst. by Colonel Durnford, representing the Local Government Board, into an application by the Stockport Corporation for permission to borrow £25,000 for the purposes of electric lighting. Mr. Shoolbred, of London, the engineer for the electric lighting scheme, gave particulars of the proposals.

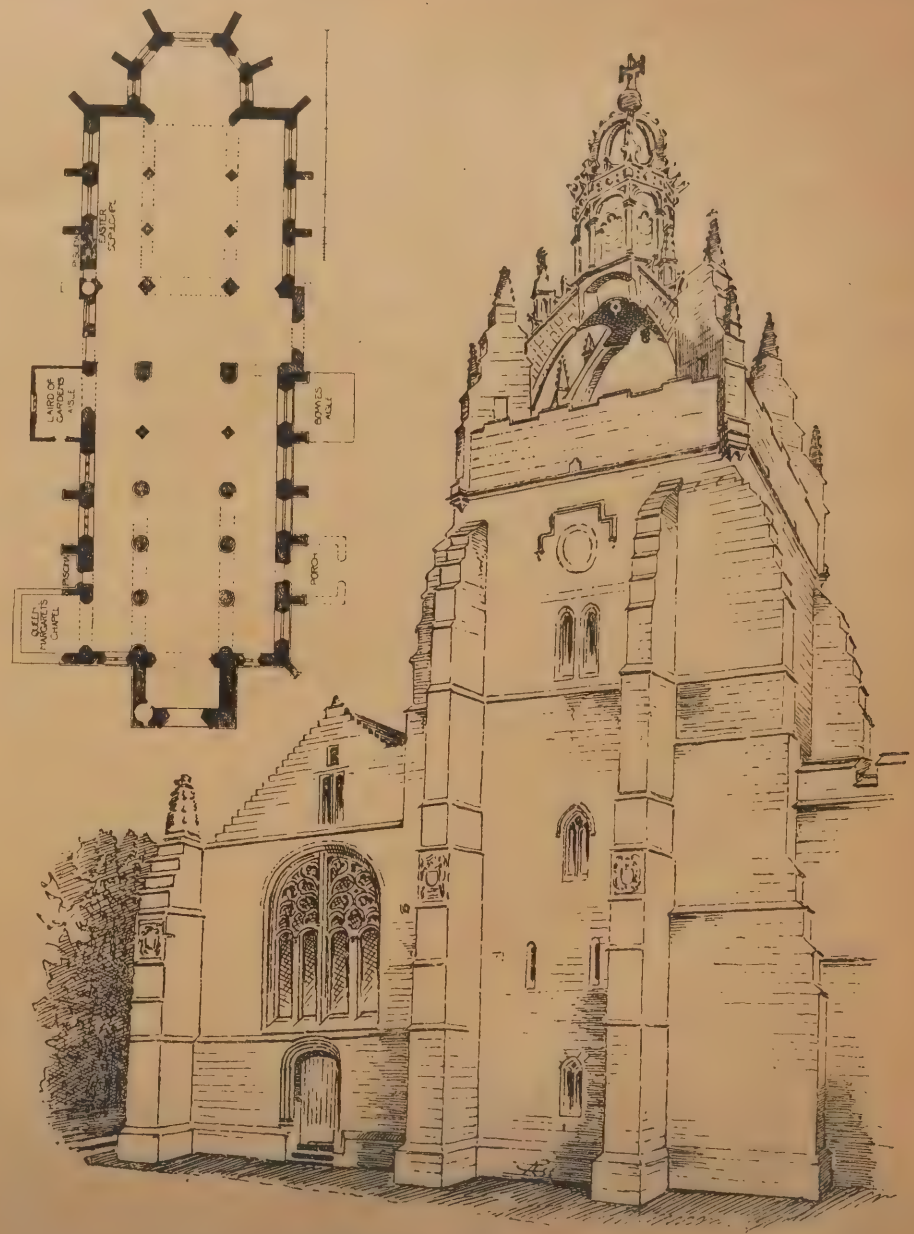
The new parochial building at St. Mary's, Bearwood, was opened on Tuesday by the Bishop of Lichfield. The building, which is of brick, stands contiguous to the church, and comprises a hall with accommodation for 300 people, and two classrooms. The cost has been £1,815. The contract has been carried out by Messrs. Harley and Son, from the plans of Mr. J. H. Hawkes.

At the meeting of Bedale Rural District Council on Tuesday, an application was received from the Bedale Parish Council, asking the council to provide Bedale with a pure and efficient water supply. It was stated that a water supply could be obtained from Spring Wood at a cost of £2,850. It was decided that steps be taken to carry out the scheme submitted by Messrs. Fairbank and Son, of York, and that it be sent to the Local Government Board for approval.

Throughout 1897 great prosperity has attended the granite industry of Aberdeen. In spite of an enormous fall in the American export trade, the year has been one of, on the whole, uninterrupted briskness in both departments of the trade—building and monumental. In the building department especially the year has been one of remarkable prosperity. It follows of course, that all the allied industries have been prosperous as well—the joiner trade, plasterers, slaters, and painters.

Who will succeed Mr. Pearson as architect of Truro Cathedral and how he will be appointed are questions which, says the *Royal Cornwall Gazette*, now have to be considered. The designs and plans of Truro Cathedral, so far as they have been completed for the new work, will be in the hands of Mr. Pearson's executor, and provision may have been made for the disposition of them in the will of the architect. If they are to remain the property of his heirs or assigns, it is supposed that some joint arrangement will have to be made between the executors and the Cathedral Committee as to what architect shall be appointed to see them carried out.

STIRLING PARISH CHURCH
INTERIOR OF CHOIR

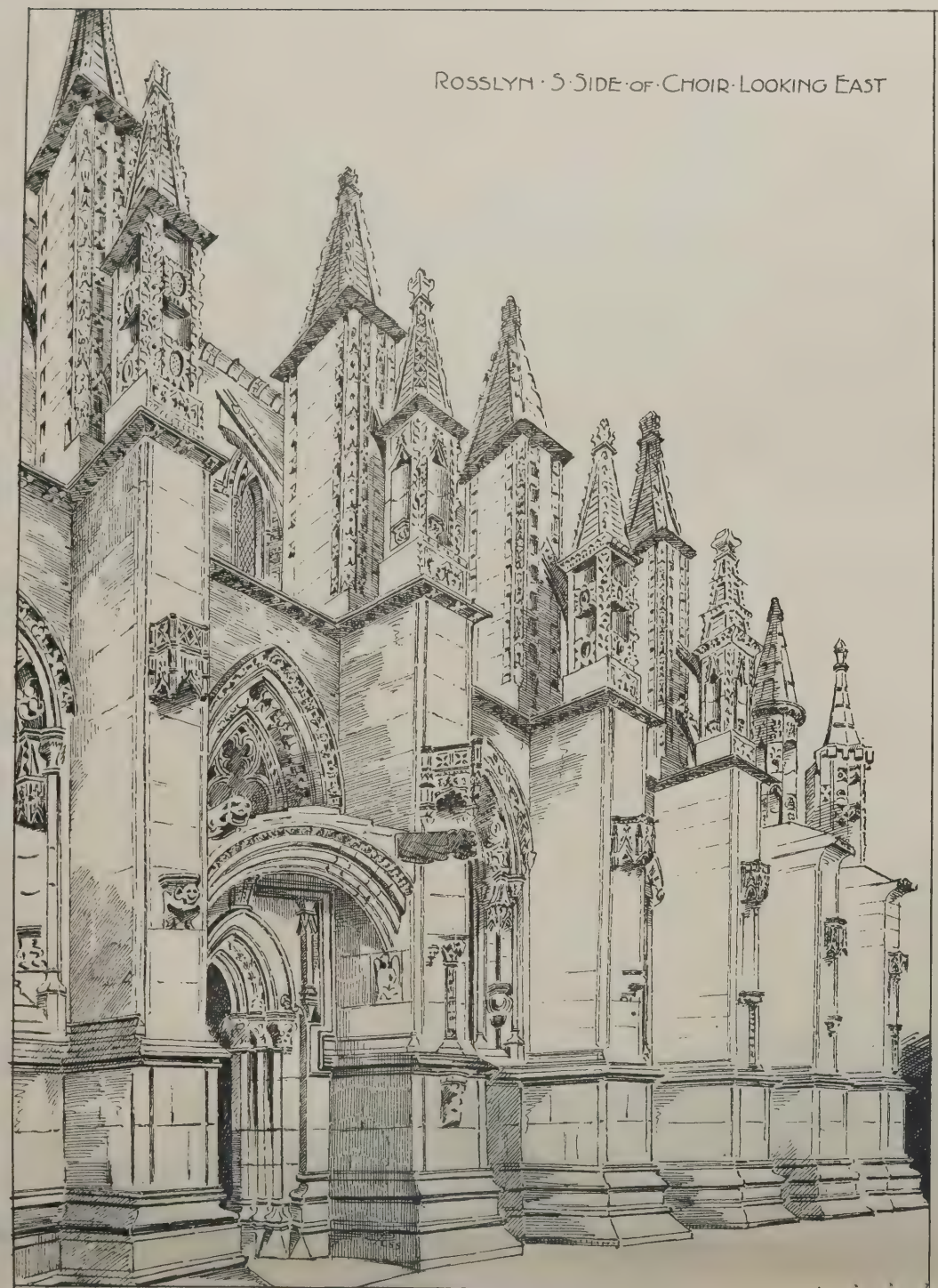


KINGS COLLEGE CHAPEL ABERDEEN
WEST END & TOWER

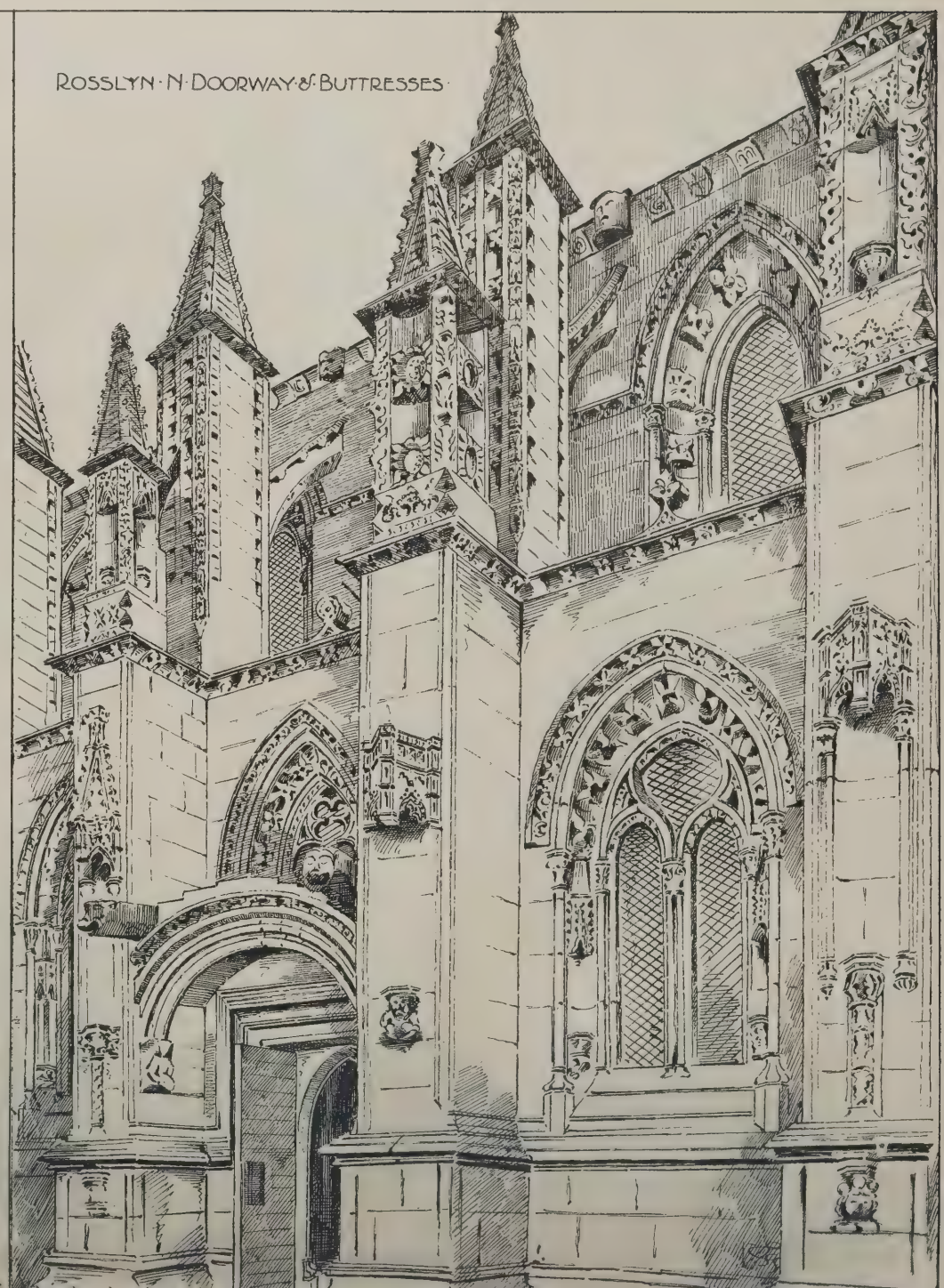
THE ECCLESIASTICAL ARCHITECTURE OF SCOTLAND.—(See p. 932.)

INK PHOTO SPRAGUE & Co LONDON

CATHEDRAL SERIES, No. 95.—SALISBURY: BRACKET, CAPITALS, &c.



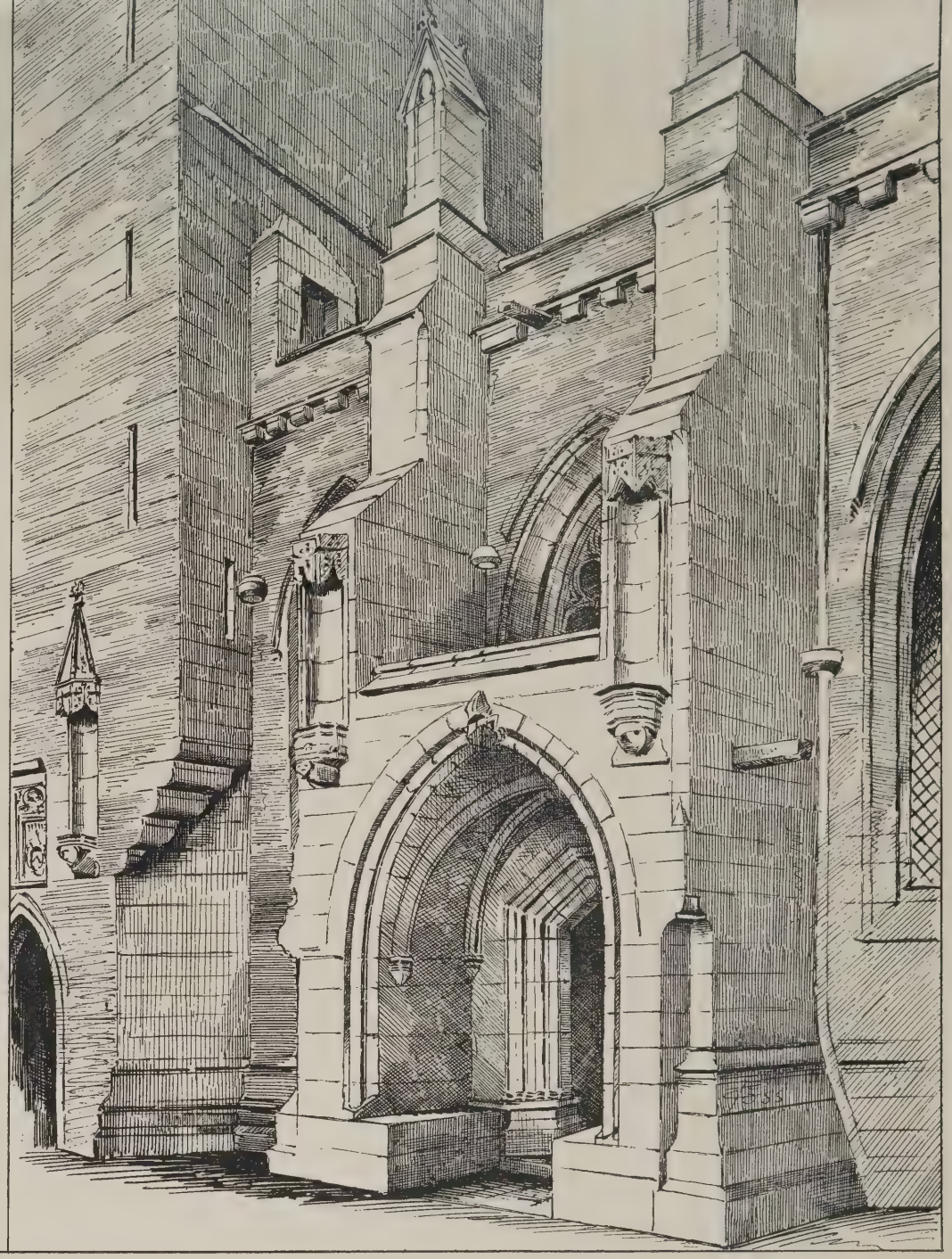
ROSSLYN · S · SIDE · OF · CHOIR · LOOKING EAST



ROSSLYN · N · DOORWAY & BUTTRESSES

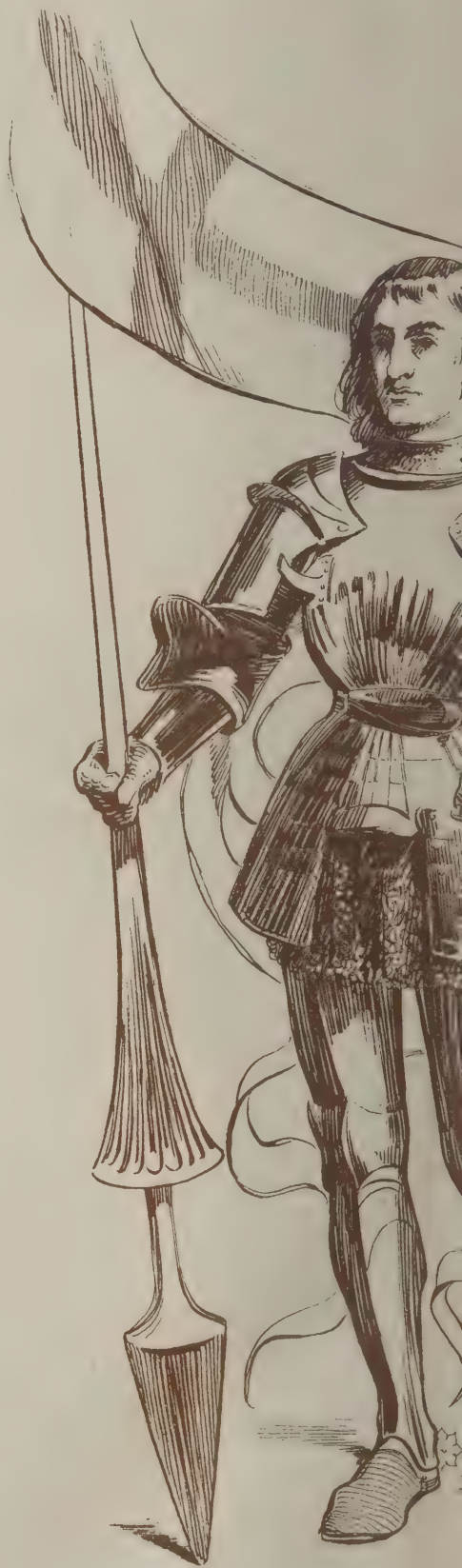
MONUMENT · IN · KINNOUL CHURCH ·

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.



ST SALVATOR'S CHURCH · S·W·PORCH

THE THREE PATRON SAINTS OF GREAT BRITAIN

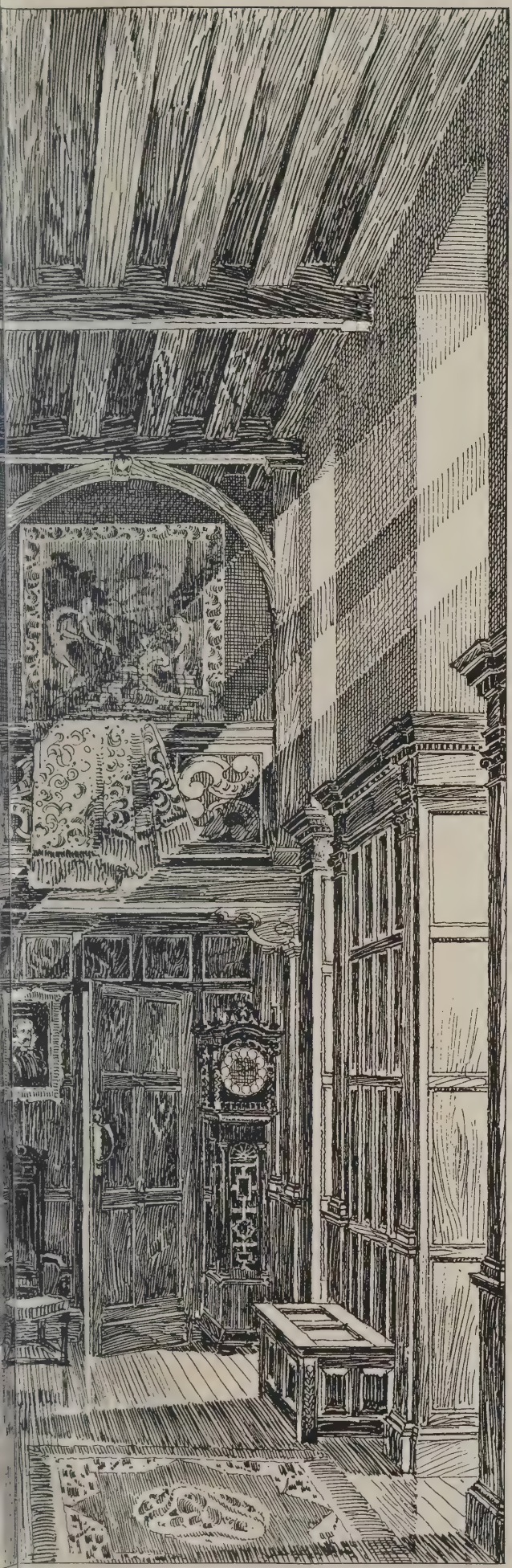


RELAND · CHURCH HALL PUTNEY · PAINTED BY FRED · ROE

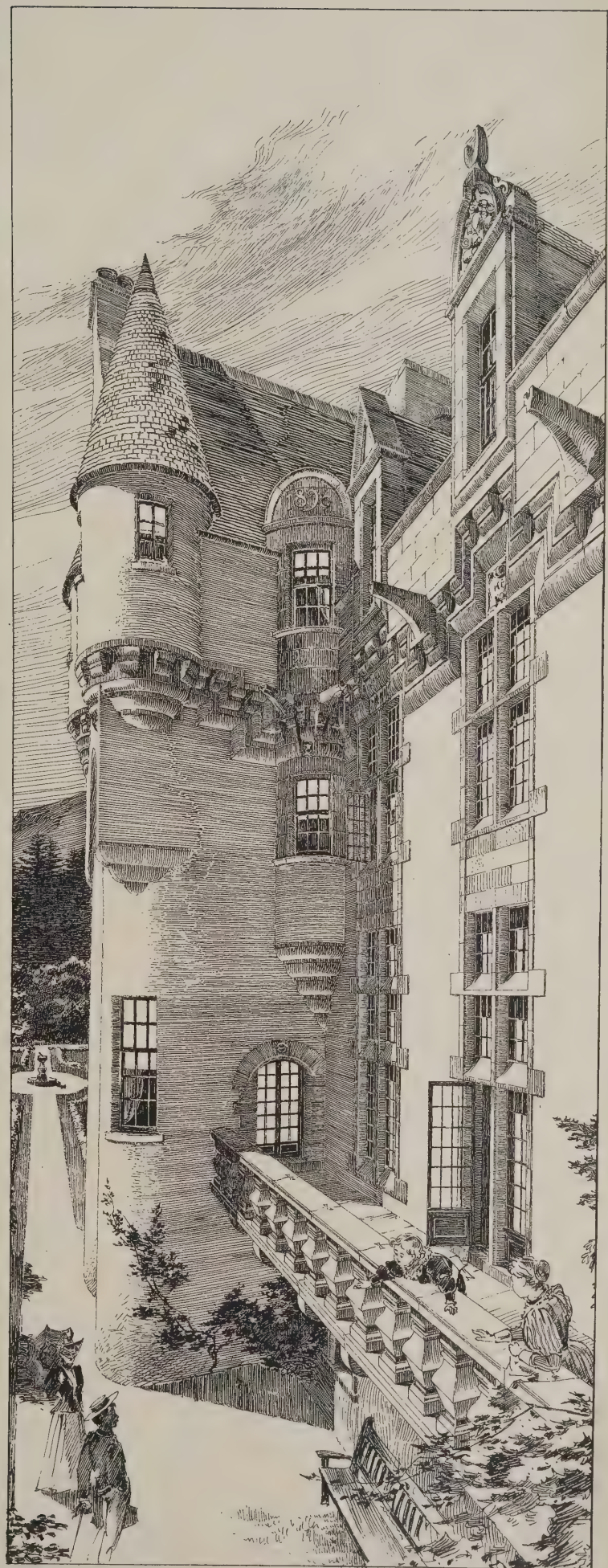
Photo-Lithographed & Printed by James Akerman 6, Queen Square W.C.

THE HALL

KINCARDINE HOUSE · DEESIDE N.B



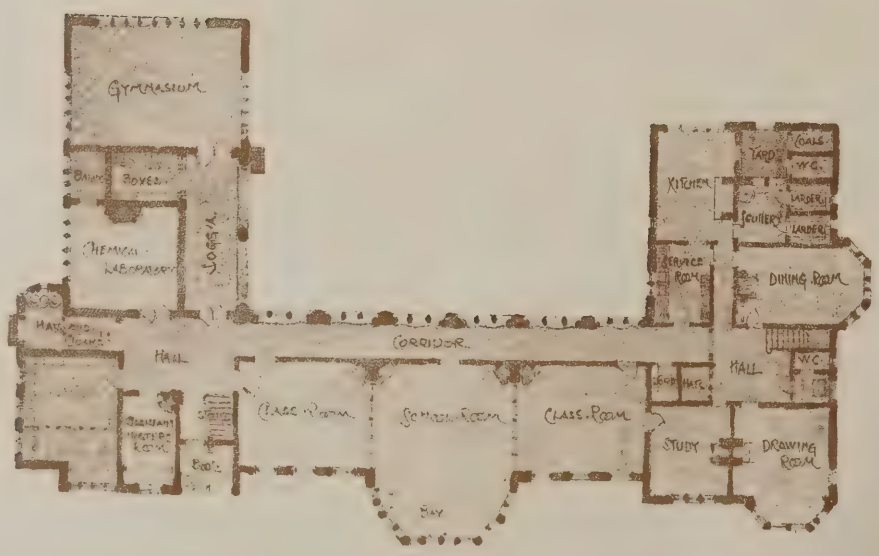
Messrs Niven & Wigglesworth · Archts

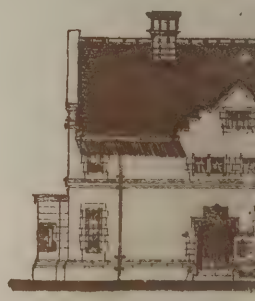


View from Tower

Photo-Lithographed & Printed by James Akerman, 6, Queen Square W C

KING JAMES GRAMMAR SCHOOL · KNARESBOROUGH MESSRS HALL COOPER & DAVIS





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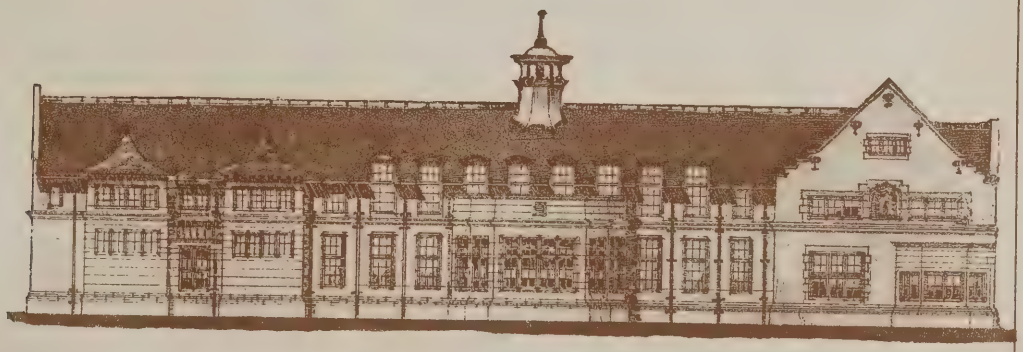

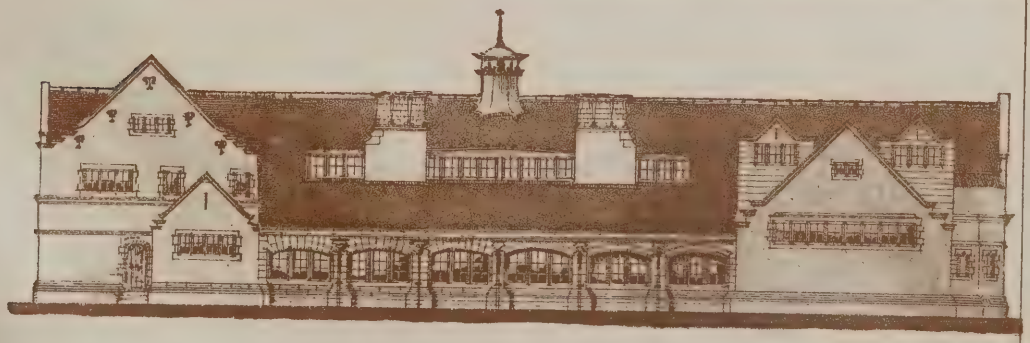

"PHOTO-TINT", by James Akerman, 6, Queen Square, London, W.C.

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CATHEDRAL SERIES, No. 95a.—SALISBURY: CAPITALS, &c., FROM THE CHAPTER-HOUSE.

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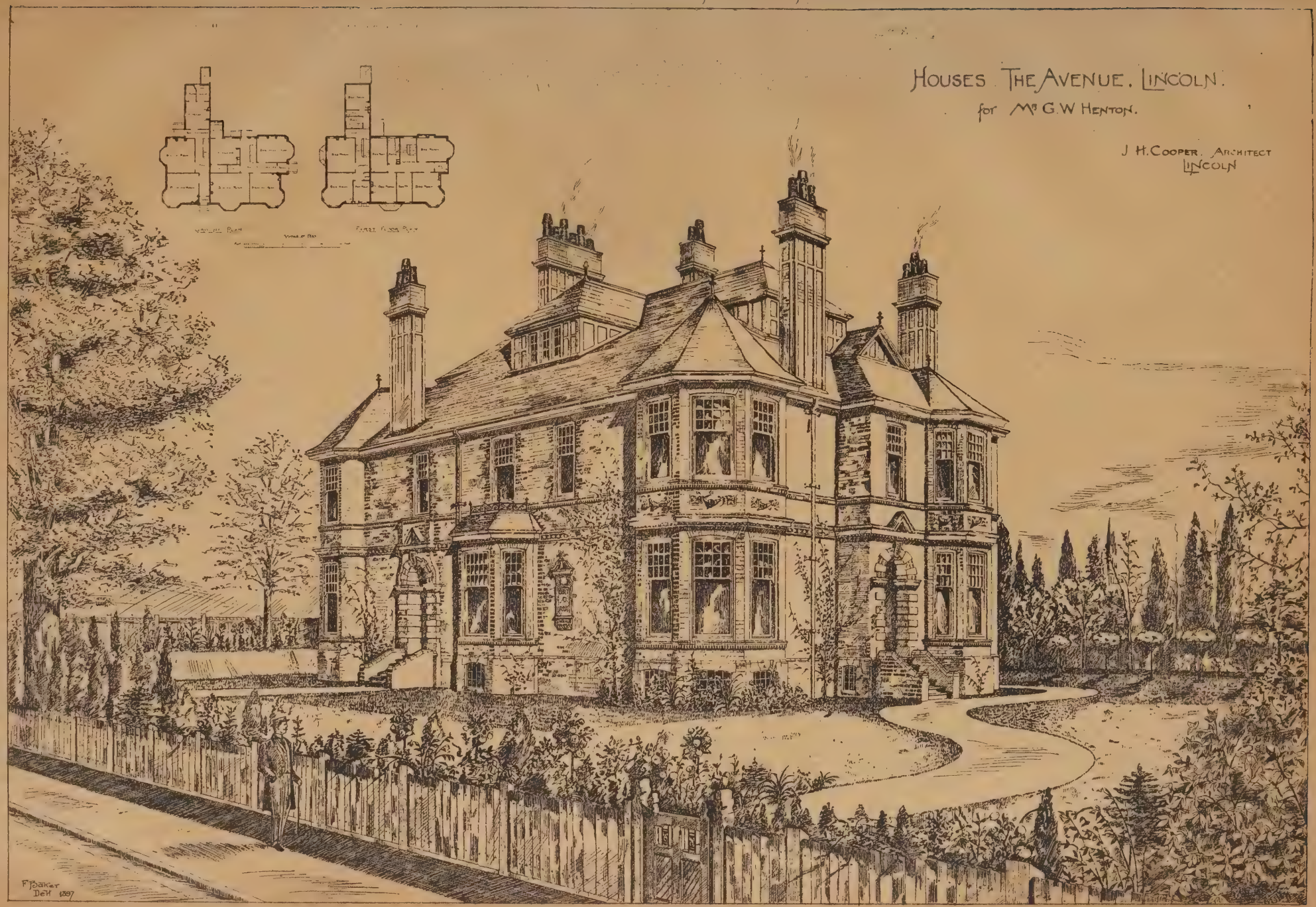
OF THE
UNIVERSITY OF ILLINOIS


HOUSES THE AVENUE. LINCOLN.
for Mr G.W HENTON.
J H. COOPER. ARCHITECT
LINCOLN
F Baker
Del 1897

Building Intelligence.

Bourne.—A number of alterations and extensions have just been carried out at Bourne College, near Birmingham. A new wing will afford increased accommodation. The cost of the extension, including the provision of a sanatorium, is £4,200. The college now is capable of accommodating over one hundred students. The main schoolroom, which is situated at the west end of the building, is surrounded with a dado of white glazed bricks. The classrooms and bathrooms are arranged on a similar plan. At the end of the north corridor is the science lecture-hall, adjoining which is a laboratory, fitted with benches, fume-chambers, and apparatus suitable for the illustration of practical chemistry and other scientific subjects. On either side of the corridors are rooms for musical recreation, and other purposes. These rooms are all on the ground floor. On the first floor are the dormitories, storerooms for clothing, linen, &c., together with apartments for students on special terms. There is also detached from the main buildings, and situate on the eastern side of the yard, a workshop fitted with benches and tools for practical instruction in carpentry, cabinet-work, machine and building construction, and other kinds of skilled labour. The total length of the frontage of the college is now 270ft.

Clothworkers' Guild, London.—Acting under the instructions of the Clothworkers' Company, Mr. T. W. Cubbon, architect, of Birkenhead, is engaged upon an extensive scheme of educational buildings, &c., to be carried out in Peel, Isle of Man, in connection with Christian's Endowed Schools. The scheme will include new elementary school buildings, also schools for secondary education, including science and art departments, navigation, cookery, manual, and other technical classes. Three of the existing schools are also to be altered and extended, and probably a keeper's house erected for the whole of the schools.

Glasgow.—The formal opening of the new Refuse Despatch Works erected by Glasgow Corporation at Haghill, Parkhead, took place last week. The site extends to 15,192 square yards. Of that, 11,012 yards are occupied by the works, leaving 4,180 yards which can be utilised for feuing purposes. The cost of ground, buildings, machinery, and railways, and including the formation of a new street, amounts to about £2,000. Entering from the street by the north gateway, carts pass over an elevated roadway to the tipping floor, where are tanks, shoots, and pails for the separation of the refuse. The process of separating and mixing is carried out on this level. Domestic refuse and dry sweepings are screened in riddles, the finer matter passing into mixing machines with revolving blades, and falling direct into railway waggons underneath. The rougher material which cannot pass through the screen is forced by the motion of the riddle on to an endless carrier, which conveys it in the direction of the furnaces. While passing over the carrier all articles of value, such as iron, tin, and bones, are picked off and utilised to the best advantage. In the slop tanks is the residium of soft sweepings from paved streets, which, when firm, is conveyed to railway waggons, and goes to enhance the quality of the prepared manure. This manure is largely used by agriculturists over a wide area of Scotland. There are five furnaces for the cremating process, each with a fire-grate area of 56sq.ft. Steam is generated by the heat from the furnaces not only for driving the machinery for treating the refuse, but also for the lighting of the whole station by electricity. It is eighteen years since the corporation decided to have refuse works, and there are now four such works in the city. Their total cost has been £126,000. Additional works are contemplated in the north-western and south-eastern districts.

Islington-green. — Collins's Music-Hall at Islington-green, built 36 years ago, has been taken down, and in its place there has arisen a theatre, which was opened on Boxing Night. The building is on an enlarged scale, some adjoining property having been acquired for the purpose of extension, and the architect is Mr. E. A. Woodrow, A.R.I.B.A., formerly in the theatres branch of the London County Council. The Louis Quatorze style of decoration has been adopted for the auditorium, the prominent tints being old gold, blue, and terracotta, and the draperies are blue, and plush-covered seats in old gold. The ground floor is divided into fauteuils, stalls, and pit-stalls, with tilt-up seats, and a pile carpet covers the floor, which is formed of wood blocks. The stage has been nearly doubled in size, and is fitted with tableaux and fireproof curtains. Hot-water radiators have been provided for making the auditorium and entrance-passages comfortable. There is seating accommodation for nearly 1,800, the gallery providing about one-third of this.

Knighton.—The restoration of the parish church has been completed, and the edifice was rededicated last week. In 1876 the nave was restored and reopened; subsequently a new vestry was added, but the building of a new chancel and organ-chamber was deferred till 1896, when the late Mr. J. L. Pearson, R.A., was appointed as architect, and his work has now been finished. The new building is Early English in style, being erected of native stone and Bath stone dressings, supported by buttresses. The windows are lancet, and the roof covered with Broseley tiles, the whole being in keeping with the other portion of the church. The dimensions of the interior are: chancel 37ft. by 25ft., and the organ-chamber 14ft. by 12ft. The walls are stuccoed, and the dressings are of Bath stone, while the floor is laid with warm-coloured encaustic tiles. The builders were Messrs. Cadwallader and Weale.

Manchester.—There has been a large amount of building in and around Manchester, says the local *Guardian*, during the year now closing. Warehouses and shops, to take the place of former structures of the kind which have been pulled down, have been erected in considerable numbers, and the tendency to employ iron wherever possible, and to a certain extent glass, has made further progress. The building of cottage property on a large scale has continued, but it has been less profitable to those engaged in it than could have been desired. There is a growing tendency towards specialism, observable in the letting and accepting of contracts, it being often customary to give one firm the brickwork only, another the carpentering, and a third the decorative work. Wages in the various industries concerned have undergone no noteworthy alteration; but among those employed in decoration, plasterers have often been in request and difficult to obtain. Cottages built to let at from 7s. to 8s. per week have been in the greatest request, and large numbers of them have been put up. The demand for bricks of the Ruabon type, which has for several years been active on account of the superiority of this material in withstanding the taint of a smoky atmosphere, has shown no sign of abatement; but the production of bricks of this class in other localities—notably in Accrington—has prevented any scarcity in the supply such as has been experienced in former periods.

Sheffield.—The Midland Railway Company have at last taken up in earnest a scheme for improving their station accommodation at Sheffield. The station is now inconveniently small to accommodate the present traffic. The company have decided to erect a new passenger station, which will absorb the present one, and to double the main line in the immediate neighbourhood. Plans have been prepared, and Parliament in the next session will be asked to sanction the carrying out of the scheme. It is hoped that that will be obtained by the middle of next year, and then the work will be entered upon at once. The new station is to have at least double the accommodation of the present structure. It is proposed to very considerably widen the main line for some distance on the south side, and for a less distance on the north side. This will involve a good deal of interference with streets converging on the station. The main entrance will be some 70ft. or 80ft. nearer the bottom of Howard-street, and the style will harmonise with the existing buildings. Inside the accommodation will consist of two long and wide island platforms for the convenience of through trains. There will be a home platform and dock platforms for the local traffic, north and south. Each of the island platforms is to have waiting-rooms, refreshment-rooms, and other conveniences. The company own the larger part of the land they require for the carrying out of their scheme; but with that advantage the cost, it is expected, will approach £200,000, and will occupy two years in carrying through.

Stoke Newington.—The Alexandra Theatre and Opera House was opened on Boxing Night. It is situate in Stoke Newington-road, within a few minutes' walk of the Dalston Station of the North London Railway. It is capable of holding no fewer than 3,000 persons—1,000 in the pit and 900 in the gallery. The stage is 50ft. deep and 60ft. wide, the proscenium being 30ft. by 32ft. Particular attention has been given to the pit, which is furnished with backed upholstered seats, and the walls of which have a dado of encaustic tiles. The chief frontage is of red brick with stone ornamentation, in the Italian style. The decorations are Elizabethan in character, the whole being finished in cream and gold, with a light copper-bronze ground. Mr. Frank Matcham is the architect.

Widnes.—The Mayor opened the new retort house at the Widnes Gasworks. The new retort house is a brick building, the outer walls being relieved with red sandstone facings. The inside dimensions are—length 90½ft., width 62ft., height from the ground-floor level to eaves 28ft., and to apex of roof 44ft. The carbonising plant consists of seven D-shaped retorts, 16ft. by 20ft., and 20ft. through, making 112 mouthpieces, having a total gas-producing capacity of 60,000c.ft. per diem. The retorts are fitted with self-sealing lids, and are heated by improved regenerator furnaces, there being one furnace only to each through bed, as against two in the old system. It is intended during the coming year to erect mechanical coke-elevating plant to facilitate the storing and rapid loading of coke in large quantities. The whole of the work, when finally complete, will cost about £4,500, exclusive of the proposed elevating machinery. The total gas-producing capacity of the town is now about 1,600,000c.ft. per diem. The whole of the work has been carried out under the supervision of Mr. I. Carr, manager of the gasworks.

CHIPS.

The scheme which the directors of the London and North-Western Railway Company contemplate carrying out in regard to the enlarging of Lime-street Station, Liverpool, promises to be of an extensive character.

Cardiff is proposing, in connection with its new tramways scheme, to repave from kerb to kerb the streets to be traversed by the tramways, as well as some other thoroughfares, with Australian hardwood blocks at a cost of £261,000. This decision has been arrived at after a consideration of the results of experimental wood-paving already carried out in the town. The corporation will import the hardwood direct from the West Australian plantations, erect machinery for cutting up the timber into blocks, so saving the expense of middlemen.

One of the most destructive fires which has occurred in West Hartlepool for many years broke out on Thursday night in last week on the premises of the Cliff House Sawmills Company, Limited, at the south end of the town. Two large brick and iron buildings containing a great quantity of wood and joiner work, as well as the whole of the machinery and stock, were destroyed. The damage is estimated to exceed £10,000.

The position of engineer to the Liverpool Corporation, vacated by the retirement of Mr. Boulnois, is, says the *Liverpool Mercury*, one of the prizes in an important profession, and a large number of applications may be expected from all parts of the country. January 18 has been fixed as the final date for sending in applications. A commencing salary of £1,000 per annum is offered, and preference will be given to candidates between 30 and 45 years of age.

The arbitration to fix the price to be paid by the Bakewell Urban District Council for the purchase of the local gasworks will be held in London during the first fortnight in the New Year. Mr. Cripps, Q.C., M.P., will be the umpire. The arbitrators will be Mr. Newbiggin for the council and Mr. Stevenson for the company. The engineer for the council will be Mr. Corbett Woodhall, and the engineer for the company, Mr. Chester.

The Local Government Board have approved of the erection, by the Croydon Board of Guardians, of new casual wards at Thornton Heath, on the cell system, from the plans of their surveyor, Mr. F. West, of Croydon.

The urban district council for Tipton accepted, on Tuesday, the conveyance of a public park 25 acres in extent, which has been purchased by subscriptions as a memento of the Diamond Jubilee.

An inquiry was held by Colonel William Randall Slacke, R.E., Local Government Board inspector, at the Guildhall, Gloucester, on the 21st inst., as to applications made by the city council for sanction to borrow £6,750 for street improvement, £6,500 for technical instruction, £2,480 for sewerage, and £1,383 for an extension of the water supply.

LEIGH SAVINGS BANK COMPETITION.

THE design by Mr. Percy Montagu Beesley, architect, illustrated to-day, is the one awarded the second premium by the managers and trustees of the Leigh Savings Bank. Eight architects submitted plans, and the sub-committee appointed to report on the several schemes placed this design first; but the managers and trustees did not adopt the sub-committee's report.

The Independent Methodists of Zion Chapel, Sussex-road, Southport, having rebuilt their chapel on a greatly improved plan, the new edifice was opened on Christmas Day. The schoolroom is partially sunk, and the chapel, which holds 300 persons, is placed above.

Bury St. Edmund's Town Council have resolved to apply to the Local Government Board for power to borrow £29,000 to carry out electric lighting.

A temperance hotel five stories in height and having frontages of 300ft. to Whitehall-crescent, South Minor-street, and Dock-street, is about to be built at Dundee, from plans by Mr. Robert Hunter, of that city. The chief front, that to Whitehall Crescent, will be occupied by shops.

The National Sunday League presented a memorial to the trustees of the National and Tate Galleries last October asking that, instead of being closed on Sundays from the middle of September, the galleries might in future be open to the public for a longer period of the year. The secretary of the League has now received a reply from the Keeper, stating that the director and trustees, having considered the proposal, are of opinion that it would not be worth while to keep either of the galleries open on Sunday afternoons during the winter months for the brief time in which the pictures could then be seen by daylight; but they think that the Sunday opening might with advantage be extended to the end of October annually. A recommendation to this effect has accordingly been made to, and approved by, the Treasury. A similar letter has been sent to Mr. Mark H. Judge in reply to a memorial from the Sunday Society.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

EDINBURGH ARCHITECTURAL SOCIETY.—The second annual dinner of the Edinburgh Architectural Society took place on Wednesday week in the Imperial Hotel, Market-street. Councillor Cameron, the hon. president, was in the chair, and the croupiers were Mr. W. N. Cumming, the vice-president, and Mr. J. F. Matthew, the hon. treasurer. After the loyal toasts, Bailie Mackenzie proposed "The Edinburgh Architectural Society." Speaking, he said, from a plain man's standpoint, he admitted that there were very fine buildings to be seen, with great detail on them; but he did not know that the public were sufficiently educated to appreciate such buildings. In the education of the professional architect he thought sometimes that there was a defect, in that the student did not study the kindred branches of the profession in regard to physics, chemistry, and electricity. Architects, he thought, lost sight of these in pursuit of what was purely architectural detail. For example, he believed that a little knowledge of electricity and of electric lighting would be of great service to young architects. Mr. Jas. A. Williamson, the president, responded for the society. The society, he said, had now been founded for two years. It consisted of junior members of the profession, and it had cut itself adrift, to some extent, from the older Association. Whether that policy was right or wrong it was not for him to say; but they felt that their own individuality was the very life of the society. There was a disposition on the part of the older association to take that, the younger society, under its wing, but, apart from questions of policy, they would not overlook the fact that so long as they had the funds to carry on the society, and had life and vigour, they were perhaps better to remain independent. Mr. Williamson afterwards proposed "The Corporation," and said that they, as architects, had reason to congratulate themselves that the members of the town council were very jealous of the amenities of the city. Bailie Pollard, in acknowledging the toast, said that the corporation were engaged in a great many matters that were purely architectural. For example, there was the rebuilding of the North Bridge-street, and he hoped, in that connection, that the town council would not be so far left to itself as to become the builder of the street. Then, again, the corporation had in hand the matter of the Usher Hall. He did not feel, as a member of the corporation, that they had very much credit in alluding to that question. He was sorry that the corporation had not been able with greater promptness to show their appreciation of the most handsome gift of Mr. Usher by finding a site for the hall before the present time. He hoped, however, that before very long a suitable site would be found, and that Mr. Usher would have the satisfaction of seeing the hall in use during his lifetime. Other toasts followed.

The salary of Mr. Stilgoe, the borough surveyor of Dover, has been raised by £100 per annum, the increase to commence from October last.

The Corporation Church of St. George, Liverpool, will be closed at the end of the present year, and service was held at the church on Sunday evening for the last time. It was built by the mayor and corporation on the site of the old Castle, under a special Act of Parliament, between 1726 and 1734.

The new viaduct which has been in course of erection for the North-Eastern Railway Company at Relly was opened recently. The old structure was a combination of wooden supports, situate round the termination of a bend in the line of rails and at the foot of a sharp gradient. The new viaduct is built mainly of brick, and spans the river Browney in four arches. It has a double line of rails, and the gradients and levels have been improved. The contractor was Mr. Shanks, of Glasgow, and it has been constructed under the direction of Mr. C. E. Harrison, the engineer to the company.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and Sixpence for every eight words after. *All Situation Advertisements must be prepaid.*

NOTICE.

Bound copies of Vol. LXXII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

RECEIVED.—P. L. F.—G. T. L.—R. and P.—D. S. T.—A. and Co.—W. W.—G. D. N.—E. A. W.

Correspondence.

"A PARALLEL TO WALTHAMSTOW."

To the Editor of the BUILDING NEWS.

SIR,—Messrs. Spalding and Cross deny that they took part in the competition for the East Finchley Schools. I never suggested for a moment that they did. Then they contradict a statement which was made to us on two occasions, far apart, and for which I expressly disclaimed all responsibility. It proceeded from their own supporters, and its place of origin can be published should circumstances require it. In any case, its greater or less correctness does not affect the central facts of the case. Messrs. Spalding and Cross are now stepping into Mr. Dunford's place, after he has fairly gained the Walthamstow Baths competition. Messrs. Spalding and Cross stepped, in like manner, into our place, after my partner and I fairly gained the East Finchley Schools and Hall competition. They carried out our competition plan and arrangement; they got credit for them at East Finchley, and in the local newspaper, and the *Builder*; and now, with an assurance which reaches the sublime, they wind up by asking for an apology!

The East Finchley committee gave us the choice of remaining their architects if we abandoned our charges for the working-drawings they had ordered and approved—or of being dismissed if we claimed them. Doing the latter, our appointment was forthwith cancelled; but every atom of information beyond this was refused us. Silence and secrecy were the order of the day, and we heard nothing more till we learned that Messrs. Spalding and Cross were carrying out our competition plans. They say that before they *undertook* the work, they were told it was definitely decided "not to intrust it to me," though it had long before been definitely intrusted to me, and though everything had been prepared for tendering. They say they ascertained, before "undertaking" the work, that our professional charges had been settled. If they had asked us, we could have told them a different story—unless their idea of a fair settlement is first to dismiss an architect because he will not work for nothing, and then to cut down to a fraction of the recognised amount what they cannot avoid paying him for. By the way, did Messrs. Spalding and Cross ascertain, before stepping into Mr. Dunford's place at Walthamstow, that *he* had been fairly compensated for the loss he was to sustain by their action?

I conclude this letter, like the previous one, by a challenge to Messrs. Spalding and Cross in the plainest terms in which I can put it. I say that they carried out at East Finchley, and in every essential point, our plans and arrangements (not our elevations). Our plan was made to fit a peculiar site, nearly triangular, and was not a mere stock arrangement which might suit half-a-dozen places. I say that Messrs. Spalding and Cross published their own names, or allowed them to be published, as those of the architects of this plan, and got all the credit for it which, according to the newspaper reports, it received. If they deny this, let them publish in the BUILDING NEWS the plans (ground floor and first floor) of the East Finchley building, as erected, and we will publish along with them the plans approved and issued by the committee and bearing our names. To evade this plain challenge on the plea that "the plans are, unfortunately, not now in their possession," will hardly suffice Messrs. Spalding and Cross in a journal which circulates amongst architects. In any case, East Finchley is within six miles of London, and if Messrs. Spalding and Cross still find insuperable difficulties in publishing the plan of the schools as they built them, perhaps you, Sir, as this is a matter of public interest, might be able to get the plans measured and drawn by a competent draughtsman. Whenever the plan of the school as built is set side by side with its plan as we designed it, your readers will see whether it is Messrs. Spalding and Cross, or I, who "do not hesitate to publish untrue statements in the attempt to injure other architects."—I am, &c.,

JAMES CUBITT.

2, Broad-street Buildings, E.C.

[Perhaps that will be the best thing for us to do, if Messrs. Spalding and Cross cannot let us have their plan. The publication of the two plans side by side will be more to the purpose than any amount of mere talk.—ED.]

SIR,—I should be glad to be allowed to express my sincere sympathy with Mr. Dunford at the very bad treatment he has been subjected to at the hands of Messrs. Spalding and Cross. I have good reasons for knowing enough of this matter to believe all the statements of the former, and I hope some more prominent member of the Institute than myself will see that the matter is properly brought before its council.

If the R.I.B.A. is to fulfil one of its chief functions, here is a good opportunity.—I am, &c.,

London, W.C. F.R.I.B.A.

CARDIFF MUNICIPAL BUILDINGS COMPETITION.

SIR,—I shall feel obliged if you will find space for the following notes on the "Selected Designs."

INSTRUCTIONS.	SELECTED DESIGN.
Page 4.—Designs will be excluded from the competition, if in violation of the instructions.	
Page 4. — Ante - assembly room and reception hall.	These two rooms are omitted: a landing takes their place, as at Manchester.
Page 4.—It is suggested that the assembly-room, ante-room, and reception hall should be *en suite*.	A corridor intervenes.
Page 1.—Each set of buildings should as far as possible be designed so as to admit of extensions.	The bits tacked on the plans entirely block out the light of the rooms they adjoin.
Page 2.—This may necessitate an alteration in the course of the new road—at any rate, along the *south or principal front*.	The principal front of the courts faces *east*.
Page 6. — Two workshops, well ventilated, and good light (ground floor).	I can find none on the plans.
Page 7.—Bar robing room with direct communication therefrom to the criminal and civil courts. In "Questions and Answers" a corridor may intervene.	This room is 140ft. from the criminal court.
Page 7.—Grand jury room to be in direct communication with the criminal court.	There is no direct communication, and the grand jury gallery is on the furthest side.
Page 7.—Ante-room common to magistrates and stipendiary, 20ft. by 16ft.	There is only a vestibule, 16ft. diam., open to a corridor.
Page 7.—The town clerk's room	is 215ft. from the mayor's parlour.
Page 7.—The ladies' and gentlemen's cloak-rooms	are about 7ft. in height at the ends.
Page 7.—The bar library	is 200ft. from the criminal court.
Page 7.—There is no lavatory for the barristers, grand jury, or nautical assessor.	
Page 7.—The jurors' lavatory	is placed in the middle of the judges' corridor.
Page 7.—The prisoners are brought into the police-courts through the public.	
Page 7.—No large heating or ventilating shafts are shown on either plans.	
Page 7.—The refreshment-room for courts has no servery.	

—I am, &c., HUGH A. MATEAR.

The Temple, Dale-street, Liverpool, Dec. 28.

TIMBER.

SIR,—My attention has been called to D. Forbes Smith's questions under this heading, which appeared in your columns on Dec. 10. There is no difference in the wood variantly called red and yellow deal; but in the trade there is a vast difference if you allude to it as red and yellow pine.

Red or yellow deal is a very ancient term, deal itself implying a converted piece of wood or portion of a tree, as a "deal of cards" is a portion of a pack of cards. The old-time designation of the tree producing it was fir, as we still have it in our Scotch fir. One reason of the dual term red and yellow is that the merchants and consumers receiving this wood from the Baltic districts, in London and the South called it yellow to distinguish it from the whitewood, which latter must evidently have been drawn at an early period from Prussia, for it was called "pruce-wood," and is now our Baltic spruce or white-wood. The merchants or woodmongers of Hull and the North, little knowing what was doing in such distant places as London and the South, called this imported fir-wood red deal, to distinguish it from the white deal, and the reason why yellow deal almost exclusively obtains in the textbooks is that they happen to be published in London and to be the work of London editors.

Botanically, the tree producing this wood is a pine, generally designated *Pinus sylvestris*, but in the trade you cannot, without creating confusion, allude to it by that name. Fir is the popular name; but, except in Sweden and Denmark, it is not the generic name, the rest of Europe classing it as a *species* of the genus *Pinus*.

A carpenter or joiner working on yellow or red deal is not supposed to know that such wood is the produce of a tree classed by botanists as a *pine*, and it is the importing of this term by the learned of to-day, who wish to be precise, that creates the confusion D. Forbes Smith alludes to.

It is quite true that the joiner will describe his converted wood *deal*, and that the carpenter will describe his balk timber, or possibly his sawn wood, *fir*. Balk timber has ever come to hand under its foreign designation of *fir*, or, as it is recorded in the Scandinavian language, *furu*. Log timber could not, by the old *wrights* or workers in wood, be called *deal*, because it was not in what they understood as deal sizes, therefore the foreign term, common on our foreign invoices and bills of lading to-day, took root with us; but their *grau*, for our white wood, never did.

D. Forbes Smith's suggestion of wiping out these old terms or landmarks is Utopian. If he

were to agitate his reform of "Northern pine" for the remainder of his days, I do not think he could advance it one inch. The confusion he complains of is part of our language, an inheritance of the past, and it cannot be set aside.

I am asked by a private correspondent my opinion on the following points:—

1. Was not the *Pinus sylvestris* originally classed as a *fir* (or, at any rate, the first imports of it from the Baltic ports), but now by botanists referred to the genus *Pinus*? 2. Is not the *red* of timber exporters and importers and timber merchants derived from the colour of the bark (same as black spruce of America from its black bark)?

In reply to No. 1, I may say the *Pinus sylvestris* has never to my knowledge been botanically classed as the *fir* in this country. Commercially, but not botanically, it certainly was so rated, as, indeed, in the balk state it is to-day. This means that it has never been referred to, but has always stood as a species of the genus *Pinus*.

In reply to No. 2, I am of opinion that the imported wood, whether in the deal or balk state, obtained its name (in the North) from its colour, and that some such title was necessary to distinguish it from the white-wood emanating from the same source. With few exceptions, the men handling imported woods are strangers to botanists and all their ways. We have to bear in mind that red and white woods, imported in the North of this country, came to hand for centuries before those sending them ever knew or cared what species of tree produced them. The same remark applies to the men of the South, who elected to designate the two woods *yellow* and *white*. If the terms were drawn from the colour of the bark of the trees in a living or unconverted state, how are we to account for the adoption of the term *yellow* in the South?—I am, &c., William Stevenson.

City Saw-mills, Hull.

CHIPS.

A sale has recently been effected by Mr. William Houghton, of Old Broad-street, of a house at Walthamstow and about 3½ acres of freehold building land at £6,000, being at the rate of upwards of £1,700 per acre.

The promoters of the Tanad Valley Railway from Oswestry to Llangynog have received an intimation from the Lords of the Treasury that they are prepared to make a special free grant of £18,000 in aid of the line. This is the first grant which has been made under the Act.

Messrs. John T. Wimperis and William H. Arber, of 25, Sackville-street, Piccadilly, the well-known architects, inform us that the partnership hitherto subsisting between them has been dissolved as from the 1st day of June last by mutual consent, and that Mr. W. H. Arber of the late firm will continue to carry on the business at the above address under the style of J. T. Wimperis and Arber, as heretofore, he having purchased Mr. Wimperis's interest in the same.

The commissioners of the Caisse de la Dette have placed at the disposal of the Ministry of Public Works a sum of £E684,000, to be expended as follows:—£E154,000 for the execution of new drainage projects in Lower Egypt during the year 1898, and £E530,000 to be devoted to the construction of two subsidiary weirs below the existing barrage, one in the Rosetta and one in the Damietta branch of the Nile. The object of these weirs is to diminish the difference in the summer water levels of the barrage, and they will relieve the severe strain thrown upon the structure. These weirs will be begun next year and finished in 1901.

A Bill for incorporating the City and Brixton Railway Company, and for empowering them to construct an underground railway from the City and South London Railway to Brixton-hill, has been deposited at the Private Bill Office. The proposed railway, which will be nearly 3¾ miles in length, will start by a junction with the City and South London line under the High-street, Borough, and will terminate under Brixton-hill. It is proposed to widen the City and South London line near London Bridge Station, and also to construct a subway connecting with the Kennington Oval Station on that line, down to which point from St. George's Church, Borough, the new subway will be parallel with, but of greater diameter than, the existing one. The capital required by the proposed company is £1,200,000. The Bill also seeks power to enable the company to acquire by purchase or lease so much of the existing City and South London Railway as lies between their proposed point of junction in the Borough and King William-street in the City. The time sought for the completion of the works is five years.

Intercommunication.

QUESTIONS.

[11876.]—**Safe Load.**—A warehouse roof, 37ft. span (without other support); trusses, ordinary gutter-post construction, 8ft. 6in. apart; tie-beams, 12in. by 6in.; principals, 7in. by 6in.; straining beams, 9in. by 6in. If a floor be laid on tie-beams of such a roof, what may be considered a safe load?—W. B. C.

[11877.]—**Attic Rooms.**—Can anyone tell me of an effective and inexpensive method of treating attic ceilings and roof slopes to exclude cold and damp? The roof over has neither boarding nor felt.—A. L.

[11878.]—**Solid Floors.**—In reference to the advantage of solid floors, as evidenced by the recent fire, and also the prohibitive cost (in many buildings) of wood-block floors, perhaps some of your experienced correspondents could give us their opinions upon a system of solid floor much used in mill work in the North. It consists of an ordinary concrete and iron floor, from 5in. to 6in. thick, upon which is laid 3 by 3 wood-splayed joists, and the spaces between the wood joists being filled in solid with concrete pugging (each layer of concrete being allowed time to dry thoroughly), and the surface afterwards boarded in the usual way. It makes an extremely solid floor, and is fire-resisting, and I believe many of these floors have been in use for a number of years, and would be a test on the ventilation question.—Lancs.

REPLIES.

[11862.]—**Strength of Cast Iron.**—Following up the question of your correspondent and the replies thereto, and acknowledging the advantage of direct support, I, and no doubt many others, would value some further opinion upon the subject of connection. Is it necessary to bolt the columns together, or would not a machine-planed socketed joint be sufficient when iron girders are used and bolted to column brackets, thereby maintaining position of columns? Also, by what method can the size and strength of cast-iron bracket upon shaft of column, to support a given weight delivered by iron joist, be determined? As, for instance, a 14 by 6 rolled steel joist carries a distributed weight of 26 tons, and is supported on C.I. brackets upon face of columns, bringing a weight of 13 tons on single bracket, what thickness of metal is necessary to receive this? As also the thickness of supporting web to bracket?—Yorks.

[11866.]—**Proportions.**—Your supposition that the section of many of our cathedrals are based in geometrical proportions is quite true. The plans also were arranged on the *vesica*. In Cesariano's "Vitruvius," published in 1521, the plan and section are given of Milan Cathedral, showing that the geometrical basis of the plan is this figure of the *vesica*. The section from this edition shows three great equilateral triangles bounding the outline of the cathedral seen in section; the outer triangle extends from the base line of the section (six parts from centre axis) to the apex of gable. Each of these divisions coincide with the two rows of piers forming the double aisles, each being equal to a division, while the nave equals two of them in width, and is six in height to apex of vault. The plan, as given by this authority, is based on the height of a man standing in the *vesica*, produced by two intersecting circles. The length and width are thus determined by the "Cross of our Lord." In fact the proportions of this and other churches are in conformity to certain mystical figures or cosmic measures which cannot be entered into here.—A Student.

[11875.]—**Tracing Paper Preparation.**—French chalk rubbed on the surface of tracing cloth, or a little ox-gall mixed with the ink before using, makes the ink run more easily. Of the two, I prefer the chalk, although they both have their disadvantages—viz., chalk when put on to the paper dirties the coat sleeves, and it clogs the pen up when using; but then, when used, you can wash your colour over the lines. With the ox-gall, it is an objectionable-smelling preparation, and when used you cannot wash your colour over the same; but in case you make a mistake in your work, it is easier taken out than what it is with the chalk.—Albert C. Freeman.

A new reservoir for the townsfolk of Grangemouth, which has been constructed at Millhall at a cost of £5,000, and capable of containing eight million gallons of water, was formally opened on Monday by Provost Mackay. Mr. William Black, C.E., Falkirk, is the engineer.

At the London Consistory Court, on Thursday in last week, application was made by the vicar and churchwardens of the parish of Twickenham for a faculty to authorise alterations and improvements being made in the parish church, including the extending of the chancel, and the building of two chambers, in one of which it was proposed to place the organ. Chancellor Tristram granted the faculty.

St. John's Church and churchyard will in a short time be a credit to the architectural features of Cardiff. The Rev. Canon Thompson, having found the means of completing the restoration of the tower, has now turned his attention to the churchyard cross. The restoration of this will be carried out, a portion of the shaft, base, and part of the foundations only remaining, and the whole of the upper portion of the shaft and step will be new, and worked out of the best Portland stone. The head of the cross will bear six figures, the Crucifixion being represented on one side and the Ascension on the other, the whole of which are surmounted by a canopy with pinnacles and crockets. The design is by Mr. C. B. Fowler, F.R.I.B.A., the architect under whose supervision the work of restoring the tower has just been carried out.

WATER SUPPLY AND SANITARY MATTERS.

Oakwood Water Supply.—These works have just been completed, and opened without any ceremony, having been in hand for two years. Their completion will make the whole of the East and West Oakwood land, forming part of the Errington Estate, available for building purposes, and as these sites are situate on the north side of the Tyne, with unsurpassed views, and are within 10 minutes' walk of Hexham Railway Station, they will speedily be taken up. The necessity for a water-supply was early recognised by the agent to the estate, Mr. Thos. Gow, of Cambo, with whom the scheme originated. Water has been obtained by boring into a fault in the millstone grit at Carr Hill, to the north of Oakwood. An abundant supply has thus been obtained and collected in a concrete collecting-tank, and brought by a line of 3in. cast-iron pipes by gravitation a distance of over one mile to an underground concrete arched reservoir at East Oakwood, holding 36,000 gallons, and thence distributed where required. The exploring for the water was done by day work, and the remainder of the work has been carried out by Mr. Gustavus Bailey, contractor, of Newcastle. The work was inspected by Mr. John Nixon, sen., of Grottington, and the designing and the carrying out of the work has been done by Mr. Edward Brown, C.E., of Newcastle-on-Tyne.

LEGAL INTELLIGENCE.

In re T. W. Lacey.—On the 3rd inst. a receiving order was made by the County-court judge, at Rochester, in the case of T. W. Lacey, described as of Rochester and London. On the same day a receiving order was also made against the debtor by the London Bankruptcy Court under another petition. The first meeting of creditors under the latter proceedings was held on the 21st inst., before Mr. H. Brougham, Official Receiver. The debtor commenced business in or about 1867 with a capital of from £500 to £600. He estimates his present unsecured indebtedness at about £300, the value of the assets not being given. Mr. Amery Parkes, who attended as solicitor on the debtor's behalf, said that matters were somewhat complicated, but an application had been made to Mr. Justice Wright, who ordered that the proceedings under the two receiving orders should be consolidated and transferred to London. The debtor's accounts were not yet ready, but if an adjournment were granted, he hoped by the next meeting to be in a position to bring forward a proposal having for its object the payments of the debts in full. The assets were amply sufficient to cover all the liabilities, and there would be no necessity for an application for adjudication. The proceedings resulted in an adjournment being taken until January 11th next.

Aberavon Ancient Lights Case.—In the Chancery Division of the High Court of Justice on Dec. 21, Mr. Justice North delivered his reserved judgment in the action of "Jones v. Jones," by which Mrs. Elizabeth Goodall Jones sought an injunction to restrain the defendant from so building at the rear of the Bear Inn, Aberavon, as to darken or obstruct those windows of her house in High-street, Aberavon, as overlooked Snell's-lane. Mr. Justice North, in delivering judgment, said there was no doubt that the windows in the plaintiff's old house were ancient lights. In 1889 that old house was pulled down, and in 1891 a new building was erected which was considerably higher than the old buildings, and would interfere with the lights of the houses on the opposite side of Snell's-lane more than the old buildings would have done. In erecting the new building no attention was paid to the position of the windows in the old. There was considerable controversy as to the accuracy of plans, and he must come to the conclusion that the plan upon which the plaintiff based her case was not proved to be accurate, and was not a plan upon which he could act, and that the evidence was of such a nature as made it absolutely impossible to say now what the accurate lines were. It was therefore quite impossible for him to grant an injunction in general terms which he could not possibly enforce. The plaintiff's case therefore failed, and the action must be dismissed with costs. Mr. Vernon Smith, Q.C., asked for an inquiry as to what damage the defendant had suffered by reason of an undertaking given by him not to proceed with his building until the action had been tried. Mr. Justice North directed an inquiry as to what sum the plaintiff ought to pay in respect of the damage the defendant had suffered by reason of the undertaking, the costs of the inquiry to be reserved.

In re Francis Morton and Co., Limited.—At a meeting of creditors held at the Law Association Rooms, Liverpool, on Tuesday, December 21st, 1897. Present: Mr. Eshelby, in the chair; Messrs. Hewlett, Dodds, Wright, Henderson, and Hall (committee), and 51 other creditors. The Chairman explained what had taken place since the date of the last meeting on the 5th August, 1897, and gave an account of the course of the negotiations, and of

their present position. He then gave an epitome of the statement of the company's assets and liabilities at the date of the latest stock-taking, and also communicated to the meeting the views of the representatives of the debenture holders as to the course they would feel called upon to adopt unless negotiations for the sale of the business, as a going concern, were shortly successful. Mr. W. H. Hewlett (The Wigan Coal and Iron Company) and Mr. James Dodds (The Pearson and Knowles Coal and Iron Company) spoke for the committee of creditors, and confirmed what Mr. Eshelby had told the meeting, and expressed the desire of the committee to be discharged. It was moved by Mr. J. G. Wright (Messrs. Isaac Jenks and Son), seconded by Mr. W. T. Millett (Messrs. James Watson and Co.), and resolved that the chairman be requested to arrange, if possible, with the debenture holders to continue the works and business of the company for, say, twelve months, in the hope that the works and assets may be sold as a going concern, the meeting being of opinion that such a course would be greatly to the advantage of the creditors, and would not be detrimental to the interests of the debenture holders, they being secured. A vote of thanks was unanimously accorded to the committee of creditors for their services. The Chairman said he proposed to summon the creditors again in about three months' time, unless special circumstances required an earlier meeting.

CHIPS.

The Maidstone typhoid epidemic is to be made the subject of a public inquiry by the Local Government Board. The date for the opening of the inquiry is not yet fixed. Up to the present time there have been just 1,897 cases in the town.

On Friday afternoon a special service was held at the parish church, Kidderminster, to commemorate the 50th anniversary of the restoration of the building, and to dedicate the memorial windows to the memory of the late Bishop Claughton, who for twenty-five years was vicar of Kidderminster before being consecrated ninety-seventh Bishop of Rochester. The memorial windows are the work of Messrs. Hardman and Co., of Birmingham. All the clerestory windows have been filled with stained glass, the series representing the canticle "The Benedicite." In each light is the figure of an angel holding an emblem of the "Works of the Lord." The figures, in alternate groups of ruby and blue, are clothed, with white and gold wings.

According to the returns presented to the city council of Inverness, £104,790 has been expended in building work in that city during the past year. The year 1896 gave a total of £90,000 in round figures, so that 1897, with £15,000 more, has come up to the highest expectations. Work has proceeded uninterruptedly and harmoniously as between employers and men, and the year closes with good relations between them.

A further step towards the restoration of the parish church of Keyston, near Peterborough, has just been completed by the repair of the roofs of the south transept and south aisle. The principal timbers have been restored in oak, following the lines of the old work, and new lead has been substituted for the old, which had become very defective. The work has been carried out by Mr. Pettitt, of Thrapston, under the superintendence of Mr. H. M. Townsend, architect, of Peterborough. The previous restoration of the spire and new roof were also executed under the advice of the same architect. The church was reopened last week.

A memorial, erected by Churchmen in the diocese of Connecticut, has been placed upon the wall of Marischal College, Aberdeen University, facing the place where Bishop John Skinner's old house stood, in which Seabury was consecrated, November 14, 1784. The memorial was specially designed by Messrs. Whitehead, of Aberdeen and Westminster, the style adopted being that of the building. The material used in its construction is polished grey Aberdeen granite. A cill, with jambs and head, incloses a recessed panel, the head of which is formed into a Perpendicular arch with spandrels, the feature of one being the sacred monogram, and of the other the budding staff. Within the arch, and above the inscription, is a mitre and ribbon in bronze. Beneath the inscription is another bronze representing the arms of the State of Connecticut. Both the bronzes are in high relief.

The Rev. Thomas Loxham, for the past 47 years rector of Great Lever, a township which adjoins Bolton, has intimated his intention to give £12,000 for a new church and schools in Rishton-lane, a populous part of Great Lever.

With a view to affording relief during floods in the neighbourhood of Maidenhead, the Thames Conservators have completed the enlargement of the tumbling bay at Bray weir. The crest of the old tumbling bay has been lowered 2ft. 9in., and an additional length of 50ft. of overfall has been made. These works provide 467sq.ft. of extra waterway for flood discharge at the weir.

Our Office Table.

Another old English room has been set up in the Western Arcade of the South Court of the South Kensington Museum by the side of the "Inlaid Room," from Sizergh Castle. It is from an old house, now pulled down, at Bromley-by-Bow, and belongs to the early years of King James I., the date, 1606, having been carved on the outside of the house. The spacious stone fireplace has over it an elaborate mantelpiece in oak with the Royal Arms very boldly carved. Specimens of furniture of the period have been taken from the museum and arranged in the room, in order to give it a furnished aspect. The rooms in the picture galleries formerly given up to the pictures of the Chantrey bequest, now removed to the Tate Gallery, have been hung with water-colour paintings, which were previously on screens. The arrangement of two rooms in the Cross Gallery connecting the Indian Section and Science Collections has now been completed. The first room, on descending the staircase, is devoted to Cairene art. In the second room are textile fabrics and embroideries from various parts of the Turkish Empire. On the ground floor of the Indian Section an important addition has been made to the plaster casts by a collection of details from the palace of the great Akbar, at Fathpur Sikri, near Agra.

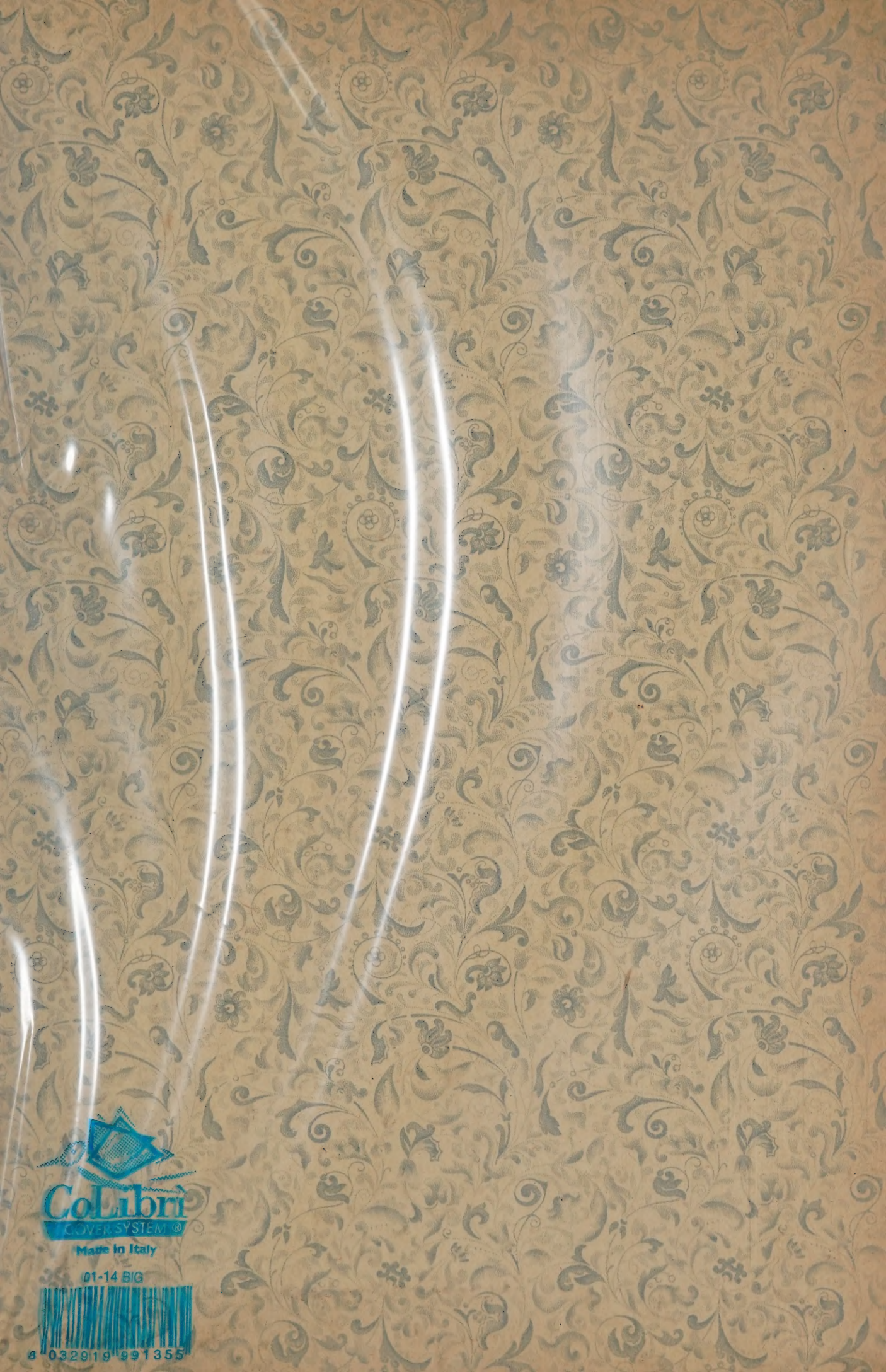
The City Commissioners of Sewers have addressed a letter to the Improvement Committee of the London County Council, stating that they have had under consideration the question of proposed street improvements in Cripplegate, where so many buildings were recently destroyed by fire. In a report upon this matter the Improvement Committee state that they had had a conference with a deputation from the Finance and Improvement Committee of the Commissioners, who had laid before them plans showing proposals for the formation of a new east and west thoroughfare directly connecting London-wall with Smithfield, and passing through the district affected by the fire, and also a new street passing from Redcross-street to Falcon-street by way of Hamsell-street. It would be apparent, however, that these proposals did not provide for such a rearrangement of the narrow streets on the area affected by the fire as would prevent the recurrence of a great conflagration, and the proposals, therefore, in their present form did not commend themselves to the committee. The committee have replied to this effect, and are awaiting a further communication on the subject from the Commissioners.

The Housing of the Working Classes Committee of the London County Council has presented a return showing the receipts and expenditure for the year 1896-97, in respect of all workmen's dwellings and model lodging-houses erected or owned by the Council. The balances brought forward from 1895-96 disclose a deficiency of £769, and at the end of March, 1897, the termination of the Council's financial year, the committee find themselves with a further deficiency of £1,186, making a total charge on the rates of £1,955. The committee anticipate better results in future, and state that for various reasons the accounts for the past year cannot be taken as a fair indication of the financial results of the Council's housing policy. The Boundary-street, Whitechapel, scheme, the largest work in housing the working classes which the Council has yet undertaken, shows a satisfactory result. In all 10 blocks of dwellings are now opened on the site, some of them only as recently as March last, and the accounts so far as it has been found possible to balance them, exhibit a surplus of £33. The committee, however, expressly state that it is impossible to say from this account what may be the effect of the scheme as a whole. The accounts in respect of Beachcroft Buildings, Brook-street, Limehouse, exhibit a deficiency of £120, and when the whole of the capital charges are brought into account, the committee think that £150 will represent the probable annual deficiency in respect to these buildings. The Council's model lodging-house in Parker-street, Drury-lane, shows, as it did in the previous year, a substantial surplus in working, and in this field the Council appear to have a large, useful, and profitable opportunity of using its powers under the Housing of the Working Classes Act, 1890.

Mr. C. G. Mott, the chairman of the City and South London Railway Company, calls attention in a letter to the Press to the rapid extension of underground electric railways in London. At present, as he says, all these railways have to be constructed under the lines of the existing streets, in order to avoid payment for the use of the subsoil; but in many instances it would conduce to the public advantage if the railways could be constructed in more direct lines under private property. This was recognised by a joint committee of both Houses of Parliament to which the question was referred several years ago, and upon their recommendation powers have since been granted authorising the railways in these cases to take an easement only, instead of being compelled to purchase the property on the surface. Considering the great depth at which these railways are constructed (generally from 70ft. to 90ft. below the surface of the ground), the value of this easement is, according to Mr. Mott, exceedingly small; but the number of separate properties under which the line in such a case would pass is so great, that the legal expenses involved in settling the amount to be paid and obtaining a separate conveyance in each case are such that, at present, the passing under private properties for any distance is not practicable. As the value of the subsoil at that depth is the same all over the Metropolis (since it can never be used in connection with the surface property), could not, he asks, Parliament fix some uniform sum to be paid for it, and so avoid the enormous legal expenses involved?

The Middlesex County Council have deposited a Bill for next Session by which Parliament will be asked to sanction a long series of enactments for the purpose of preventing the pollution and obstruction of the waters of the river Brent and of all other streams within the county. The preamble states that these waters are so polluted as to cause a nuisance and endanger the health of residents in the vicinity, whilst the Rivers Pollution Prevention Act is too restricted to enable the council to take effective action. It is, therefore, proposed, by the clauses, to allow the council to fix a standard of purity, with powers to enforce the same "by all lawful and proper means." The powers embrace dredging of rivers and streams, shortening bends so as to improve the scour, the stopping up of outlets of sewers, and power to prohibit the passing of any matter or liquid into the waters which might lead to pollution. The Bill also proposes to empower the council to advance money to local authorities and to take over the management of main roads from the district councils.

The 29th annual feast to 72 aged craftsmen and their wives at Exeter was held at the Luckie Horseshoe Studios, in that city, on Christmas Day. Mr. Harry Hems, as usual, occupied the chair, and Mr. Greville C. Hems the vice-chair. The meal consisted of hot joints, geese, plum pudding, washed down by a plentiful amount of Bass's beer. After dinner the family and historical old punchbowls were introduced, together with churchwarden pipes. During the afternoon the happy party was joined by the Lord Bishop of Exeter (the 61st bishop of that diocese) and his chaplain, Alderman Pople (third mayor of Exeter and the 698th mayor by succession), the mayoress, the sheriff, the town clerk, the chief constable, and several city councillors and guardians of the poor. The Loving Cup (a relic of 1861, when Mr. Hems won it as champion long-distance runner (amateur) of Yorkshire) was passed around, and many happy speeches followed, health and continued prosperity to Mr. Harry Hems and his family being proposed by the popular mayor in most felicitous terms. A capital tea was duly served, and ancient dances and songs followed. Just as "Roger de Coverley," footed by the ancient ones and the hosts together, was concluded, the bell (Peter) in the adjacent cathedral struck the hour of midnight. Then "Auld Lang Syne" was somewhat reluctantly sung, and on the guests leaving, each was presented by their hosts with a new Jubilee shilling, a pound of plum-pudding, and half a pound of tea. On Monday evening some four score orphan children were entertained to a high tea at the studios, followed by a magic lantern, dancing, &c., whilst an immense Christmas tree had its splendid crop duly divided between the delighted little folk. Whether the ancient ones or the fatherless children were the most delighted it would be hard to say. As for the hosts, we know their enjoyment was thorough.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